AC Servo Amplifier "SANMOTION R" Series with Built-in SynqNet Interface

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1. Introduction

The FA market is currently experiencing a rising demand for AC servo amplifiers compatible with the SynqNet interface, and every company is bringing products that meet this demand to market. SynqNet is a motion control network developed by Danaher Motion. Our company was also interested in AC servo amplifiers compatible with SynqNet. As the next step after our conventional network products with SERCOS, DeviceNet, and CANopen interfaces, we developed products with built-in SynqNet.

This document introduces descriptions and features of the AC servo amplifier "SANMOTION R" Series with built-in SynqNet interface.

2. Background of the Development

There has been a movement to replace systems that use SERCOS and DeviceNet with systems that use SynqNet.

For networking products, the network-type of the host controller selected inevitably limits the network-type of the servo amplifier that can be used. This is why rapid development of an AC servo amplifier with built-in SynqNet interface is a must.

3. Specifications
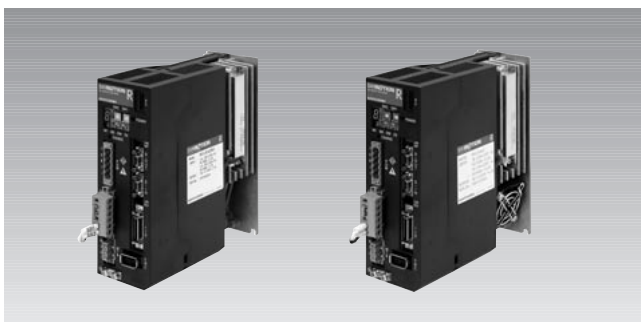
Fig. 1 shows a photograph of the product.

Fig. 1   AC servo amplifier "SANMOTION R" Series
with built-in SynqNet interface

3.1 Amplifier specifications

Table 1 outlines specifications of the product.

• Product lineup

Single-phase 200 VAC input, Capacity: 15 A, 30 A

• Compatible with SANMOTION P, Q, and R Series motors

• Compatible sensors

Wire-saving incremental encoder

Optical absolute encoder

Table 1   Specifications

	Model No.	RS1L01AZ	RS1L03AZ
Input voltage	Control power	Single-phase 200 to 230 VAC, +10 %, -15%, 50/60 Hz ±3 Hz	
	Main circuit power	Single-phase 200 to 230 VAC, +10 %, -15%, 50/60 Hz ±3 Hz	
Environment	Ambient temperature, humidity	Temperature: 0 to 55°C, Humidity: 90% or lower (No condensation)	
	Storage temperature, humidity	Temperature: -20 to 65°C, Humidity: 90% or lower (No condensation)	
	Altitude	Less than 2000 m above sea level	
	Vibration	0.5 G frequency range 10 to 55 Hz, 2 hours in the X, Y, Z direction	
	Impact	2G	
Output	Rated current	Same as the SANMOTION R Series	
	Maximum output current	Same as the SANMOTION R Series	
Structure		Tray-type	
Dimensions	Height [mm]	168	168
	Width [mm]	55	55
	Depth [mm]	150	150
	Mass [kg]	1	1.1
Built-in functions	Protection function	Same as the SANMOTION R Series	
	LED indicator	7-segment LED (one)	
	Dynamic brake	Included	
	Regeneration processing	Included (external and internal regeneration resistors)	
I/O signal	Contact inputs (5)	CW limit switch, CCW limit switch, HOME switch, Node disable switch, User0 input switch	
	Contact outputs (3)	Alarm output, Holding brake control output, User0 output	
Communication	PC I/F	SANMOTION R Setup	
	Controller IF	SynqNet	
Motor to combine		Same as the SANMOTION R Series	

3.2 Communication specifications

The basic communication specifications are shown in Table 2.

For an overview of the communications specifications, see the SynqNet home page noted in the Reference section.

The network features include a duplex communication link that allows the network to recognize issues such as disconnected cables automatically.

The physical layer of the network conforms to 100 Mbps Ethernet.

Table 2 General specifications

Item	Specification
Transmission cable	Shielded twisted pair cable
Connector type	9-pin micro D-Sub connector
Physical layer insulation (yes/no)	Yes (Compliant with Ethernet 100baseT)
Interface	MEI Corp, proprietary
Transfer speed	100 Mbps
Transfer distance	Maximum 100 m between nodes
Slave stations	32
Control configuration	Host Master: Position, speed control Servo amplifier: Torque control
Control cycle	8 KHz (125 μS)

3.3 Features and performance

The basic hardware layout includes the "SANMOTION R" Series main circuit and control circuit in addition to a communication interface.

Fig. 2 shows a block diagram that includes control circuit and the communication interface.

(1) Control mode

Torque control mode.

Receives torque commands from the host controller.

(2) Parameter editing

The torque command filter and the torque command notch filter are set using the "SANMOTION R" setup software.

(3) I/O interface

Besides the communication signal, the following I/O signals are used.

These signals are controlled over the SynqNet communications by the host controller.

