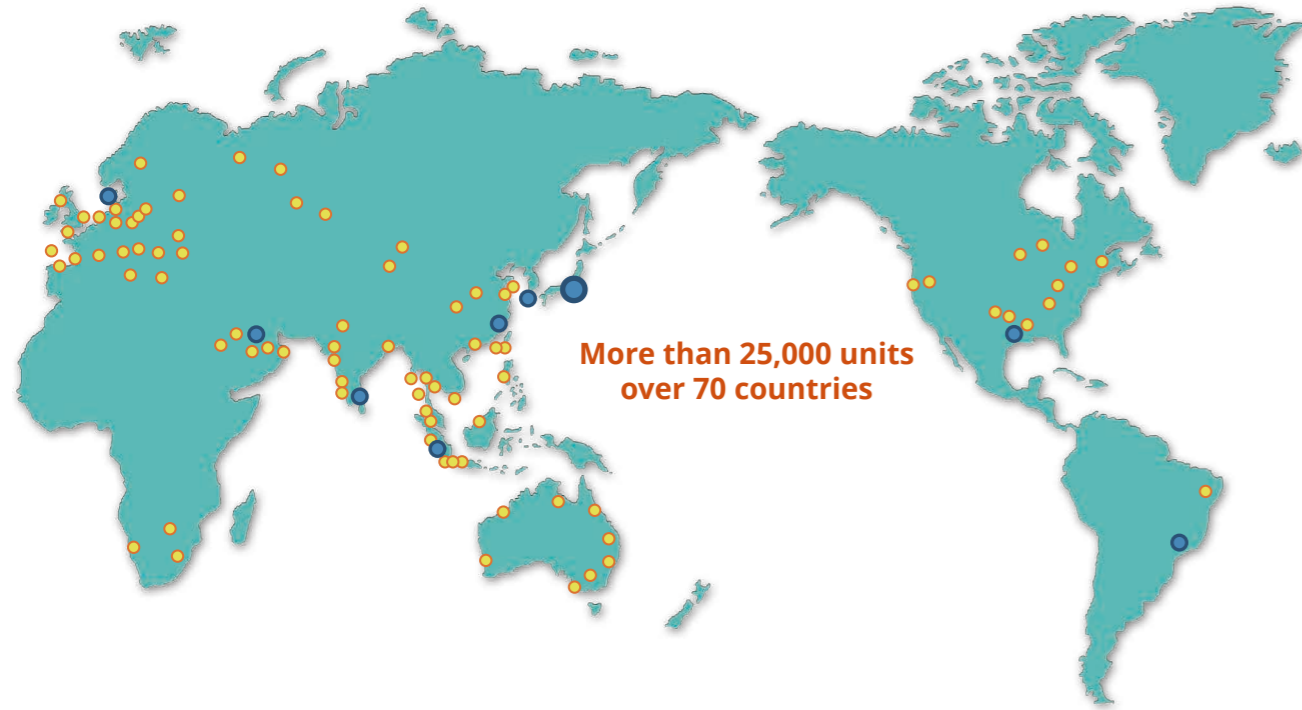


With the rapid pace of globalization in manufacturing, companies are hard pressed keeping their plants up and running all over the world. Rising to this challenge, Yokogawa continues to expand its global service network, and currently counts 225 service offices all over the world. Our process industry expertise and experience is second to none, and service and engineering personnel provide the same high-quality standard of service worldwide, over every phase of the plant lifecycle. To ensure the availability of your global processes, look to Yokogawa.

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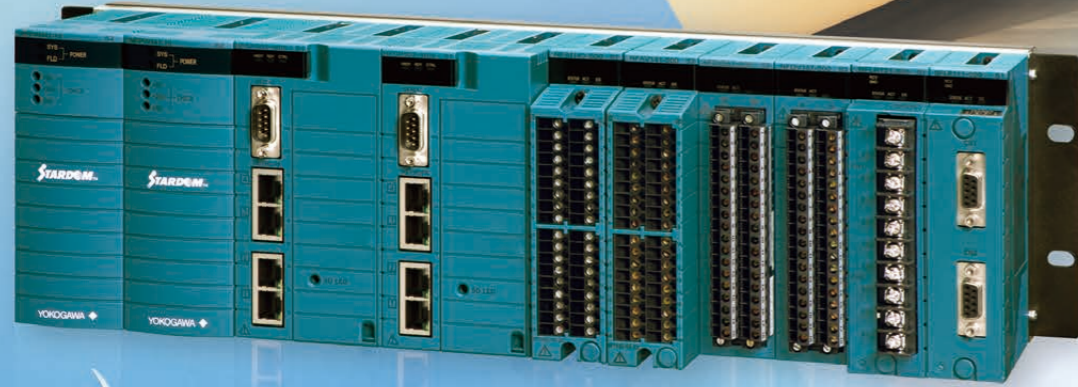
# FCN-500

