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## General Specifications

FCN Autonomous Controller  
Hardware (FCN-500)



GS 34P02Q14-01E

### ■ GENERAL

*This document describes the general specifications of the FCN autonomous controller with NFCP501/NFCP502 CPU module. (FCN is an acronym for field control node.)*

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.

For Function, refer to FCN Autonomous Controller Functions (FCN-500), GS 34P02Q03-01E.



### ■ FEATURES

- High-performance, high-reliability modular controller
- Memory with ECC
- Low heat dissipation eliminates the need for a fan
- A wealth of RAS features — CPU self-diagnostics, temperature monitoring, I/O diagnostics, and more
- The CPU, power supply module, internal communication bus on backboard (SB bus), E2 bus (extension bus), and control network (Ethernet port 1 and 2) can all be duplexed, and all modules are hot-swappable. Use a couple of the CPU module of the same type to make the CPU module duplex configuration.
- Can function as link active schedulers (LASs) for low-speed voltage mode (H1) FOUNDATION Fieldbus segments, and link up FOUNDATION Fieldbus-enabled field devices.

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## ■ INSTALLATION REQUIREMENTS

| Item                            |                         | Specification                                                                                        |                                                                         |
|---------------------------------|-------------------------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
|                                 |                         | FCN-500<br>(NFCP501-□0□/NFCP502-□0□<br>Standard Type)                                                | FCN-500<br>(NFCP501-□1□/NFCP502-□1□<br>Extended Temperature range Type) |
| Ambient temperature             | Operation               | 0° to 55°C                                                                                           | -20° to 70°C (*1)                                                       |
|                                 | Transportation          | -40° to 85°C                                                                                         |                                                                         |
| Ambient humidity                | Operation               | 5 to 95 %RH (no condensation)                                                                        |                                                                         |
|                                 | Transportation          | 5 to 95 %RH (no condensation)                                                                        |                                                                         |
| Ambient temperature fluctuation | Operation               | Within ±10°C/h                                                                                       |                                                                         |
|                                 | Transportation          | Within ±20°C/h                                                                                       |                                                                         |
| Dust                            |                         | 0.3 mg/m <sup>3</sup> or less                                                                        |                                                                         |
| Protection class                |                         | IP20                                                                                                 |                                                                         |
| Resistance to corrosive gases   |                         | ANSI/ISA S71.04 Class G2 (Standard) (ANSI/ISA S71.04 Class G3, option)                               |                                                                         |
| Resistance to vibration         |                         | 0.15 mm P-P (5 to 58 Hz), 1 G (58 to 150 Hz)                                                         |                                                                         |
| Resistance to shock             |                         | 15 G, 11 ms (during power-off, for sine half-waves in XYZ-directions)                                |                                                                         |
| Altitude                        |                         | 2000 m or less                                                                                       |                                                                         |
| Noise                           | Electric field          | 3 V/m or less (26 MHz to 1 GHz)                                                                      |                                                                         |
|                                 | Magnetic field          | 30 A/m (AC) or less, 400 A/m (DC) or less                                                            |                                                                         |
|                                 | Electrostatic discharge | 4 kV or less contact discharge, 8 kV or less aerial discharge                                        |                                                                         |
| Grounding                       |                         | Apply the grounding system which is defined by the rules and standards of the country or the region. |                                                                         |
| Cooling                         |                         | Natural air cooling                                                                                  |                                                                         |

\*1: It depends on I/O modules. Refer to "■ I/O AND RELATED MODULE" for details

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## ■ CPU MODULE

One CPU module is mounted in each control unit, or two for a duplexed CPU configuration. The CPU module runs a real-time operating system, supports programming languages compliant with the IEC 61131-3 international standard, and serves as a Duolet virtual machine.

### ● Model and Suffix Codes

|              |         | Description                                             |
|--------------|---------|---------------------------------------------------------|
| Model        | NFCP501 | CPU module for FCN (with 2 Ethernet ports)              |
|              | NFCP502 | CPU module for FCN (with 4 Ethernet ports)              |
| Suffix Codes | -S      | With standard functions (*1)                            |
|              | -W      | With extended functions (*1)                            |
|              | 0       | Standard type                                           |
|              | 1       | With Extended Temperature range option                  |
|              | 5       | Basic type with no explosion protection                 |
|              | 6       | With ISA Standard G3 option and no explosion protection |
|              | E       | Basic type with explosion protection                    |
|              | F       | With ISA Standard G3 option and explosion protection    |

\*1: The application portfolio which can be used differs by Standard function type and Extended function type. For details, refer to "FCN Autonomous Controller Functions (FCN-500)" (GS 34P02Q03-01E).

