General Specifications

FCN Autonomous Controller Hardware (FCN-100)

GS 34P02Q12-01E

■ GENERAL

This document describes the general specifications of the FCN autonomous controller with NFCP100 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-100” refers to the autonomous controllers with NFCP100 CPU module.

For Function, refer to FCN/FCJ Autonomous Controller Functions (FCN-100/FCJ), 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, local bus (SB bus), and control network can all be duplexed, and all modules are hot-swappable.
- Can function as link active schedulers (LASs) for low-speed voltage mode (H1) FOUNDATION Fieldbus segments, and link up FOUNDATION Fieldbus-enabled field devices.

■ CONFIGURATION

An FCN-100 consists of the following:

- Base module
- Power supply module
- CPU module
- SB bus repeat module (extending the SB bus, the local bus for FCNs, to connect an extension unit)
- I/O modules

There are two types of base module.

- NFBU200 base module (long): Up to 2 extension units connectable for I/O expansion
- NFBU050 base module (short): Compact and dedicated to one-unit-configuration

Maximum I/O Module Configurations

Base Module	Unit Configuration	Standard	Duplexed (*1)
NFBU200 base module (long)	Control unit only	Max. 8 modules	Max. 6 modules
	With 1 extension unit	Max. 16 modules	Max. 12 modules
	With 2 extension unit	Max. 25 modules	Max. 20 modules
NFBU050 base module (short)	Control unit (*2)	Max. 3 modules	Not applicable (*3)

*1: When CPU and SB bus repeat modules are duplexed
*2: SB bus repeat modules cannot be mounted on NFBU050.
*3: Neither power supply nor CPU modules can be duplexed on NFBU050.

YOKOGAWA

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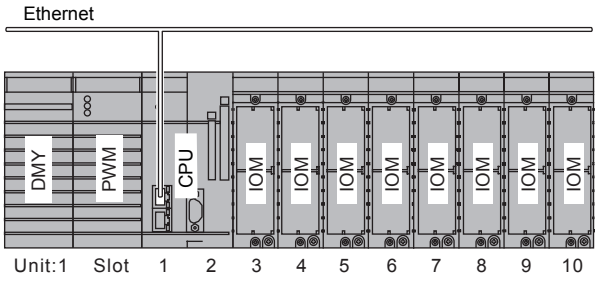
Tel.: 81-422-52-5616 URL: http://www.stardom.biz

● Examples of Configuration

Standard control unit alone



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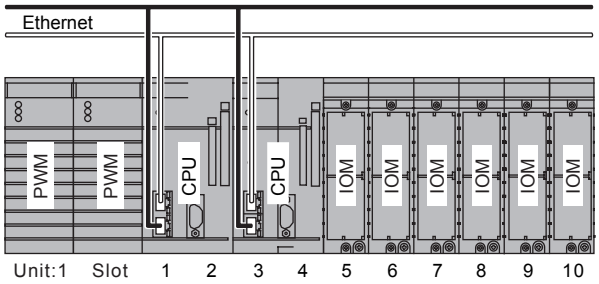
Control unit alone with duplexed CPU and power supply modules



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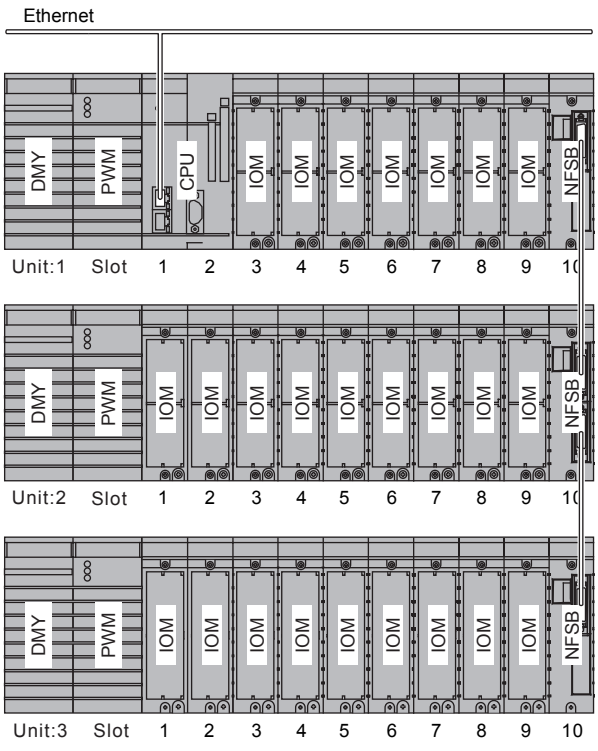
Abbreviation	Description
PWM	Power supply module
CPU	CPU module
IOM	I/O module
NFSB	SB bus repeat module
DMY	Dummy cover for power supply Module Slot