## STARDOM Autonomous Controller





# FCN-500



## Process Control PLC **FCN-500** *strengthens your core competencies*

The FCN-500 STARDOM controller is a reliable platform that keeps you competitive in a rapidly changing market.

- Adapted to complex applications with a high speed CPU and gigabit Ethernet communication
- Increased uptime and reduced inventory by use of hot-swappable modules shared between single and redundant configurations
- Reduced engineering and maintenance hours by reuse of program components

### Integration

- OPC, DNP3, and Modbus support for use with a variety of SCADA systems
- Support of FOUNDATION™ Fieldbus, HART®, Modbus®, PROFIBUS-DP®, and CANopen® for field device digital communications
- Integrates with several types of networks such as GPRS and satellite for SCADA communications

### Reliability

- Excellent environmental resistance
- Redundant configuration for all key components
- ECC memory on durable hardware

### Network

- TCP/IP-based high speed (1 Gbps) Ethernet port
- Flexible network configuration with a mixture of redundant and separated networks by selecting 2 or 4 ports model
- Assurance of consistent network security policy with other Yokogawa systems

### Maintenance

- Hot-swappable modules
- Same modules for single and redundant configurations, and for control and extension units
- PC-less maintenance flexibility with SD card operations

### Engineering

- Support of all five IEC 61131-3 programming languages
- Extensive regulatory control libraries cultivated throughout Yokogawa's DCS history
- Target-less debugging for efficient engineering

# Integration

Seamless vertical and horizontal integration of the FCN-500 with SCADA, DCS, and field instruments enhances the flexibility of your plant.

## One network...but dual redundant

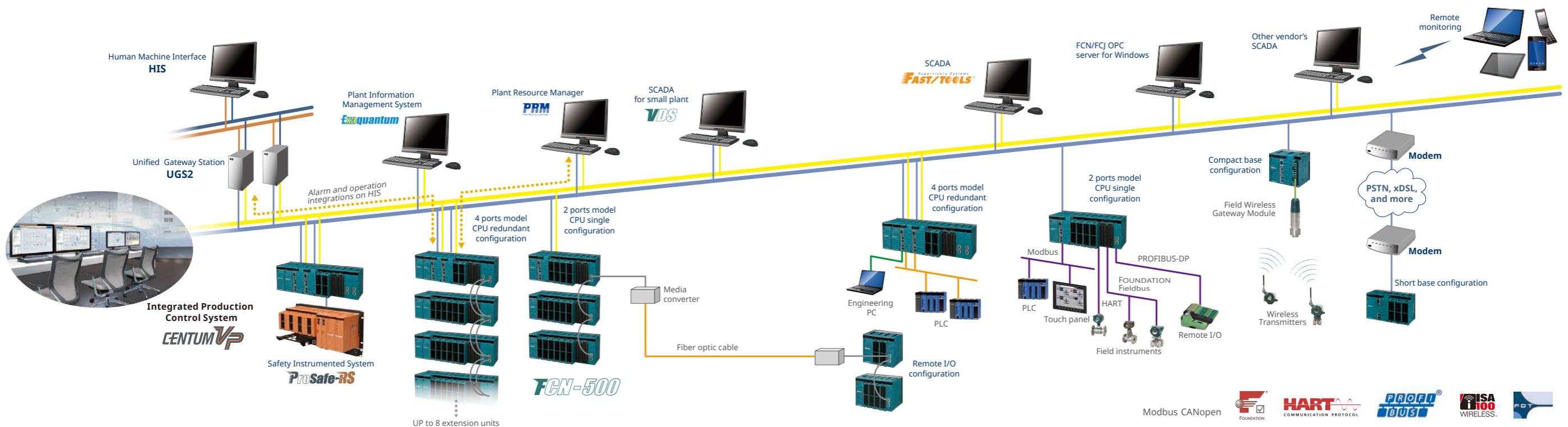
A TCP/IP-based network enables a seamless connection with control and information networks using COTS network components, and also allows the easy adaption of controllers for use with narrow bandwidth network infrastructure including public telephone lines, GSM/GPRS, satellite, and radio.

