General Specifications

GS 33K50G85-50E

Model ALP121
PROFIBUS-DP
Communication Module (for FIO)

[Release 5]

■ GENERAL

*This document describes about Model ALP121 PROFIBUS-DP Communication Module (for FIO) which performs as the PROFIBUS-DP master device (referred to as the master device) to communicate and exchange data with PROFIBUS-DP slave devices (*1) (referred to as the slave device).*

This PROFIBUS-DP communication module can be mounted on field control units (AFV30□, AFV40□). It can also be mounted on the ESB bus node unit (ANB10□) and the optical ESB bus node unit (ANB11□) which are connected to AFV30□ or AFV40□.

ALP121 style S2 or later has been certified by PROFIBUS Nutzerorganisation e.V. as complying with the PROFIBUS DP-V1.

*1: The PROFIBUS-DP slave devices represent the field bus devices connected to a PROFIBUS-DP communication cable. PROFIBUS remote I/O, PLC, and others are among the PROFIBUS-DP slave devices. HART devices and 4-20 mA analog equipment are connected to PROFIBUS remote I/O. ALP121 module can also be connected with PROFIBUS-PA devices via a PROFIBUS DP/PA coupler and refer to the PROFIBUS-PA device data.

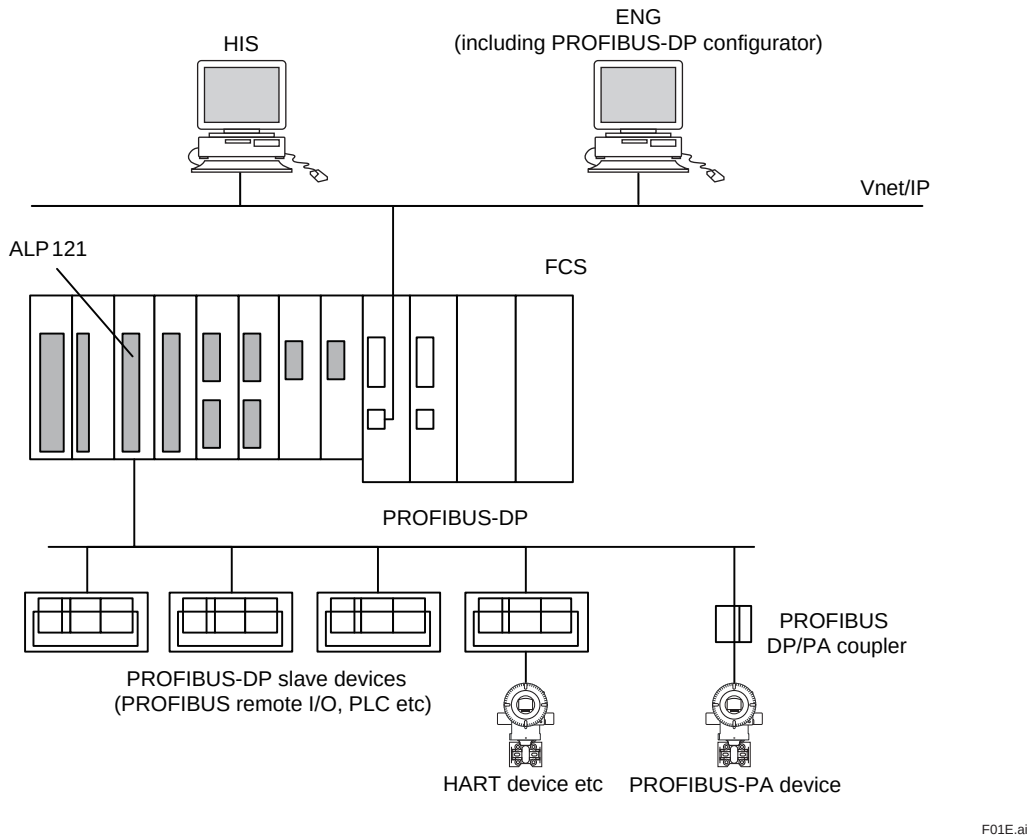


Figure System configuration example

■ HARDWARE SPECIFICATIONS

Hardware specifications for ALP121 PROFIBUS-DP communication module are as shown below.

