General Specifications

Model ALE111
Ethernet Communication Module

ProSafe-RS

GS 32Q06K51-31E

[Release 3]

■ GENERAL

This document describes about Model ALE111 Ethernet Communication Module used with a safety control station (SCS) for performing Modbus communication.

By using the SCS's Modbus slave communication function, the data in SCS can be set or referred to by the Modbus master which is as separate system from SCS via a Ethernet communication module.

This Ethernet communication module can be mounted on SSC60□ and SSC50□ safety control units and SNB10D safety node unit that are connected with safety control units by ESB bus.

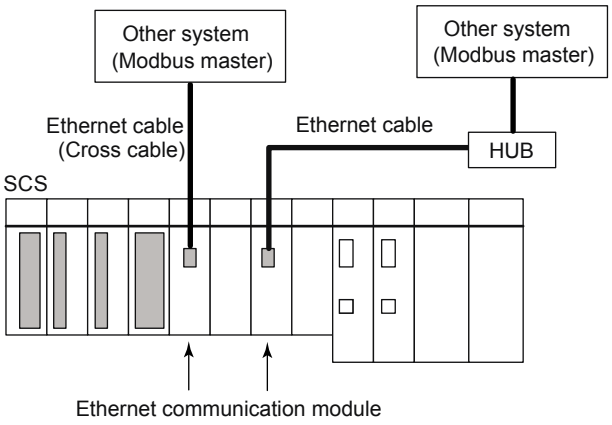

Figure A sample configuration of the Ethernet communication module

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■ HARDWARE SPECIFICATIONS

Hardware specifications of ALE111 Ethernet communication module are as shown below. This module is interference-free module that has no interference with the safety loop.

Table Ethernet Communication Module Hardware Specification

Item	Specifications
Model	**ALE111 (*1)**
Physical layer interface	IEEE 802.3 10BASE-T Half-duplex
Connection method	Point-to-point
Connector	RJ-45
Transmission speed	10 Mbps
Transmission route	100 ohm twisted-pair cable (not shielded)
Transmission distance	1 segment, 100 m (in between SCS and other systems, or SCS and HUB)
Installation method	Mounted on SSC60□, SSC50□, or SNB10D (*2)
No. of ports	One port
Media access control	CSMA/CD
Communication functions	Modbus slave communication function
Current consumption	0.5 A
Weight	0.3 kg

*1: ALE111 style code S1 and unit revision U:2 or later must be used.
*2: SNB10D connects with SSC60□ or SSC50□ by ESB bus.

■ OPERATING ENVIRONMENT

● Hardware Requirements

The Ethernet communication module runs on the following SCS.

SSC60S, SSC60D, SSC50S, SSC50D

● Software Requirements

The Ethernet communication module runs on the control functions on the following SCS. Revision R3.02.00 or later.

CFS1300 Safety Control Functions Package (for SSC60□ and Vnet/IP): for SSC60□
CFS1100 Safety Control Functions Package: for SSC50□

● Engineering Requirements

Engineering work can be performed with CHS5100 Safety System Generation and Maintenance Function Package. Revision R3.02.00 or later.

■ INSTALLATION ENVIRONMENT

CFS1300 Safety Control Functions Package (for SSC60□ and Vnet/IP)

No. of communication module to be mounted	Max. 2 units/SCS (*1) (for Modbus slave communication function)

*1: This is the sum of ALR111, ALR121, and ALE111.

CFS1100 Safety Control Functions Package

No. of communication module to be mounted	Max. 2 units/SCS (*1) (for Modbus slave communication function)

*1: This is the sum of ALR111, ALR121, and ALE111.

■ MODBUS SLAVE COMMUNICATION FUNCTION

Modbus slave communication function enables ProSafe-RS a Modbus communication where an SCS acts as a Modbus slave and communicates with a Modbus master which is a different system from ProSafe-RS.

● Relationship between SCS and Modbus Master

Communication module's definition information, Modbus device addresses, mapping definition of SCS data, and so on are to be downloaded using engineering function of a Safety Engineering Station (SENG).

When a data is sent from an external Modbus master (external device), the SCS's CPU receives it through its Ethernet communication module. The SCS's CPU sends a response message using the Modbus slave communication function to the Modbus master in response to the data request. The SCS Maintenance Support Tool displays error information and notifies the error status using the SCS status display function when an error in the Ethernet communication module and communication content occurs.