Standard control unit + 2 extension units



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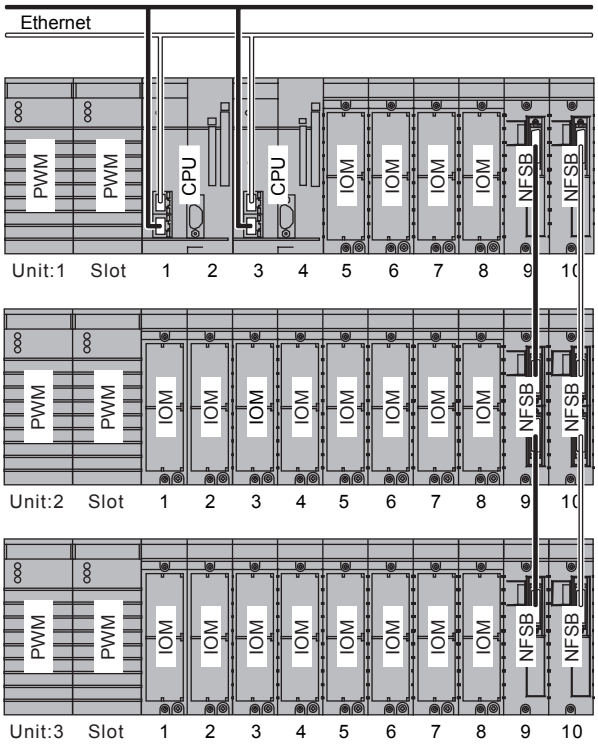
Control unit with duplexed CPU modules, power supply modules, and SB bus + 2 extension units

Note: The CPU module, power supply module, and SB bus can be made duplex individually, when required.



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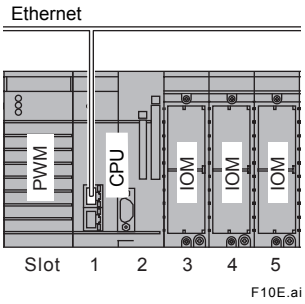
Short control unit



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■ INSTALLATION REQUIREMENTS

Item		Specification
Ambient temperature	Operation	0° to 55°C
	Transportation/storage	– 40° to 85°C (*1)
Ambient humidity	Operation	5 to 95 %RH (no condensation)
	Transportation/storage	5 to 95 %RH (no condensation)
Rate of change in temperature	Operation	Within ±10°C/h
	Transportation/storage	Within ±20°C/h
Dust		0.3 mg/m^3 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: System clock may be reset if the temperature falls below -10°C.

■ COMPLIANT STANDARDS

Item		Standards
Safety standards (*1) (*8) (*15)	CSA	CAN/CSA-C22.2 No.61010-1
	CE Marking Low Voltage Directive	EN 61010-1 (*12) EN 61010-2-201 (*12) EN 61010-2-030
	EAC Marking	CU TR 004
EMC standards	CE Marking EMC Directive (*12)	EN 55011 Class A Group 1 (emission) (*13) EN 61000-6-2 (immunity) (*1) (*2) (*9) EN 61000-3-2 EN 61000-3-3 (*3)
	RCM	EN55011 Class A Group 1 (*13)
	KC Marking	Korea Electromagnetic Conformity Standard
	EAC Marking	CU TR 020
Standards for Hazardous Location Equipment (*4) (*5)	FM Nonincendive (*1)	Class I Division 2, Groups A, B, C, D T4 Class 3600:2011 Class 3611:2004 Class 3810:2005
	ATEX Type "n" (*6) (*7) (*12)	⟨Ex⟩II 3 G Ex nA nC II C T4 Gc X (*10) (*14) ⟨Ex⟩II 3 G Ex nA II C T4 Gc X (*11) (*14) EN 60079-0:2009 EN 60079-0:2012 EN 60079-15:2010
	CSA Non-Incendive (*1)	Class I Division 2, Groups A, B, C, D T4 CAN/CSA-C22.2 No. 0-M91 CAN/CSA-C22.2 No. 0.4-04 CAN/CSA-C22.2 No. 157-92 C22.2 No. 213-M1987 TN-078

*1: For the rack-mountable devices, DIN rail-mountable devices, and wall-mountable devices to meet the Safety Standards and EMC Standards, the devices must be installed in a lockable metal cabinet. The cabinet must conform to IEC/EN/CSA 61010-2-201 or provide degrees of protection IP3X or above and IK09 or above.
*2: For lightning surge immunity, a device such as a lightning arrester needs to be installed externally. Some module can select a pressure clamp terminal block with surge absorber. For details, see “Terminal Block” (GS 34P02Q41-01E).
*3: The specified magnitude of the voltage drop determined by the cable wiring length needs be met.
*4: Refer to TI 34P02Q91-01E for the products meeting NI.
*5: For modules conforming to explosion-proof standards, refer to the section “I/O Module” and the table “List of FCN’s Modules and Modules Conforming to Explosion Protection Standard” of this document.
*6: When FCN is used under the ATEX Type “n” environment, the Instruction Manual, IM 34P02Q11-02E “Explosion Protection of FCN/FCJ Products” is required for safer installation and wiring.
*7: To be compliant with these standards, the FCN hardware needs to be installed in a lockable metal cabinet of IP54 or higher protection rating.
*8: For ensuring the FCN hardware to satisfy the safety standards, the dedicated breakers in the power supply side must be installed and conform to the following specifications.
  • [CSA] CSA C22.2 No.5 or UL 489
  • [CE Marking] EN 60947-1 and EN 60947-3
*9: When using the NFLP121, mount one (A1193MN) ferrite core on the NFLP121 side of the PROFIBUS cable to meet the EMC standards.
*10: Applied for NFDR541and FCN.
“Type of protection” of FCN is including the whole mounted module.
*11: Applied for products except for NFDV541.
*12: NFDR541 is compliant with the standards only when the voltage of 24 VDC or less is applied to its output terminal.
*13: A Class A hardware device is designed for use in the industrial environment. Please use this device in the industrial environment only.
*14: Symbol ‘X’ denotes the specific condition of use. See “Explosion Protection of FCN/FCJ Products” (IM 34P02Q11-02E) for detail.
*15: To be compliant with these standards, the FCN’s cable which is drawn out from the metal, needs to be used the VW-1 class or more of flame-retardant cable.

