

# Establishing SERCOS Japan

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## 1. Introduction

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Sanyo Denki was the first servo actuator manufacturer to announce an "open architecture declaration (multiple interface declaration)" in November, 1996.<sup>(1)</sup>

In 1997, we introduced FA open architecture controllers "S-MAC".<sup>(2)</sup> To further promote open architecture, we have since developed "PZ-W" series of servo amplifiers with SERCOS support,<sup>(3)</sup> as well as servo actuators with DeviceNet support.<sup>(4)</sup>

SERCOS Japan was founded on June 17, 1998 with the mission of promoting SERCOS in Japan, and Sanyo Denki was one of the original founders who helped set up SERCOS Japan. This paper gives an outline of SERCOS Japan.

First, we will discuss the historical background behind the establishment of SERCOS Japan.

For many years, interfaces between NC devices and servo amplifiers had been analog, with the possible exceptions of private digital networks from some manufacturers.

In order to solve this problem, in 1989, NC control device manufacturers, servo amplifier manufacturers and motor manufacturers in Europe proposed and introduced an open digital interface standard called SERCOS at a European machine tool trade fair, EMO '89.

In the following year, Fordergemeinschaft SERCOS Interface e.V. (FGS), currently called Interests Group SERCOS Interface e.V. (IGS), was founded for specifying, standardizing and providing technical support for SERCOS. Then in 1994, to promote SERCOS in the United States, SERCOS N. A. was established.

Meanwhile in Japan, SERCOS had become increasingly promising with the appearance of PC-based controllers and strong requests from users. With this background, SERCOS Japan was founded through a major joint effort.

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## 2. Mission and Activities of SERCOS Japan

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The mission of SERCOS Japan is to establish business plan for publicizing and promoting SERCOS in Japan. It is operated to realize these targets. Operation includes the following activities :

- (1) holding periodical conferences,
- (2) providing SERCOS information via the web,
- (3) participating in conferences held by IGS and SERCOS N. A.,
- (4) dispatching groups to inspect cases of SERCOS application, and
- (5) preparing for domestic qualification procedures.

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## 3. Organization Outline of SERCOS Japan

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In the organization chart of SERCOS Japan, Prof. Wada from Setsunan University serves as the President, while Mr. Haraguchi from Digital Engineering and Chief Editor of Nikkei Business Publications heads the Steering Committee (Director-General).

The remainder of the organization is as follows.

- (1) Members and Steering Committee: Members include Official Members, Associate Members who participate mainly in conferences, and Private Members (students and researchers). The Steering Committee consists of 3 to 5 Members selected by the Members themselves. The Steering Committee manages the association (makes decisions and executes plans). The term of service is 2 years for Committee persons and 3 years for the President.
- (2) Meetings: SERCOS Japan holds an annual general meeting, and the Steering Committee may decide to convene extraordinary general meetings if required. As a general rule, general meetings are held on the same day as conferences.
- (3) Conferences: At present, conferences are held twice a year. Official Members, Associate Members, Private Members, IGS members, SERCOS N. A. members and any individuals permitted by the Steering Committee may participate in these conferences.
- (4) Exhibition: The steering committee arranges exhibitions.
- (5) Publishing: Materials are published in principle via the web. The Steering Committee decides whether to publish materials such as the proceedings of the conferences. The web site is at <http://www.sercos.or.jp> (under construction).
- (6) Membership fee: Membership fees are collected from Official Members, Associate Members and Private Members.
- (7) Others: At present, the address of the association is an editorial room of Digital Engineering, Nikkei Business Publications.

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#### 4. Structure of SERCOS Japan

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The structure of SERCOS Japan is illustrated in [Fig. 1](#). The President is at the top, and the rest consists of the Steering Committee and the Members. The Steering Committee consists of the Director-General, the Working Group and the Editorial Committee.

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#### 5. Contributed Papers for the Establishment meeting

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Following are papers that were received for the establishment meeting of SERCOS Japan, and are printed here with the permission of SERCOS Japan.

**Mr. Hideyuki Hayashi**

Director, IMS Center

Manufacturing Science and Technology Center Foundation

Taking this opportunity, I am indeed grateful to all those who have helped establish SERCOS Japan to serve as an information hub in Japan.

