

General Specifications

NFLP121 PROFIBUS-DP Communication Module



GS 34P02Q57-01E

■ GENERAL

This General Specification (GS) describes PROFIBUS-DP communication functions and hardware specifications of the module.

The PROFIBUS-DP Communication Module is installed in the FCN and communicates with the devices that have PROFIBUS-DP communication functionality.

For details on FCN-500, see “FCN Autonomous Controller Hardware (FCN-500)” (GS 34P02Q14-01E) and “FCN Autonomous Controller Functions (FCN-500)” (GS 34P02Q03-01E).

For details on FCN-100, see “FCN Autonomous Controller Hardware (FCN-100)” (GS 34P02Q12-01E) and “FCN/FCJ Autonomous Controller Functions (FCN-100/FCJ)” (GS 34P02Q01-01E).

For details on FCN-RTU, see “FCN-RTU Low Power Autonomous Controller Hardware” (GS 34P02Q13-01E) and “FCN-RTU Low Power Autonomous Controller Functions” (GS 34P02Q02-01E).

Notation in this document:

- The term “FCN” refers to the module consisting type autonomous controllers.
- The term “FCN-500” refers to the autonomous controllers with NFCP501/NFCP502 CPU module.
- The term “FCN-100” refers to the autonomous controllers with NFCP100 CPU module.
- The term “FCN-RTU” refers to the low power autonomous controllers with NFCP050 CPU module.

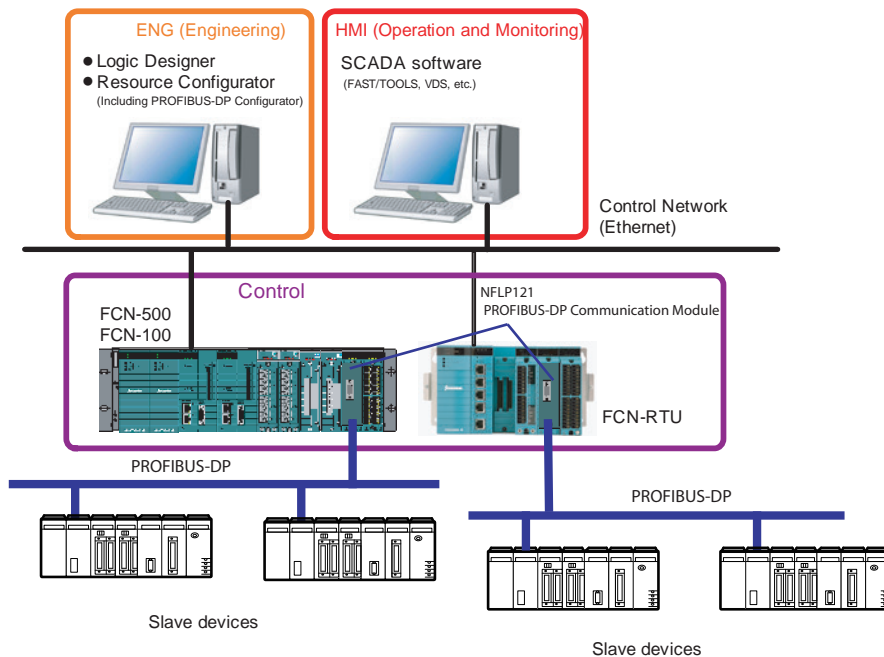
■ FEATURES OF THE PROFIBUS-DP COMMUNICATION

Specifications of the PROFIBUS-DP has been standardized internationally by the association of Profibus, and has been approved in the fieldbus international standard IEC61158 and European standard EN50170.

PROFIBUS-DP has been used for communication with automation systems and distributed devices (remote I/O, inverters, etc.).

■ STARDOM PROFIBUS-DP SYSTEM CONFIGURATION

The figure below shows an example of a PROFIBUS-DP communication system in STARDOM configuration:



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Figure PROFIBUS-DP System Configuration Example

- **FCN (CPU module NFCP501/NFCP502 style S1 or later, CPU module NFCP100 style S3 or later, CPU module NFCP050 style S2 or later)**

FCN controls and monitors slave devices. It collects system alarms and other information from slave devices. Its control and calculation functions allow calculation results to be sent to slave devices.