In relation to the CE Marking, the manufacturer and the authorised representative for the Product in the EEA are indicated below:

• Manufacturer:
  Yokogawa Electric Corporation (2-9-32 Nakacho, Musashino-shi, Tokyo 180-8750, Japan)
• Authorised representative in the EEA:
  Yokogawa Europe B.V. (Euroweg 2, 3825 HD Amersfoort, The Netherlands)

■ BASE MODULE

A base module is a chassis on which various function modules such as CPU, power supply, SB bus repeat, and I/O modules are mounted to configure a control unit or extension unit.

● Features

Model	Usage	"Number of Mountable I/O Modules"	"Number of Mountable Power Supply Modules"	SB Bus
NFBU200	Control Unit	8 (*1)	1 or 2 (when duplexed)	Duplex
	Extension Unit	9 (*2)		
NFBU050	Control Unit	3 (*3)	1	Single

*1: Two from the ten slots are exclusive for at least one CPU module in the control unit.
*2: One from the ten slots is exclusive for at least one SB bus repeat module in the extension unit.
*3: Two from the five slots are exclusive for one CPU module. No SB bus repeat modules can be mounted.

● Model and Suffix Codes

Base Module (long)

		Description
Model	NFBU200	Base module (long)
Suffix Codes	-S	Standard type
	0	19-inch rack-mounted
	1	DIN rail-mounted
	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

Base Module (short)

		Description
Model	NFBU050	Base module (short)
Suffix Codes	-S	Standard type
	1	DIN rail-mounted
	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

Optional Accessories

		Description
Model	NFDCV01	Dummy cover for I/O module slot
	NFDCV02	Dummy cover for power supply module slot

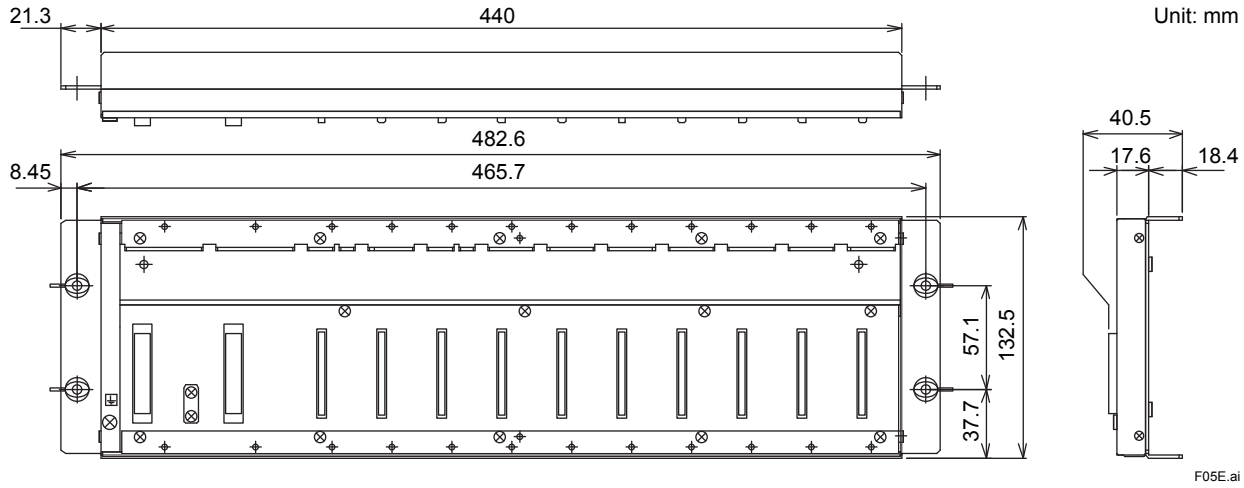
● Specifications

Item			Specification		
Model			NFBU200-S0□	NFBU200-S1□	NFBU050-S1□
Weight			1.9 kg	1.0 kg	0.58 kg
Dimensions (W x H x D)			482.6×132.5×40.5 mm	440×131×42.3 mm	283×131×24.2 mm
Mounting			19-inch rack-mounted	DIN rail-mounted	
Maximum power consumption	5 V	Self-consumption	0.4 A(max)		0.025 A
	24 V	Self-consumption	0		