### ● Specifications

| Item                 | Specification                                                                                                |                                      |
|----------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Model                | NFCP501                                                                                                      | NFCP502                              |
| Style                | S2 (*6)                                                                                                      |                                      |
| Processor            | Atom E3815 1.46 GHz                                                                                          |                                      |
| Memory               | Main                                                                                                         | 256 MB with ECC                      |
|                      | Static RAM                                                                                                   | 2 MB with ECC, backed up by battery  |
| Secondary memory     | 1 GB on-board flash memory                                                                                   |                                      |
| External media       | SD card 1 slot : SDHC (4 to 32GB) Class 10                                                                   |                                      |
| Serial Port (*1)     | 1 RS-232-C port: D-sub 9 pins, male (*2)                                                                     |                                      |
| Communication method | Full/Half duplex (software settings)                                                                         |                                      |
|                      | Asynchronous                                                                                                 |                                      |
|                      | Baud rate                                                                                                    |                                      |
| Network interface    | 2 Ethernet ports: RJ45 modular jacks                                                                         | 4 Ethernet ports: RJ45 modular jacks |
|                      | Baud rate                                                                                                    |                                      |
| I/O interface        | SB bus (duplex)                                                                                              |                                      |
| RAS features         | Watchdog timer, temperature monitor, etc.                                                                    |                                      |
| Battery (*3)         | 1000 mAh graphite fluoride lithium battery (*4)                                                              |                                      |
| Display              | 3 LEDs for CPU status indication, 2 LEDs for Ethernet status indication, 1 LED for SD LED, 1LED for EXEC LED |                                      |
| Switches             | RESET switch, SHUT DOWN switch, FUNC switch, EXEC switch                                                     |                                      |
| Protection           | CPU cover (with the hole for wire lock)                                                                      |                                      |
| Power supply         | Supply voltage                                                                                               | 5 V DC $\pm$ 5%                      |
|                      | Current consumption                                                                                          | Max. 1200 mA                         |
| Duplex configuration | Possible (*5)                                                                                                |                                      |
| Weight               | 0.9 kg                                                                                                       |                                      |
| Size                 | Dimensions (W x H x D)                                                                                       | 65.8 x 130 x 149.3 mm                |
|                      | Occupying slots                                                                                              | 2                                    |

\*1: A serial port cannot be used when CPU modules are configured in redundancy.

\*2: Connectors are fastened using inch screw threads (No. 4-40 UNC).

\*3: With battery exhaustion detection function

\*4: A battery is exchangeable at on-line.

\*5: Use a couple of the CPU module of the same type (same Model, same suffix codes and same system software version) for the CPU module duplex configuration. A combination of CPU module styles S1 and S2 is possible.

\*6: The CPU module NFCP501/NFCP502 style S2 or later is required to use the E2 bus interface module.

## ● Appearances

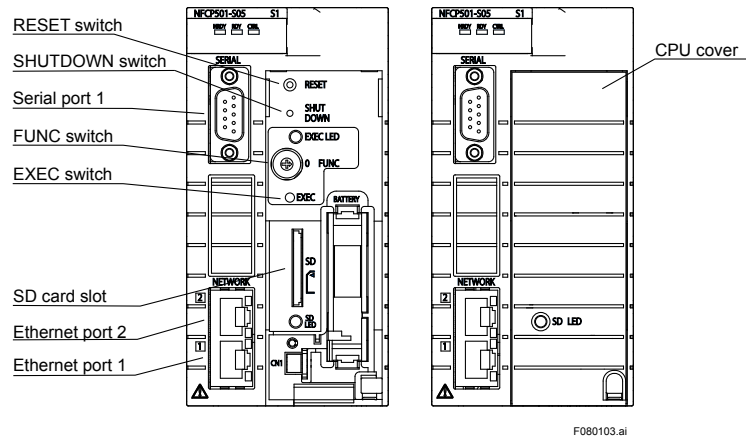


Figure NFCP501 (Left: removed CPU cover, Right: mounted CPU cover)

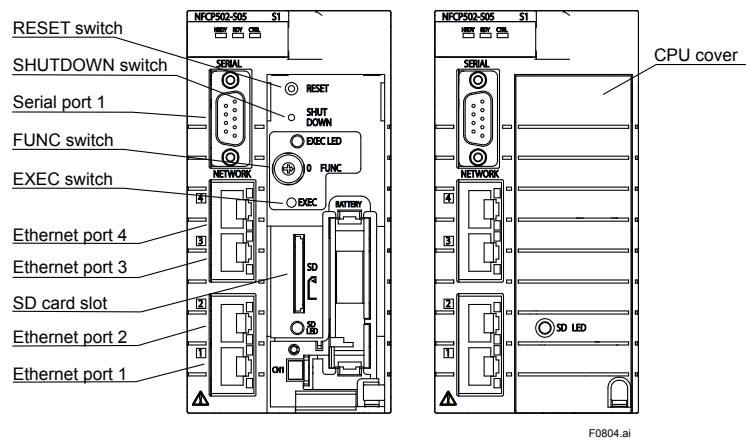
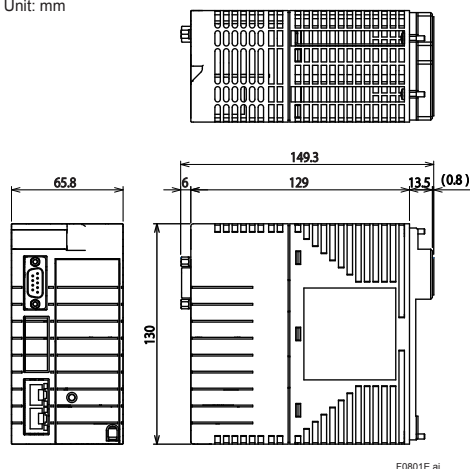