- **PROFIBUS-DP Communication Module (NFLP121)**

The PROFIBUS-DP Communication Module is installed in the FCN system to provide for PROFIBUS-DP communications. It runs as a master device in PROFIBUS-DP communication.

- **Logic Designer**

Logic Designer software is used for developing control applications for the FCN.

It is used to create, debug, and download control applications to be run on the FCN.

- **Resource Configurator (Including PROFIBUS-DP Configurator)**

Resource Configurator software is used for basic FCN setup. It is used for basic configuration (IP address, I/O modules, license, and etc.) of the FCN and device label definition.

From Resource Configurator, you can run the PROFIBUS-DP Configurator software tool.

PROFIBUS-DP configurator is used for basic configuration of the PROFIBUS-DP (transmission rate, etc.), the slave device configuration, and module definitions and parameter settings in the slave device.

- **SCADA software (FAST/TOOLS, VDS and etc.)**

SCADA software is used for controlling and monitoring processes. SCADA software controls and monitors slave devices via the FCN or FCN-RTU.

- **Slave devices**

PROFIBUS-DP slave devices have PROFIBUS-DP communication functionality and thus can exchange data with the FCN connected to same PROFIBUS-DP via a PROFIBUS-DP Communication Module (NFLP121).

■ STARDOM PROFIBUS-DP SYSTEM MAIN FUNCTION

The main function of a PROFIBUS-DP system is described below.

● Communication and control functions

The PROFIBUS-DP Communication Module (NFLP121) runs as PROFIBUS-DP master device.

It supports two specification versions, namely, DP-V0 and DP-V1, and has the following communication and control functions.

- Process data input and output: Control loops can be implemented using I/O data processing POU's for PROFIBUS-DP and device labels defined for I/O devices.
- Message display: Diagnostic information detected by the PROFIBUS-DP Communication Module (NFLP121) or slave devices can be displayed on HMI (for operation and monitoring) as messages. Messages of the DP-V1 specification can also be displayed for slave devices supporting the DP-V1 specification.
- I/O module status display: Errors of the PROFIBUS-DP Communication Module (NFLP121) or other PROFIBUS-DP communication errors can be displayed on HMI (for operation and monitoring).

● System Specification

Item	Specification
Number of installed NFLP121 modules	4 max. for FCN-500 or FCN-100 (*1) 2 max. for FCN-RTU
Number of slave devices	123 max. per module (if repeaters are used) 31 max. per module (if no repeaters are used)
Number of device labels (*2)	255 max. per slave device 500 max. per module
Communication I/O data size	3072 words max. per module (*3)
Number of communication I/O definitions	200 max. per module (*4)
Communication capacity	244 bytes max. for cyclic communications 240 bytes max. for acyclic communications
Transmission rate	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000, 12000 kbps

- *1: The number of NFLP121 modules allowed may be reduced if other communication modules are also installed. For details, see "FCN Autonomous Controller Hardware (FCN-500)" (GS 34P02Q14-01E) or "FCN Autonomous Controller Hardware (FCN-100)" (GS 34P02Q12-01E).
- *2: Total channel number of slave modules. All channels are counted up even they are not in use.
- *3: Minimum communication I/O data size is 2 words. No allocation limit for input data size and output data size. Maximum 1536 words can be assigned for holding output data.
- *4: Total number of modules in slave devices. Input/output mixed module is counted as two I/O definitions.