Table PROFIBUS-DP Communication Module Hardware Specifications

Item	Specifications
Model	**ALP121**
Interface	PROFIBUS-DP
Connection method	EIA-RS-485-compliant
Signal isolation	Isolated between field and the a system
Transmission speed	9600 bps to 12 Mbps
Maximum transmission distance	1.2 km (at the communication speed of 9600 bps).
No. of communication port	One port
Communication port	D-sub 9 pin (female) (*1)
Maximum current consumption	0.7 A
Weight	0.3 kg

*1: The cables, connectors, and terminators must comply with PROFIBUS-DP standards (PROFIBUS Specifications IEC61158-2 type3).

■ OPERATING ENVIRONMENT

Hardware Requirements

This module runs on the following FCS.

AFV30S, AFV30D, AFV40S, AFV40D

Software requirements

This module runs on the following FCS control function of the revision CENTUM VP R5.02 .00 and later.

LFS1700 Control Function for Field Control Station (for AFV30□/AFV40□, Vnet/IP and FIO): for AFV30□/AFV40□

Engineering Requirements

Works on LHS5100/LHMS5100 Standard Builder Function. The Standard Builder Function contains PROFIBUS-DP Configurator dedicated for ALP121.

■ INSTALLATION ENVIRONMENT

LFS1700 Control Function for Field Control Station (for AFV30□/AFV40□)

No. of ALR111/ALR121/ALE111/ALP121/AGS813/AGP813 modules	Max. 8 units/FCS (Max. 4 pairs for dual-redundant operation)
No. of ALF111 modules	Max. 30 units/FCS (Max. 15 pairs for dual-redundant operation)
No. of all the communication modules	Max. 30 modules/FCS (*1)
I/O data capacity for communication	1000 words/ALP121
No. of communication definition	200 definitions/ALP121
No. of communication functions	Max. 8 types/FCS (*2)
Communication I/O data capacity	Max. 8000 words/FCS (incl. data from other communication function)

*1: This is the sum of ALR111, ALR121, ALE111, ALF111, ALP121, AGS813, and AGP813 modules.
*2: This is the sum of communication functions of ALR111, ALR121, ALE111 and ALP121.

LFS1700 Control Function for Field Control Station (for AFV30□/AFV40□) + LFS1750 Node Expansion Package (for 10 nodes)

No. of ALR111/ALR121/ALE111/ALP121/AGS813/AGP813 modules	Max. 16 units/FCS (Max. 8 pairs for dual-redundant operation)
No. of ALF111 modules	Max. 32 units/FCS (Max. 16 pairs for dual-redundant operation)
No. of all the communication modules	Max. 48 modules/FCS (*1)
I/O data capacity for communication	1000 words/ALP121
No. of communication definition	200 definitions/ALP121
No. of communication functions	Max. 8 types/FCS (*2)
Communication I/O data capacity	Max. 8000 words/FCS (incl. data from other communication function)

*1: This is the sum of ALR111, ALR121, ALE111, ALF111, ALP121, AGS813, and AGP813 modules.
*2: This is the sum of communication functions of ALR111, ALR121, ALE111 and ALP121.