● Dimensions

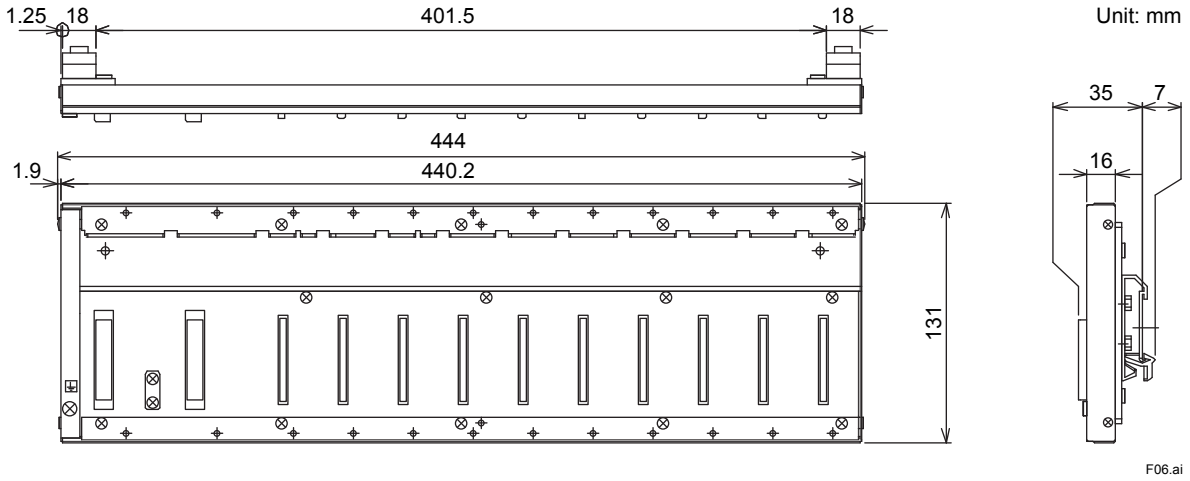
19-inch rack-mounted Model (NFBU200)

Unit: mm



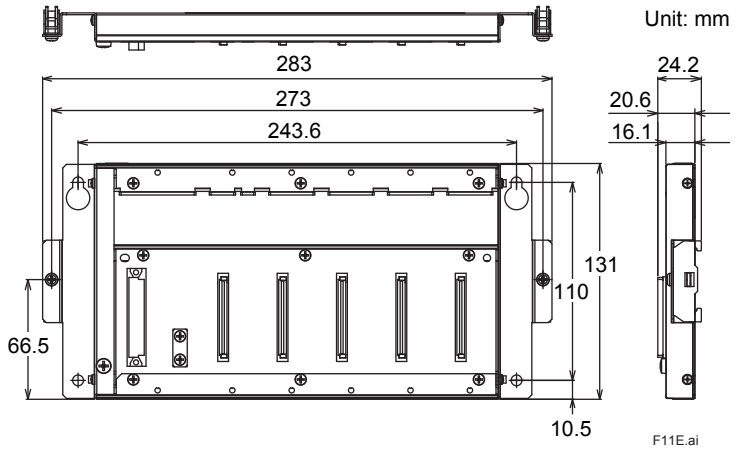
DIN rail-mounted Model (NFBU200)

Unit: mm



DIN rail-mounted Model (NFBU050)

Unit: mm



■ POWER SUPPLY MODULE

Mounted on a base module, a power supply module supplies steady power to other modules. Two power supply modules can be installed on a base module for redundancy.

This power supply module is equipped with input terminals for a 24 V DC power supply in addition to the main power input. The 24 V DC power input from these terminals are referred to as analog field power supply and fed to analog I/O modules to drive their field interface circuits and supply power to the connected field devices through the base module. However, when a 24 V DC power supply is needed for digital outputs, it must be supplied to individual terminals of the corresponding I/O modules. (For details, see the respective specifications for I/O modules.)

● Model and Suffix Codes

		Description
Model	NFPW441	Power supply module (100-120 V AC input)
Suffix Codes	-5	Standard type with no explosion protection
	-E	Standard type with explosion protection
	0	Basic type
	1	With ISA Standard G3 option

		Description
Model	NFPW442	Power supply module (220-240 V AC input)
Suffix Codes	-5	Standard type with no explosion protection
	0	Basic type
	1	With ISA Standard G3 option

		Description
Model	NFPW444	Power supply module (24 V DC input)
Suffix Codes	-5	Standard type with no explosion protection
	-E	Standard type with explosion protection
	0	Basic type
	1	With ISA Standard G3 option

● Pin Assignment

Power supply terminals (Models NFPW441 and 442)

Pin No.	Name	Signal
1	FLD24 V DC +	24 V analog field power supply (+) (*1)
2	FLD24 V DC –	24 V analog field power supply (-) (*1)
3	G	Ground of line filter
4	L	Power input
5	N	

Power supply terminals (Model NFPW444)

Pin No.	Name	Signal
1	FLD24 V DC +	24 V analog field power supply (+) (*1)
2	FLD24 V DC –	24 V analog field power supply (-) (*1)
3	G	Ground of line filter
4	+	Power input
5	–	

*1: When analog I/O modules such as NFAI141 (with 2-wire transmitter), NFAI135, NFAI841, NFAB841, NFAI835, NFAF135, and NFAP135 are installed, an analog field power supply is needed.

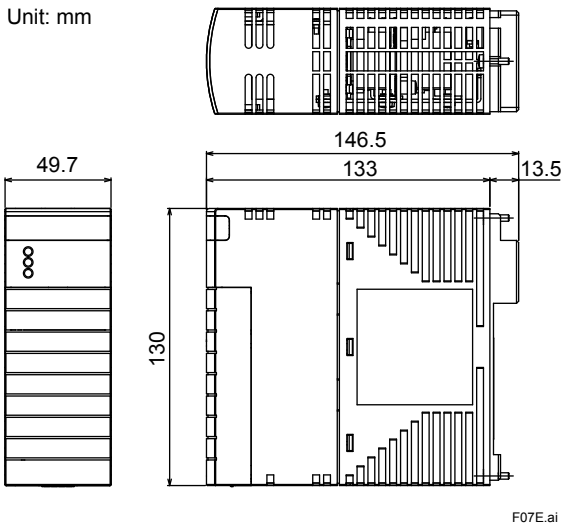
Checking terminals

Pin No.	Name	Signal
1	+5 V-CHK	Checking of 5 V system power
2	+24 V-CHK	Checking of 24 V field power supply
3	GND	Signal grounding

● LEDs

LED Indicator	Color	Description
SYS-POWER	Green	Lights when the 5 V system power output is on.
FLD-POWER	Green	Lights when the 24 V field power supply is on.