■ ENGINEERING

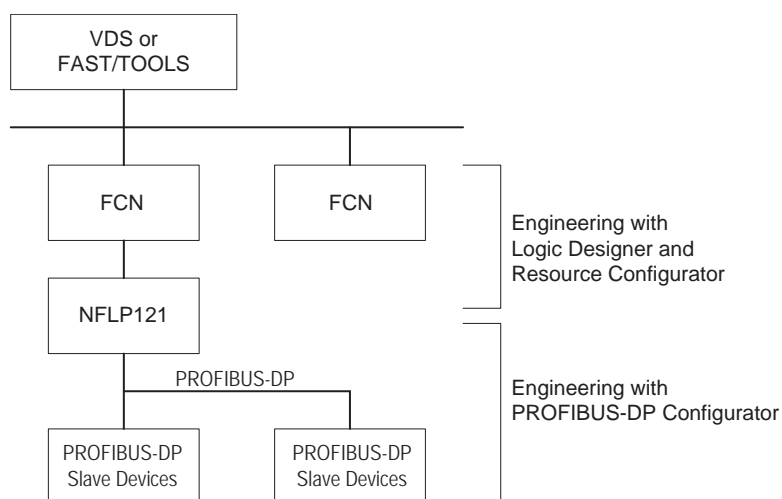
The Resource Configurator, PROFIBUS-DP Configurator and Logic Designer software tools are used in system engineering.

Table List of Engineering Software

Software	Description
Resource Configurator	Configuring PROFIBUS-DP Communication Module (NFLP121) and other I/O modules
	Starting PROFIBUS-DP Configurator
	Downloading FCN configuration information and PROFIBUS-DP Configurator configuration information.
PROFIBUS-DP Configurator	Registering slave devices
	Configuring PROFIBUS-DP communication protocol
Logic Designer	Defining device label variables
	ICreating control applications
	Downloading control applications

● Engineering Scope

The following shows the scope and targets for PROFIBUS engineering.



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Figure Engineering Scope

■ SOFTWARE

● Operating Environment

The PROFIBUS-DP Configurator runs on the Windows 7 Professional SP1 (32-bit/64-bit) operating system.

The other system requirements are the same as those of the Logic Designer.

Note: For details on the system requirements of Logic Designer, see "NT751FJ Logic Designer" (GS 34P02Q75-01E).

● Software Required

PROFIBUS-DP systems configuration requires the following software.

Table Software and License Required

Software	Rev. No.
Resource Configurator (Including PROFIBUS-DP Configurator)	R4.02.01 or later
Logic Designer	R4.02.01 or later
PAS Portfolio (Input/Output Data Processing POU's)	R4.02.01 or later
FCN/FCJ Basic Software	R4.02.01 or later

Note: Refer to related GS for other software revisions.

■ HARDWARE SPECIFICATIONS

Hardware specifications for NFLP121 PROFIBUS-DP communication module are as shown below.

● SPECIFICATIONS

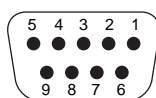
Item	Specification
Model	NFLP121
Interface	PROFIBUS-DP
Connection method	EIA-RS485-Compliant
Number of port	1
Isolation	Between signal and system
Connector	D-sub 9-pin female
Maximum transmission distance	1.2 km/segment 9600 bps
Maximum current consumption	700 mA 5V DC
Weight	0.3 kg

Note: The cables and terminators must comply with PROFIBUS-DP standards (PROFIBUS Specifications IEC61158-2 type3).

Table Connectors (D-sub 9-pin, female) (*1)

Pin No	Signal Name	Function
1	Shield	Shield
2	—	Not used
3	RxD/TxD-P	Data reception/ transmission
4	—	Not used
5	DGND	Signal ground
6	VP	+5 V
7	—	Not used
8	/TxD-N	Data reception/ transmission
9	—	Not used

*1: Connectors are fastened using inch screw threads (No.4-40UNC).



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Figure Pin No. of D-sub 9-pin Connectors on the Module

■ LED DISPLAYS

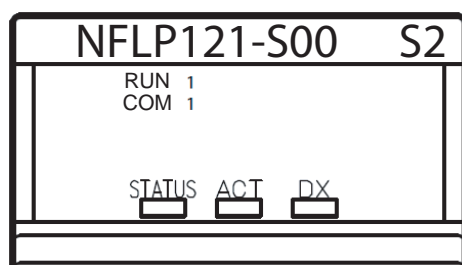
● Status Indicators

LED Indicators	Color	Description
STATUS	Green	Lights when the hardware is normal
ACT	Green	Lights when the module is running normally
DX	Green	Not used