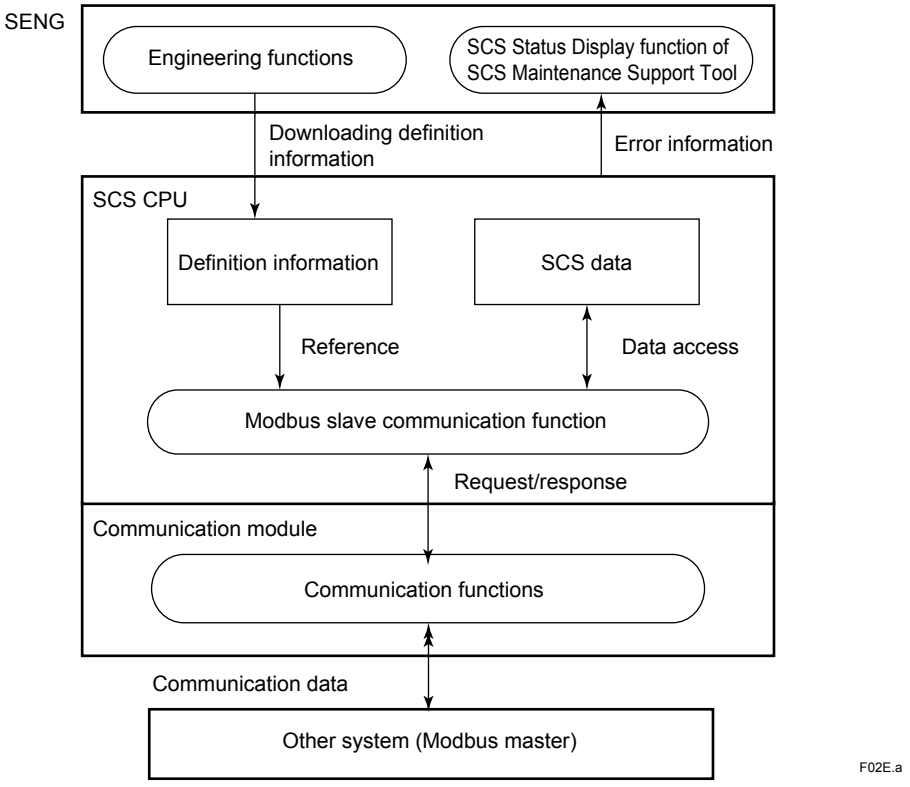


Figure: Flow of data in other system

● Specification of Communication Function

Connection method : Ethernet connection via a hub. Or, with a 10BASE-T connection, a crossover cable can also be used for a peer-to-peer connection without a hub.
Transmission protocol: Conforms to OPEN Modbus/TCP SPECIFICATION Release 1.0, 29 March 1999 Andy Swales Schneider Electric protocol
No. of connection: Max. 2/SCS
Transaction: 1/connection
Communication protocol: TCP/IP

Table List of Applicable Devices

Device type	Device name	Communication capacity (per communication)	Read	Write
Bit device	Coil	32 words	Y	Y
	Input relay		Y	N
Word device	Input register	124 words	Y	N
	Maintenance register		Y	Y

Y: Applicable
N: Not Applicable

● Dual-redundant Communication

The dual-redundant configuration of the network can be available by establishing an independent transmission path from the Modbus master for every two the Ethernet communication modules mounted in the SCS. However, control/stand-by switching function in between the dual-redundant Ethernet communication modules mounted on adjacent slots is not supported.

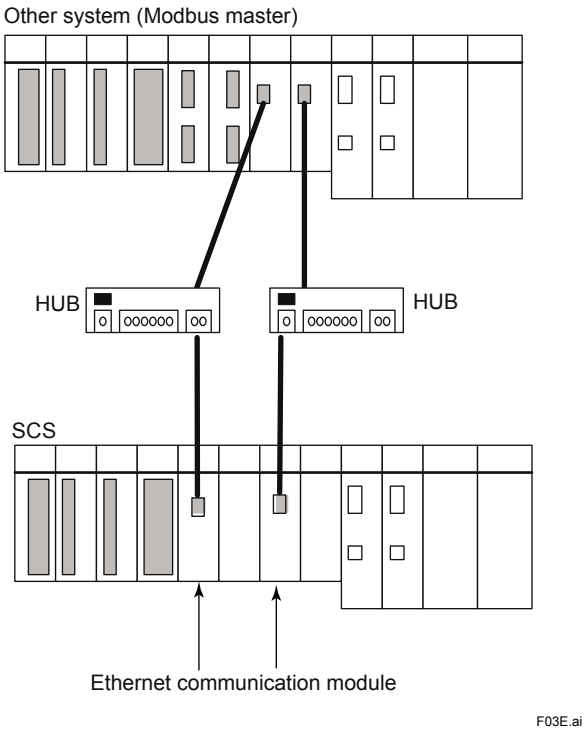
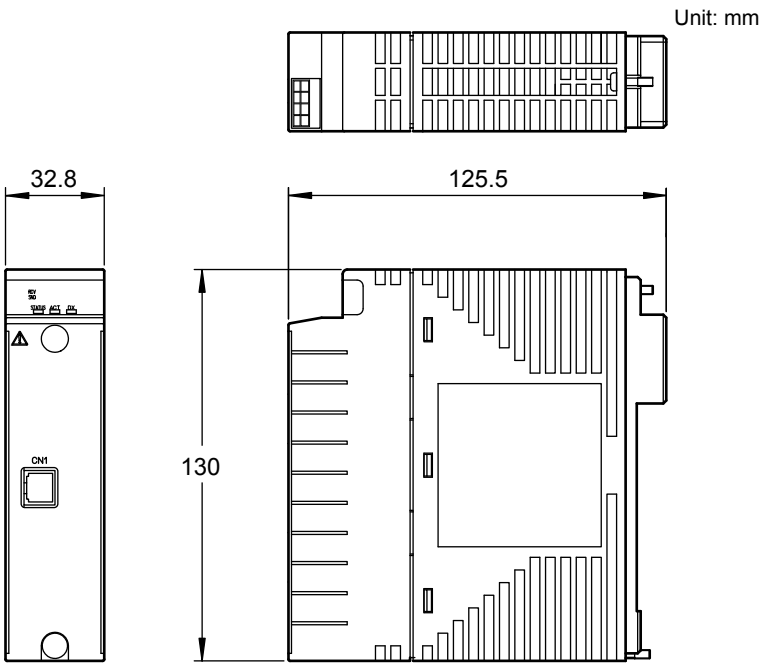


Figure Dual-redundant configuration of the Ethernet communication module (for dual-redundant network configuration)

■ EXTERNAL DIMENSIONS

● **ALE111 Ethernet Communication Module**

Unit: mm



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■ MODEL AND SUFFIX CODES

		Description
Model	ALE111	Ethernet Communication Module
Suffix Codes	-S	Standard Type
	5	With no explosion protection
	E	With explosion protection
	1	With ISA Standard G3

■ ORDERING INFORMATION

Specify the model and suffix codes.
For selecting the right products for explosion protection, please refer to TI 32S01J30-01E without fail.

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