The host controller also manages functions such as polarity selection and function assignments.

[Contact inputs: 5]

CW limit signal

CCW limit signal

HOME signal

NODE DISABLE signal

General input signal

[Contact outputs: 3]

Alarm signal

Holding brake control signal

General output signal

[External encoder input]

Line receiver input (phase A, phase B, phase Z)

(4) Check terminal

The front of the amplifier has check terminals for analog monitor output and digital monitor output.

The "SANMOTION R" setup software can be used to select the signal that is output on the check terminal.

(5) Maintenance tools

The R setup software can be used by this AC servo amplifier as a maintenance tool.

This software can be used to easily edit parameters, monitor status, trace waveforms, or operate in test mode.

Additionally, the startup assist function, tools, and other functions used on the host controller are available.
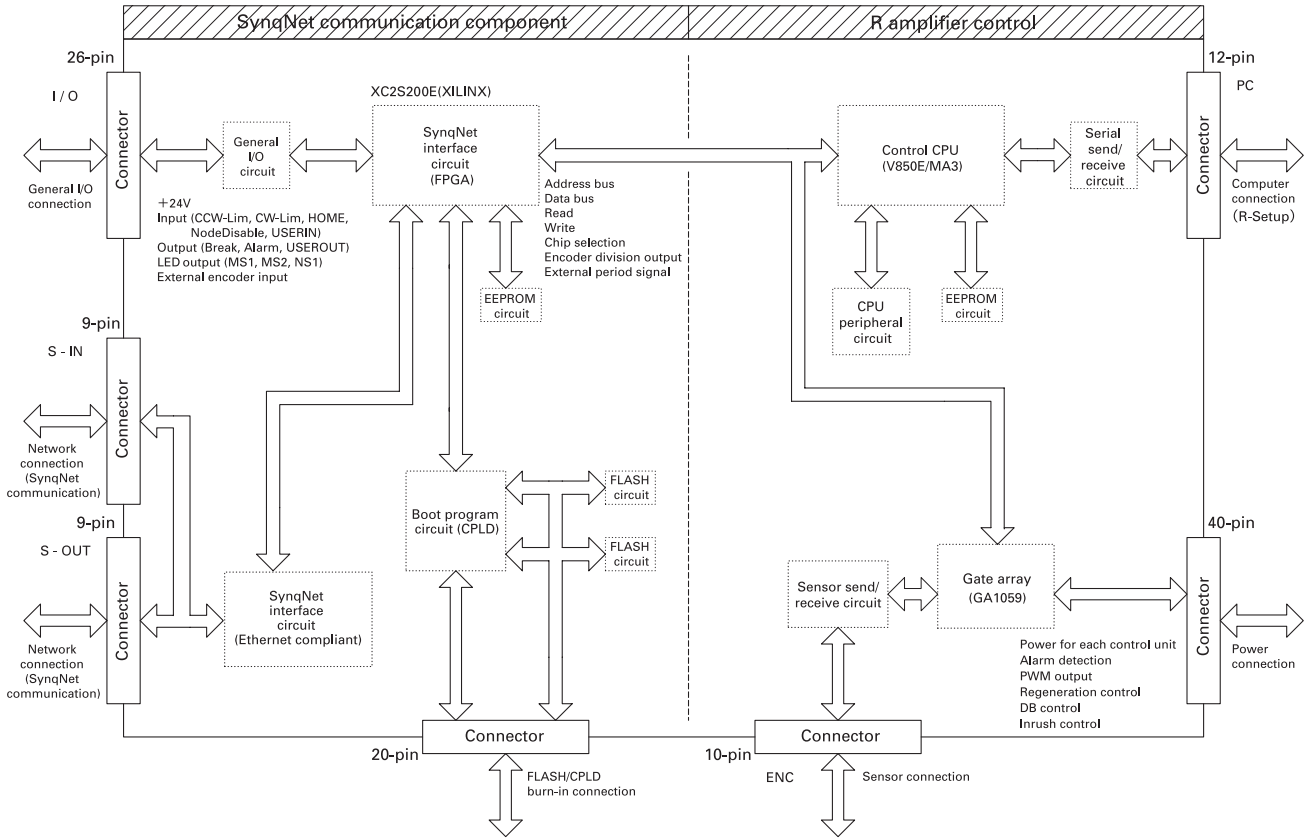
(including Motion Console and Motion Scope).

Fig. 2   Block Diagram

4. Conclusion

We have here presented an AC servo amplifier with SynqNet compatibility that is based on the standard "SANMOTION R" Series and offers the same features and functionality as the original device.

We believe that the SynqNet interface, with its fast Ethernet (100 Mbps) standards compliance at the physical layer and increased stability via duplex communications, will continue to grow in popularity in the future.
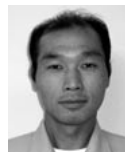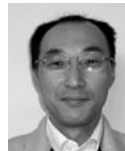
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Reference

(1) SynqNet web site: www.synqnet.org