● Individual Channels' Status Indicators

LED Indicators	Color	Description
RUN	Green	Flashes when the communication function is being started.
	Green	Lights when the communication function is ready and normal.
COM	Green	Flashes randomly when configuration by PROFIBUS-DP Configurator is underway.
	Green	Flashes periodically when configuration by PROFIBUS-DP Configurator is completed and system is waiting for instruction to start bus communication.
	Green	Lights when communication is established. (*1)

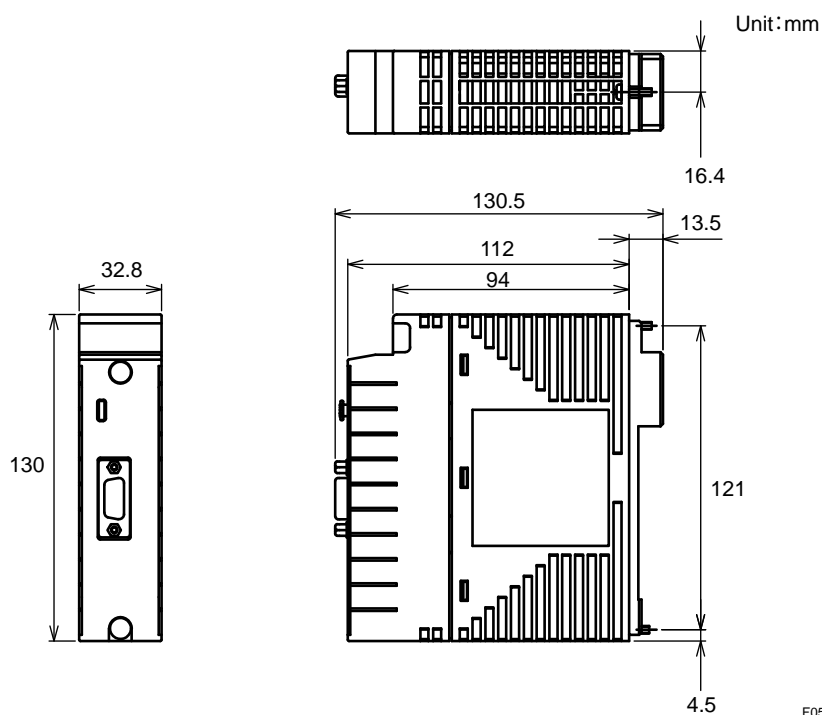
*1: If any of the slave devices defined using PROFIBUS-DP Configurator is disconnected, the COM indicator is off.



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■ EXTERNAL DIMENSIONS

● NFLP121



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■ MODEL AND SUFFIX CODES

		Description
Model	NFLP121	PROFIBUS-DP Communication Module
Suffix Code	-S	Standard type
	0	Always 0
	0	Basic type
	1	With ISA Standard G3 option

■ RELATED DOCUMENTS

FCN Autonomous Controller Functions (FCN-500)	GS 34P02Q03-01E
FCN Autonomous Controller Hardware (FCN-500)	GS 34P02Q14-01E
FCN/FCJ Autonomous Controller Functions (FCN-100/FCJ)	GS 34P02Q01-01E
FCN Autonomous Controller Hardware (FCN-100)	GS 34P02Q12-01E
Logic Designer	GS 34P02Q75-01E
Application Portfolios for FCN/FCJ	GS 34P02P20-01E
VDS	GS 34P02A02-01E
FCN-RTU Low Power Autonomous Controller Functions	GS 34P02Q02-01E
FCN-RTU Low Power Autonomous Controller Hardware	GS 34P02Q13-01E
FAST/TOOLS	GS 50A01A10-01EN

■ RESTRICTIONS AND PRECAUTIONS ON INSTALLATION

- When you install these I/O modules, ensure that the total required power does not exceed the rated output of the power supply module used.
- For further restrictions and precautions for module installation, see "FCN/FCJ Installation Guide" (TI 34P02Q91-01E).

■ ORDERING INFORMATION

Specify the model and suffix codes.

■ TRADEMARKS

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