● Dimensions



● Specifications

Item			Specification		
Model			NFPW441	NFPW442	NFPW444
Power supply input		Rated input voltage	100 to 120 V AC	220 to 240 V AC	24 V DC
		Input voltage range	80 to 132 V AC (rms)	170 to 264 V AC (rms)	21.6 to 31.2 V DC
		Input frequency	47 to 66 Hz (Rating: 50/60 Hz)		
		Input current	Max. 1.4 A	Max. 0.7 A	Max. 3.3 A
		Fuse rating	3.15 A	3.15 A	6.3 A
		Rush current	Max. 80 A for 5 ms or less	Max. 90 A for 5 ms or less	Max. 20 A
		Leak current	Max. 1 mA		—
		Withstanding voltage	3000 V AC for 1 minute		500 V AC for 1 minute
		Insulation resistance	50 MΩ at 500 V DC		
		Insensitive momentary power-failure time	10 ms (80%)		2 ms (90%)
Output		Rated output voltage	+5.1 V DC		
		Rated output current	0 to 7.8 A		
		Peak current	11.8 A		
		Total output	40 W (60 W peak)		
		Startup time after power-on	Max. 300 ms		
			Max. 100 ms (after a power failure of 200 ms long with the rated input)		
		Overvoltage protection	Max. 7 V		
		Overcurrent protection	Min. 105% (shutdown after 4 to 14 seconds long overcurrent)		
Analog field power supply	Input	Rated input voltage	24 V DC ±10%		
		Input current	Max. 4 A		
		Fuse rating	6.3 A		
	Output	Rated output voltage	Input voltage minus matching-diode drop		
		Rated output current	4 A		
		Overvoltage protection	35 V		
Duplex configuration			Possible (when installed on base module NFBU200)		
Weight			0.6 kg		
Dimensions (W x H x D)			49.7 x 130 x 146.5 mm		

■ 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 Java virtual machine.

● Model and Suffix Codes

		Description
Model	NFCP100	CPU module for FCN
Suffix Codes	-S	Standard type
	0	Always 0
	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

● Specifications

Item		Specification
Model		NFCP100-S0□
Processor		MMX-Pentium 166 MHz
Memory	Main	128 MB with ECC
	Static RAM	1 MB with ECC, backed up by battery
System card		1 slot
Serial Port (*2)		1 RS-232-C port: D-sub 9 pins, male (*1)
Communication method		Full duplex
Synchronisation		Asynchronous
Baud rate		0.3, 1.2, 2.4, 4.8, 9.6, 14.4, 19.2, 28.8, 38.4, 57.6, or 115.2 kbps
Network interface		2 Ethernet ports: 100/10 Mbps, 100BASE-TX or 10BASE-T, RJ45 modular jacks
I/O interface		SB bus (duplex)
RAS features		Watchdog timer, temperature monitor, etc.
Battery		2700 mAH lithium battery
Display		3 LEDs for CPU status indication, 2 LEDs for LAN status indication
Switches		Reset, shutdown
Power supply	Supply voltage	5 V DC ±5%
	Current consumption	Max. 1800 mA
Duplex configuration		Possible
Weight		0.7 kg
Size	Dimensions (W x H x D)	65.8 x 132 x 145.7 mm
	Occupying slots	2

*1: Connectors are fastened using inch screw threads (No. 4-40 UNC).
*2: A serial port cannot be used when CPU modules are configured in redundancy.

● Pin Assignments of CPU Module's Serial Port

Table Connector Pin Assignment (D-sub 9-pin, male)

Pin No	Signal name	Function
1	CD	Data channel receiving carrier detection
2	RD	Receiving data
3	SD	Transmission data
4	ER	Data terminal ready
5	SG	Signal ground
6	DR	Data set ready
7	RS	Transmission request
8	CS	Transmission enabled
9	—	Not used

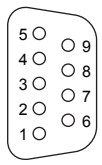


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Figure Pin Position (Front View)

● LEDs

Status Indicators

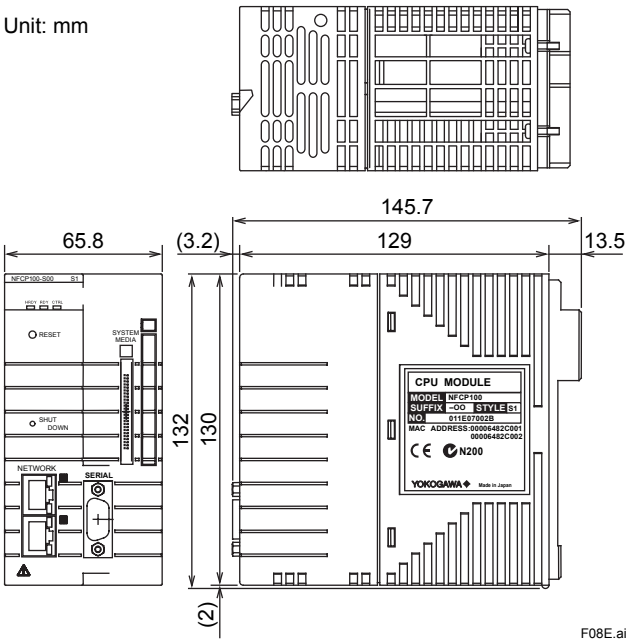
LED Indicator	Color	Description
HRDY	Green	Lights when the hardware is normal.
RDY	Green	Lights when the system is normal.
CTRL	Green	Lights when the control actions are carried out normally.