LFS1700 Control Function for Field Control Station (for AFV30□/AFV40□) + LFS1750 Node Expansion Package (for 14 nodes)

No. of ALR111/ALR121/ALE111/ALP121/AGS813/AGP813 modules	Max. 32 units/FCS (Max. 16 pairs for dual-redundant operation)
No. of ALF111 modules	Max. 64 units/FCS (Max. 32 pairs for dual-redundant operation)
No. of all the communication modules	Max. 64 modules/FCS (*1)
I/O data capacity for communication	1000 words/ALP121
No. of communication definition	200 definitions/ALP121
No. of communication functions	Max. 8 types/FCS (*2)
Communication I/O data capacity	Max. 8000 words/FCS (incl. data from other communication function)

*1: This is the sum of ALR111, ALR121, ALE111, ALF111, ALP121, AGS813, and AGP813 modules.
*2: This is the sum of communication functions of ALR111, ALR121, ALE111 and ALP121.

- **Note**

ALP111 and ALP121 cannot be mounted on the same FCS together. An FCS with ALP111 and another FCS with ALP121 can co-exist in a same project.

■ PROFIBUS COMMUNICATION SPECIFICATIONS

● Communication with PROFIBUS Devices

The PROFIBUS-DP device data is stored in the communication modules' I/O image area. FCS accesses the communication module asynchronously from them, and refers to or sets the I/O images. This enables FCS to use the PROFIBUS-DP device data through the I/O terminals of the function block in the same way as the general analog and digital I/O signals.

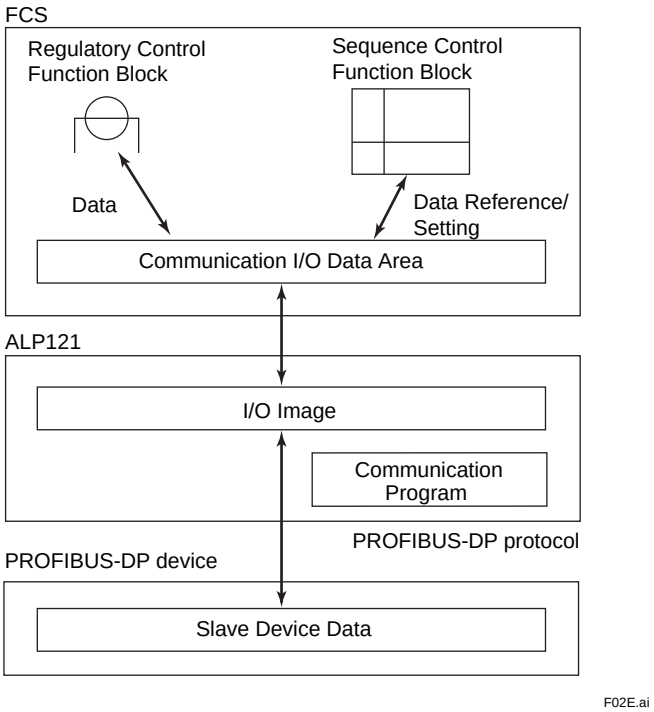


Figure Flow of Data in a Slave Device

Redundancy of Communication

It is possible to make the communication dual-redundant by installing ALP121 modules in an odd-number slot and the next slot (the odd number + 1) of the same node unit. Two types of ALP121 dual-redundant configuration are applicable.

PROFIBUS-DP communication module dual-redundant configuration

Install a pair of ALP121 modules on an FCS to make them work in the same PROFIBUS-DP network. The control side ALP121 module exchanges data with the slave devices. The stand-by side ALP121 module monitors the communication status of the control side ALP121 module.