Today, the domestic manufacturing industry is coming to a clear turning point due to massive changes in the social economic environment and international environment. At this juncture, production systems must provide a cost-effective, multi-vendor environment as well as a flexible, advanced system that is quick and easy to set up and modify. Progress in information technology has been remarkable, greatly influencing production systems as seen in the case of personal computers being installed at production sites. On the other hand, in the OA field,

opening up of information technology has advanced. Now, a single PC can be connected to PCs worldwide via the Internet.

Indeed, production related machines have greatly benefited and have basically advanced from the progress in information technology. However, because such advancement has been largely due to the progress in technology specific to each manufacturer, setup and modification of a system had to be dealt with individually by the corresponding manufacturer, with promptness and simplicity not adequately addressed.

For this reason, in 1996, our foundation established the Japan FA Open Systems Promotion Group, involving the participation of various companies. This group is actively involved in the application of open information technology to production fields while developing new technologies in production equipment, data representation and systems, in order to realize universal infrastructure technologies in an open architecture environment.

SERCOS Japan is now working on the interfaces between various controllers and servo motors, which are closely related to our business fields on promoting open architecture. Because standardization in this field has been slow, we appreciate the fact that SERCOS is promoting the IEC standardization activity and making its specifications public. However, one problem is that there are numerous specifications in this field and that none of them have come into wide use as yet at present. For this reason, it is very important to understand the users' needs and to specifically show them the convenience and merits of using SERCOS, as well as its performance and functions.

I believe that open architectures in production systems will greatly strengthen the infrastructure in the manufacturing industry in Japan. I hope that open architecture in the field of production technology will grow and become more widely understood through the activities of SERCOS Japan.

**Mr. Wilhelm Blumlein**  
President, IGS

I congratulate you on your decision to establish a promotion society SERCOS in Japan.

The definition of goals, which are of importance for the user of SERCOS drive interfaces is an essential condition for the success of this job. All competition considerations of the members against each other should be unimportant. That is easier said than done. When we look back on the beginning of IGS in Germany, this willingness of cooperation was forced by a number of technical problems and organizational questions, arising after the first formulation of the standards, which were impossible to foresee at the beginning. Each member realized that each party will benefit from best possible results from a common work on the interface.

This resulted in a successful cooperation with the unwritten law, that while presenting SERCOS on exhibitions and meeting, all members will put the promotion for their products aside for the common efforts for a worldwide unique and standardized drive interface. During the lectures and discussions SERCOS is of first important : the presentation of the products should be a functional example only.

We will not conceal that there were also causes of friction during the development, which were quite expensive for the individual companies, and that some of them had not the necessary patience to hold out until the ISO standard was realized. But it is positive that some of them decided in a participation again.

**Prof. Ryuji Wada**

President, SERCOS Japan

Department of Industrial and Systems Engineering, Faculty of Engineering  
Setsunan University

Despite much concern at present, we should not be overly pessimistic about the future. For example, the progress in open NC has greatly improved network-oriented digital production machines, heralding a new era in production systems in combination with network computers. In terms of system innovation, as the functions of one constituent unit advance, other constituent units must follow, resulting in modification and integration of technologies. Beyond a certain point, changes in the system become qualitative as the whole system is redesigned.

This situation applies to the whole movement toward FA open architecture. It is inevitable in today's information age that a system will become more complicated before it becomes simple again, and I believe that new economic values based upon information and knowledge lie within such changes.

Such information and knowledge, in addition to the general accumulation of software and information expertise, will strengthen the infrastructure of the production industry of the future. "The new context" in the production industry depends on the new values realized through the effective application of massive intellectual assets and resources that become available through networks.

For this reason, the strategic meaning and importance of open systems in the production industry will continue to grow.

The key phrase representing global trends in various fields in the 21st century is indeed "open architecture".

The production industry itself has reached a major turning point as production systems must now address the issue of how goods should be produced in modern society. I believe that open systems are the ultimate global standard that the production industry is striving for.

One step in the promotion of the open network is the promotion of the SERCOS open motion network, and I have been asked to serve as the first president of the association charged with this task. Since I have been involved in FA open architecture work such as MAP and OSEC, I decided to accept the position but only to help ensure a successful foundation.

I accepted the position not because I felt that SERCOS is today in its ideal form, but because I wanted to take part in the formation and modification of the base that SERCOS constitutes. I would like to objectively analyze why SERCOS has been slow to spread, even though it was standardized by IEC more than 10 years ago, and why numerous similar motion networks have appeared. The great mission of SERCOS Japan, the third SERCOS association and the first one in Asia, is to develop the core of an open architecture that will benefit both manufacturers and users.