LAN status indicators (near RJ45 modular jacks)

LED Indicator	Color	Description
LINK	Green	Lights when the connection to a hub is normal.
ACT	Orange	Lights when the transmission/ reception is on.

● Dimensions

Unit: mm



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■ SB BUS REPEAT MODULE

Used to connect a control unit to I/O extension units.

To duplex the SB bus, install two SB bus repeat modules in each unit.

Each SB bus repeat module is connected to another via a dedicated T-joint and cable.

● Model and Suffix Codes

		Description
Model	NFSB100	SB bus repeat module for FCN
Suffix Codes	-S	Standard model
	5	With no explosion protection
	E	With explosion protection
	0	Basic type
	1	With ISA Standard G3 option
Option Codes	/SBT01	With an SB bus T-joint
	/SBT02	With an SB bus T-joint with built-in terminator

Note: When connecting a control unit and extension units, install at both ends a T-joint with built-in terminator on each SB bus repeat module.

		Description
Models	NFSBT01	SB bus T-joint
	NFSBT02	SB bus T-joint with built-in terminator

		Description
Model	NFCB301	SB bus cable
Suffix Codes	-C030	Cable length 30 cm
	-C100	Cable length 1 m
	-C200	Cable length 2 m
	-C400	Cable length 4 m
	-C800	Cable length 8 m

● Specifications

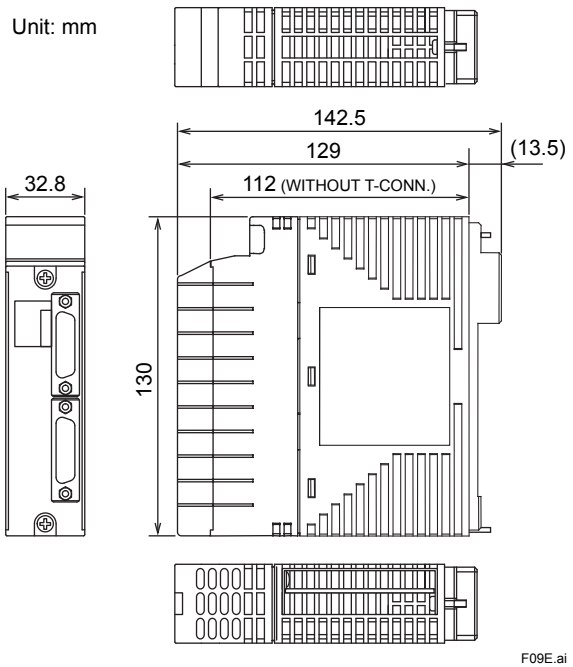
Item		Specification
Model		NFSB100
Transmission method		Serial communication
Baud rate		128 Mbps
Transmission distance		Max. 8 m per line
Extension units		Max. 2 units (3 units including a control unit)
Duplex configuration		Possible
Power supply	Supply voltage	5 V DC±5%
	Current dissipation	Max. 500 mA
Weight		0.2 kg
Size	Dimensions (W x H x D)	32.8 x 130 x 142.5 mm
	Occupying slots	1
Slots to be installed in		Slot No. 10 (for single SB bus) Slot Nos. 9 and 10 (for duplexed SB bus)

● LEDs

LED Indicator	Color	Description
STATUS	Green	Lights when the hardware is normal.
SND	Green	Lights when the transmission is on.
RCV	Green	Lights when the reception is on.

● Dimensions

Unit: mm



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■ I/O MODULE

An autonomous controller FCN supports versatile I/O modules. For details, refer to the following general specifications:

- GS 34P02Q31-01E Analog I/O Modules
- GS 34P02Q35-01E Digital I/O Modules
- GS 34P02Q36-01E Serial Communication Module
- GS 34P02Q55-01E Foundation Fieldbus Communication Module
- GS 34P02Q57-01E PROFIBUS-DP Communication Module
- GS 34P02Q58-01E CANopen Communication Module

● List of FCN's Modules and Modules Conforming to Explosion Protection Standards

Table List of FCN's Modules and Modules Conforming to Explosion Protection Standards (1/2)