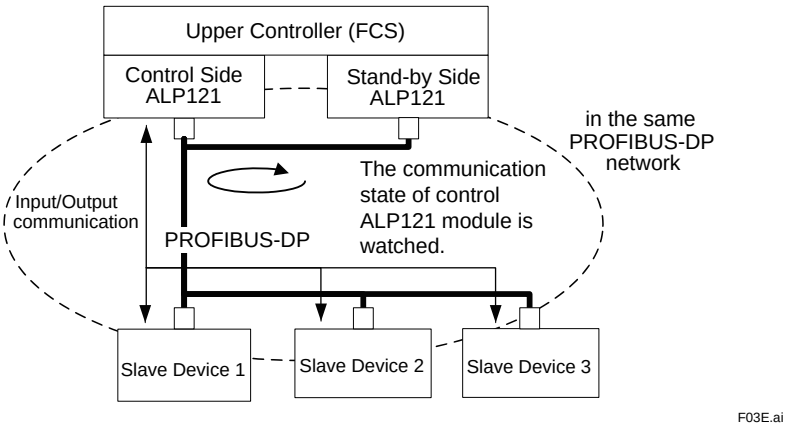


Figure Dual-redundant Configuration of the PROFIBUS-DP Communication Modules (for PROFIBUS-DP Communication Modules Only)

The control of a ALP121 module switches over, if any of the following conditions occur:

- A control side ALP121 module is failed, and a stand-by side ALP121 module is functioning normally.
- All the slave devices connected with control side ALP121 module are in the “not ready” communication status, the stand-by side ALP121 module is in normal, and at least one or more slave devices connected with the stand-by side ALP121 module are detected in the “ready” communication state.

Dual-redundant network configuration

Both ALP121 modules and the communication interface between the PROFIBUS-DP network and the slave devices can also be in dual-redundant configuration. By segmenting the two ALP121 PROFIBUS-DP networks, the network itself can be made dual-redundant. In order to implement dual-redundant network configuration, PNO (*1) dual-redundant slave devices (*2) are required.

A PNO dual-redundant slave device has 2 ports - primary and backup. The control side ALP121 module and the stand-by side ALP121 module are connected to the primary port and the backup port of the slave device respectively.

Two ALP121 modules function as the master device to communicate with slave devices, and exchange data with PROFIBUS-DP slave devices.

The FCS uses the input image data of the slave device acquired from the control side ALP121 module.

The slave device output image data of the primary port is used as the output image data from FCS.

*1: PNO stands for “PROFIBUS Nutzerorganisation e.V”.
*2: PNO dual-redundant slave device is a slave device conformed to the “Slave Redundancy V1.2” specifications issued by PNO.

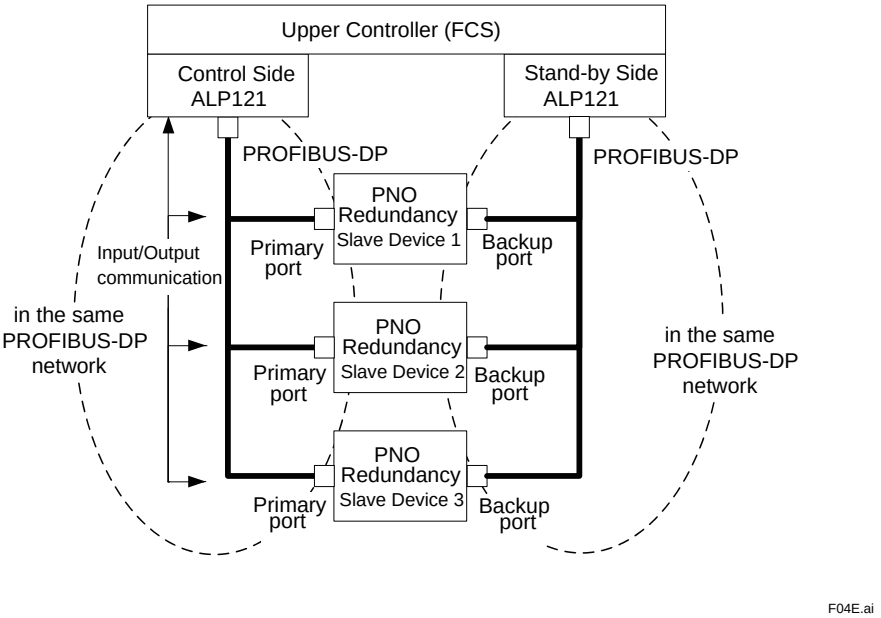


Figure Dual-redundant Configuration of the ROFIBUS-DP Communication Module

The control of the ALP121 module switches over, if any of the following conditions occur:

- A control side ALP121 module is failed, and a stand-by side ALP121 module is normal.
- Eliminate all the slave devices connected with ALP121 from the condition if both the primary and backup ports are in communication failure. Among the remaining slave devices, if there are one or more slave devices with primary port is in communication failure yet the backup ports for all slave devices are normal.