There is an old Chinese saying, 'Start with yourself'. Rather than numerous fruitless discussions, it is more constructive to reach specific milestones in open architectures. We must join hands and start with ourselves.

Lastly, I would like to sincerely thank Mr. Yamamoto, President and C.E.O. of Sanyo Denki, who responded diligently to the various requests from SERCOS IGS in Germany, as well as all the staff especially Mr. Nakata, Director of Sanyo Denki, who drew up the plan for establishing SERCOS Japan.

I will do my best to cooperate fully with all the associations and manufacturers involved as well as with SERCOS Japan Members and the Steering Committee in order to promote the open architecture movement in the FA industry of Japan.

I would greatly appreciate your continued understanding and generous support.

**Shigeo Yamamoto**  
President and Chief Executive Officer  
Sanyo Denki Co., Ltd.

Since the economic bubble burst, Japan has been mired in deep recession as never before. This has been a turning point, with the ways of the world and sense of value changing.

Issues that used to be closed, private or dedicated are now being made open, public or shared.

Liberalization of trade and markets, changing attitudes toward procurement by companies, distribution of information by public offices and companies, movements toward open architecture in computer systems, and the sharing of information in networks all are part of this tremendous sea change.

And because these changes are toward what is more fair, more economical and most of all, what people want, the pace of change is accelerating.

People in the industrial world like ourselves welcome such change, strongly believing that it is our mission to build new values that are more beneficial to the users.

Developments in our industry such as NC control machines, servo amplifiers, motors and sensors should follow the flow of these changes.

Nowadays, to realize the optimal system for an application, the user must be able to freely choose the best components from among various manufacturers. This will lead to true customer satisfaction.

I would like to point out that products from all over the world are already being supplied to other countries around the globe, and it is uncommon for one industrial product to be manufactured from components from only one country. Furthermore, the manufacturing equipment used to manufacture industrial products is also being supplied from many countries.

Under these circumstances, worldwide standards such as IEC61491 will become very important. Companies and industries worldwide must accept and participate in such standards not only because it is advantageous for business but also because it is mandatory for progress in the industry.

In 1989, various manufacturers in Europe developed and presented an open digital interface standard, SERCOS, in order to solve the problems regarding interfaces between NC control machines and serve systems.

Then, one year later, in order to define the specifications, promote and provide technical support for SERCOS, FGS (currently IGS) was founded. In 1994, to promote SERCOS in the United States, SERCOS N. A. was established.

And finally, thanks to the hard work of all those concerned and with the consent of SERCOS IGS Germany, SERCOS Japan has been established.

In carrying out our various missions around the world and in contributing to the progress of the industry, I am sure that SERCOS Japan will play an essential role.

Once again, I deeply thank all those involved in the establishment of SERCOS, and I sincerely hope that the future of industry as well as SERCOS Japan will be a bright one.

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## 6. Conclusion

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Japan has lagged behind Europe and the United States in the field of FA open architecture. Especially in the field of motion control networks, analog networks and manufacturers' own digital networks have prevented networks from being open.

Today, SERCOS Japan has been established with 39 companies registered. The

movement toward open architecture in Japan in the motion field will thus surely accelerate.

Sanyo Denki markets "FA Intelligent Systems" consisting of such key products as Industrial PC "S-MAC PC", full-software control language "AML", and "PQ", "PZ" and "PV" amplifiers that offer network support. As a member company of SERCOS Japan, we will be promoting the FA open architecture and SERCOS in response to the voice of users.

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## References

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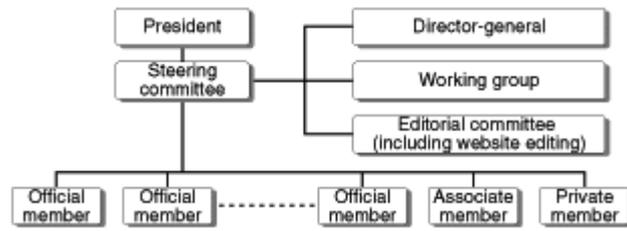
## Toshirou Tani

Joined company in 1969.

System Realize Division

Worked on user-oriented engineering after working on the design and development of servo systems.

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**Fig. 1. Structure of SERCOS Japan**