Type	Model	Function	Explosion protection		
			FM NI (Non-incendive)	ATEX Type "n"	CSA NI (Non-Incendive)
Base module	NFBU200	Base module (long)	X	X	X
	NFBU050	Base module (short)	X	X	X
Power supply module	NFPW441	Power supply module (100 - 120 V AC input)	X	–	X
	NFPW442	Power supply module (220 - 240 V AC input)	–	–	–
	NFPW444	Power supply module (24 V DC input)	X	X	X
CPU module	NFCP100	CPU module for FCN	X	X	X
SB bus repeat module	NFSB100	SB bus repeat module for FCN	X	X	X
Analog I/O Modules (*1)	NFAI141	Analog Input Module (4 to 20 mA, 16-channel, Non-Isolated)	XX (*2)	X	XX (*2)
	NFAV141	Analog Input Module (1 to 5 V: differential input, 16-channel, Non-Isolated)	X	X	X
	NFAV142	Analog Input Module (-10 to +10 V, 16-channel, Non-Isolated)	X	X	X
	NFAI841	Analog I/O Module (4 to 20 mA input, 4 to 20 mA output, 8-channel input/8-channel output, Non-Isolated)	XX (*2)	X	XX (*2)
	NFAB841	Analog I/O Module (1 to 5 V input: differential input, 4 to 20 mA output, 8-channel input/8-channel output, Non-Isolated)	X	X	X
	NFAV542	Analog Output Module (-10 to +10 V, 16-channel, Non-Isolated)	X	X	X
	NFAI143	Analog Input Module (4 to 20 mA, 16-channel, Isolated)	X	X	X
	NFAI543	Analog Output Module (4 to 20 mA, 16-channel, Isolated)	X	X	X
	NFAV144	Analog Input Module (-10 to +10 V, 16-channel, Isolated)	X	X	X
	NFAV544	Analog Output Module (-10 to +10 V, 16-channel, Isolated)	X	X	X
	NFAT141	TC/mV Input Module (16-channel, Isolated)	X	X	X
	NFAR181	RTD Input Module (12-channel, Isolated)	X	X	X
	NFAI135	Analog Input Module (4 to 20 mA, 8-channel, Isolated channels)	X	X	X
	NFAI835	Analog I/O Module (4 to 20 mA, 4-channel input/4-channel output, Isolated channels)	X	X	X
	NFAP135	Pulse Input Module (8-channel, Pulse count, 0 to 10 kHz, Isolated channels)	X	X	X
	NFAF135	Frequency Input Module (8-channel, 0.1 Hz to 10 kHz, Isolated channels)	X	X	X
Digital I/O Modules (*1)	NFDV151	Digital Input Module (32-channel, 24 V DC, Isolated)	X	X	X
	NFDV157	Digital Input Module (32-channel, 24 V DC, Pressure Clamp Terminal support only, Isolated)	X	X	X
	NFDV161	Digital Input Module (64-channel, 24 V DC)	–	–	–
	NFDV141	Digital Input Module (16-channel, 100 V - 120 V AC, Isolated)	X	–	X
	NFDV142	Digital Input Module (16-channel, 200 - 240 V AC)	–	–	–

X: Conforming
XX: Conforming conditionally
N.A.: Not applicable
*1: To use modules as hazardous location equipment (non-incendive), use the specified pressure-clamp terminal blocks or MIL connector cables (KMS40, KMS50) / MIL connector terminal blocks (TAS40 and TAS50) .
*2: I/O modules with suffix code "with HART communication" do not conform to the explosion-proof standards.

Table List of FCN's Modules and Modules Conforming to Explosion Protection Standards (2/2)

Type	Model	Function	Explosion protection		
			FM NI (Non-incen-dive)	ATEX Type "n"	CSA NI (Non-Incen-dive)
Digital I/O Modules (*1)	NFDV532	Pulse Width Output Module (4-channel : Up Pulse/Down Pulse, 24 V DC, Isolated)	–	–	–
	NFDV551	Digital Output Module (32-channel, 24 V DC, Isolated)	X	X	X
	NFDV557	Digital Output Module (32-channel, 24 V DC, Pressure Clamp Terminal support only, Isolated)	X	X	X
	NFDV561	Digital Output Module (64-channel, 24 V DC)	–	–	–
	NFDR541	Relay Output Module (16-channel, 24 to 110 V DC/100 to 240 V AC, Isolated)	XX (*3)	XX (*4)	XX (*3)
Turbomachinery I/O Modules (*5)	NFGS813	Servo Module	–	–	–
	NFGP813	High Speed Protection Module	–	–	–
Communication Modules	NFLC121	CANopen Communication Module(1-port, 10 kbps to 1 Mbps)	–	–	–
	NFLF111	Foundation fieldbus communication module (4-port)	X	X	X
	NFLP121	PROFIBUS-DP Communication Module (1-port, 9.6 kbps to 12 Mbps)	–	–	–
	NFLR111	RS-232-C Communication Module (2-port, 300 bps to 115.2 kbps)	X	X	X
	NFLR121	RS-422/RS-485 Communication Module (2-port, 300 bps to 115.2 kbps)	X	X	X
Pressure Clamp Terminal Block	NFTA4S	Pressure Clamp Terminal Block for Analog (16-channel)	X	X	X
	NFTT4S	Pressure Clamp Terminal Block for Thermocouple/mV (16-channel)	X	X	X
	NFTR8S	Pressure Clamp Terminal Block for RTD (12-channel)	X	X	X
	NFTB5S	Pressure Clamp Terminal Block for Digital Input (32-channel)	X	X	X
	NFTD5S	Pressure Clamp Terminal Block for Digital Output (32-channel)	X	X	X
	NFTI3S	Pressure Clamp Terminal Block for Isolated Analog Module and Pulse Module (for NFAI135, NFAP135, NFAF135: 8-channel, NFAI835: 4-channel input, 4-channel output)	X	X	X
	NFTC4S	Pressure Clamp Terminal Block for Digital (16-channel, with dedicated connector, without surge absorber)	X	X	X
	NFTC5S	Pressure Clamp Terminal Block for Digital (32-channel, with dedicated connector)	X	X	X
	NFTF9S	Pressure Clamp Terminal Block for Foundation Fieldbus	X	X	X
Terminal Block	TAS40	MIL Connector Terminal Block (40 Pole Plug Types, M3.5)	X	X	X
	TAS50	MIL Connector Terminal Block (50 Pole Plug Types, M3.5)	X	X	X
Cable	NFCB301	SB Bus Cable	X	X	X
	KMS40	MIL Connector Cable (40 Pole Plug Types)	X	X	X
	KMS50	MIL Connector Cable (50 Pole Plug Types)	X	X	X
SB Bus T-joint	NFSBT01	SB Bus T-joint	X	X	X
	NFSBT02	SB Bus T-joint with Built-in Terminator	X	X	X
Dummy Cover	NFDCV01	Dummy Cover for I/O Module Slot	N.A.	N.A.	N.A.
	NFDCV02	Dummy Cover for Power supply Module Slot	N.A.	N.A.	N.A.
	NFCCC01	MIL Cable Connector Cover	N.A.	N.A.	N.A.