Number of slave devices that can be connected

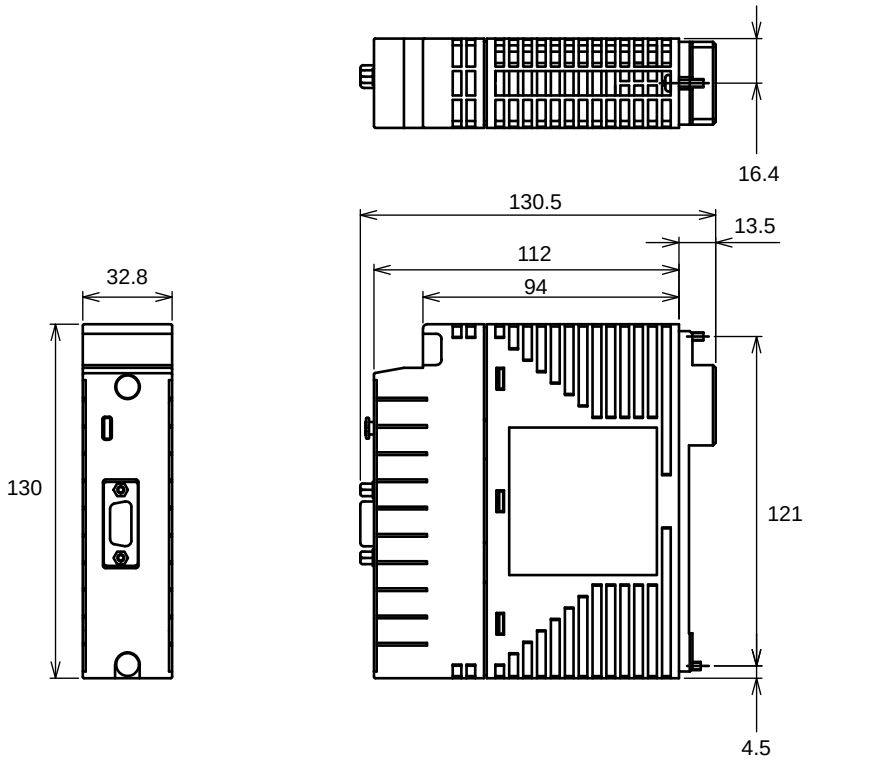
The number of slave devices to be connected with PROFIBUS-DP communication module differs by the module configuration as follows.

Number of connectable slave devices	PROFIBUS-DP communication module is in single configuration. In dual-redundant network configuration (*2)	Without repeater: Up to 31 devices/ALP121 With repeater (*1): Up to 123 devices/ALP121
	In PROFIBUS-DP communication module dual-redundant configuration	Without repeater: Up to 30 devices/ALP121 With repeater (*1): Up to 123 devices/ALP121

*1: The number of repeaters shall be three or less (max. 4 segments).
*2: In the dual-redundant network configuration, the network is divided into two PROFIBUS-DP networks.
The connectable number of slave devices in dual-redundant network configuration is the same as that of slave devices in single PROFIBUS-DP communication module configuration.

■ External dimensions

Unit: mm



■ MODEL AND SUFFIX CODES

		Description
Model	ALP121	PROFIBUS-DP Communication Module
Suffix Codes	-S	Standard type
	0	Always 0
	0	Basic type
	1	With ISA Standard G3 option

■ ORDERING INFORMATION

Specify model and suffix codes.

■ TRADEMARKS

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