Figure NFCP502 (Left: removed CPU cover, Right: mounted CPU cover)

## ● Dimensions

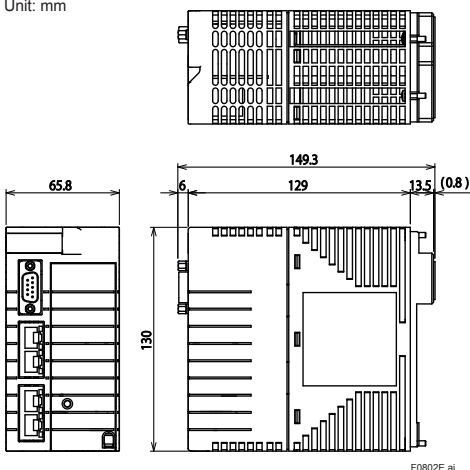
Unit: mm



F0801E.ai

Figure NFCP501 (Dimension)

Unit: mm



F0802E.ai

Figure NFCP502 (Dimension)

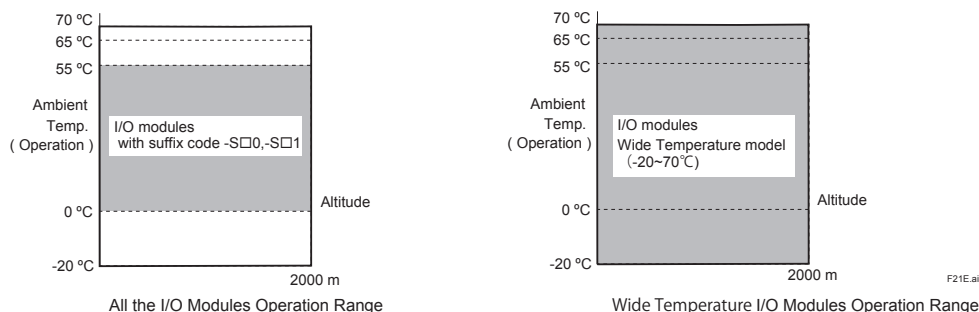
## ■ RESTRICTIONS AND PRECAUTIONS ON INSTALLATION

See Installation Guide for "STARDOM FCN/FCJ Installation Guide" (TI 34P02Q91-01E).

### ● Limitations of Installation for using in the wide temperature range (-20 to +70°C) environments

Main components of FCN (NFCP501/NFCP502-□1□, NFPW444, base modules, N2EB100) can operate in the wide temperature range (-20 to +70°C) environments.

The I/O Modules which are marked up on table "List of FCN's Modules and Installation Limitations" can operate in the wide temperature range environments.



### ● I/O Module Arrangement and Restriction for using ambient temperature is higher than 55°C

Table Module Arrangement and Restrictions on Installation (when ambient temperature is higher than 55°C)

| Model   | Left-side slot     | Right-side slot                         | Limitations                                                 |
|---------|--------------------|-----------------------------------------|-------------------------------------------------------------|
| NFAI841 | X (*1)             | X (*1)                                  | External load (Analog Output): 200-750Ω                     |
|         | X                  | N.A.                                    |                                                             |
|         | N.A.               | X                                       |                                                             |
| NFAI543 | N.A.               | N.A.                                    | External load (Analog Output): 0-400Ω                       |
|         | N.A.               | X (*1)                                  | Up to 12 channels<br>External load (Analog Output): 0-400Ω, |
| NFDR541 | X                  | N.A.                                    | Required a vacant slot on one side<br>Up to 8 channels      |
|         | N.A.               | X                                       |                                                             |
| NFAI835 | X                  | N.A.                                    | External load (Analog Output): 200-750Ω                     |
|         | X                  | X                                       | External load (Analog Output): 200-500Ω                     |
| NFAV144 | X                  | N.A.                                    | Required a vacant slot on one side                          |
|         | N.A.               | X                                       |                                                             |
| NFPW444 | N.A. or<br>NFPW444 | N.A. or<br>NFPW444 /<br>NFCP501/NFCP502 | Up to 75% of rated output current                           |

X: Any module (arbitrary)  
\*1: Except NFAI841

N.A.: Blank or Not allowed

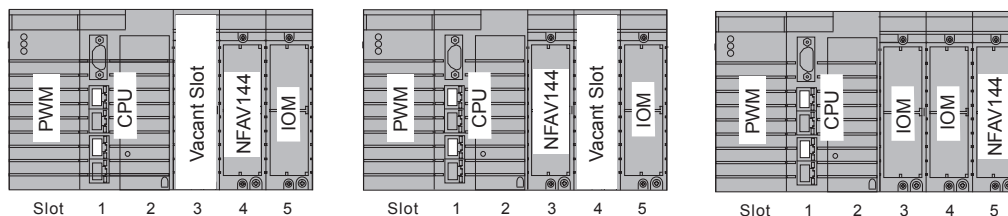


Figure Installation Example of using NFAV144



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