X: Conforming
XX: Conforming conditionally
N.A.: Not applicable
*1: To use modules as hazardous location equipment (non-incendive), use the specified pressure-clamp terminal blocks or MIL connector cables (KMS40, KMS50) / MIL connector terminal blocks (TAS40 and TAS50) .
*2: I/O modules with suffix code "with HART communication" do not conform to the explosion-proof standards.
*3: The relay output module (NFDR541) does not conform to the explosion-proof standards when it is used in between 100 to 240V AC..
*4: The relay output module (NFDR541) is compliant with the standards only when the voltage of 24 VDC or less is applied to its output terminal.
*5: For Turbomachinery I/O Modules, refer to GS 34P02Q04-01E Turbomachinery Controller Overview.

■ CABLE SPECIFICATIONS

The following describes the specifications required for the power and grounding cables used. For field signal wiring cables, see “Field Connections” (GS 34P02Q30-01E).

● Applicable Cables

Insulated cables for industrial equipment such as:

- 600 V polyvinyl chloride insulated wires (IV); JIS C3307
- Polyvinyl chloride insulated wires for electrical apparatus (KIV); JIS C3316
- 600 V grade heat-resistant polyvinyl chloride insulated wires (HIV); JIS C3317
- Heatproof vinyl insulated wires VW-1 (UL1015/UL1007)
- Control cables (vinyl insulated vinyl sheath cable) (CVV); JIS C3401

● Recommended Sizes

Power cable: AWG20 to 14 (0.5 to 2 mm^2) with ring tongue terminal
Grounding cable: AWG14 to 13 (2 to 2.6 mm^2) with ring tongue terminal

● Recommended Solderless Terminals

Power cable: Insulated M4 solderless terminals, 8.5 mm wide or less
Grounding cable: Insulated M4 solderless terminal, 8.5 mm wide or less

Follow the specifications required by the M4 solderless terminals used.

■ RESTRICTIONS AND PRECAUTIONS ON INSTALLATION

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

● Limitations of Installation for NFAT141 (the combination of Thermocouple input and Pressure clamp terminal)

To keep the reference junction compensation accuracy (GS 34P02Q31-01E), make sure to meet the following conditions. The pressure clamp terminal should not be affected by radiated heat.

- Do not install a heat-radiating unit beneath the NFAT141 installed unit.
- Do not install NFAT141 in a place where airflow impinges directly.
- Do not install NFAT141 next to the CPU modules (NFCP100), power supply modules (NFPW44x).
- The installable modules next to the NFAT141 are as follows. When installing other than following I/O modules, make an empty slot (one or more) in each side.
  Installable modules: NFAT141, NFAR181, NFAV141, NFAV142, NFAV144, NFAV542

● Limitations of Installation for Communication Modules

- A total of up to eight NFLR111/NFLR121 can be installed for each FCN-100.
- A total of up to eight NFLF111/NFLC121/NFLP121 can be installed for each FCN-100.

● Limitations of Installation for I/O Modules

When you install the following I/O modules, ensure that the required power volume does not exceed the rated power output of the power supply module. For the amount of power supply that each I/O module requires (5 V DC and 24 V DC), refer to the applicable general specifications.

● About Use of NFBU050

- NFBU050 is dedicated to control unit. It cannot be used as extension unit.
- SB bus repeat module cannot be mounted on NFBU050.

● Precaution on NFPW426 (Power Supply Module for FCN-RTU)

NFPW426 (Power supply module for FCN-RTU) cannot be used for FCN-100. Only NFPW441, NFPW442 or NFPW444 can be used for FCN-100.

■ For Type “n”

When FCN-100 is used under the Type “n” environment, the Instruction Manual, “Explosion Protection of FCN/FCJ Products” (IM 34P02Q11-02E) below is required for safer installation and wiring.

Document No.	Name
IM 34P02Q11-02E	Explosion Protection of FCN/FCJ Products

■ ORDERING INFORMATION

Specify the model and suffix codes.

For selecting the right products for explosion protection, please refer to “STARDOM FCN/FCJ Installation Guide” (TI 34P02Q91-01E) without fail.

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