The use of a redundant network configuration and data buffering guard against the loss of valuable data in the event of a disruption in network communications.

## One window...but multiple systems

Many applications make combined use of DCS and PLC systems. From a single window on the Yokogawa DCS HMI, operators enjoy seamless and transparent access to all the utilities on these different systems, with complete consolidation of all alarms.

## Operation and Monitoring



## One field...spanning hundreds of kilometers

With gas fields, pipelines, and other SCADA applications, field devices are often dispersed over a very wide area, and the annual cost of regularly checking these devices is prohibitively high.

By making use of remote device diagnostics, Yokogawa's plant asset management system enables a much more efficient maintenance approach with dramatic reductions in costs.

Connection	Physical layer	Devices (protocols)
Upper-level systems	Ethernet	VDS (TCP/IP), FAST/TOOLS (TCP/IP, DNP3, Modbus TCP), HIS (Vnet/IP via gateway) other vendor SCADA systems (OPC, DNP3, Modbus TCP)
	Serial (RS-232, RS-422/485)	FAST/TOOLS (Modbus RTU/ASCII), Other vendor SCADA systems (Modbus RTU/ASCII, DNP3)
Other devices	Ethernet	FA-M3 (driver available), MELSEC (driver available), others (Modbus TCP)
	Serial (RS-232, RS-422/485)	FA-M3 (driver available), MELSEC (driver available), others (Modbus RTU/ASCII)
Fieldbus	FOUNDATION Fieldbus	FOUNDATION Fieldbus devices
	HART	HART devices
	PROFIBUS-DP	PROFIBUS-DP devices
	CANopen	CANopen devices
	ISA100	ISA100 Wireless™ devices (via gateway)
	Ethernet	Modbus TCP
	Serial	Modbus RTU/ASCII

Integration  
Reliability  
Network  
Maintenance  
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# Reliability

Highly reliable architecture inherited from Yokogawa's DCS assures stable production even in harsh environments and for complex applications.

## High reliability with single configuration

### Durable design

- Wide operating temperature coverage available (-20 °C to 70 °C ) as an option, also support for each distributed unit with using E2 bus interface module
- Compliant with EMC standards
- Optional G3 coating
- Fan-less design thanks to excellent heat dissipation
- No IC chips mounted on the base module



### Reliable and high speed CPU module

#### High speed control

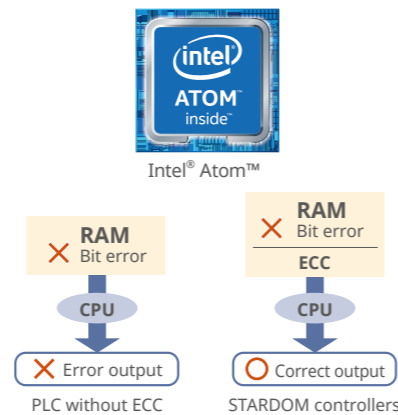
- Fast processing speed for complex applications (5 msec task scan)
- High speed control even with redundant configuration

#### Error correcting code (ECC) memory

- Correction of single-bit errors in RAM prevents unexpected malfunctions

#### Secured file system

- Secure precious data in case of sudden power failure



### Wide variety of I/O modules with self-diagnostic functions

#### AI/O modules for process control

- AI, AO, mixed AI/O, pulse input, frequency input
  - 4 to 20 mA, 1 to 5 V, -10 to +10 V, RTD, TC/mV
  - Channel isolated, isolated, non-isolated
  - Transmitter power supply from AI/O module (\*)
- \*: Check to see each module specification

#### DI/O for a diverse range of applications

- 32 or 64 channels for 24 V DC on/off or transistor contact signals
- 16 channel for 24 V DC on/off relay signals
- 4 channels pulse width output

#### Communication module

- FOUNDATION Fieldbus, PROFIBUS-DP, CANopen, RS-232-C, RS-422, and RS-485

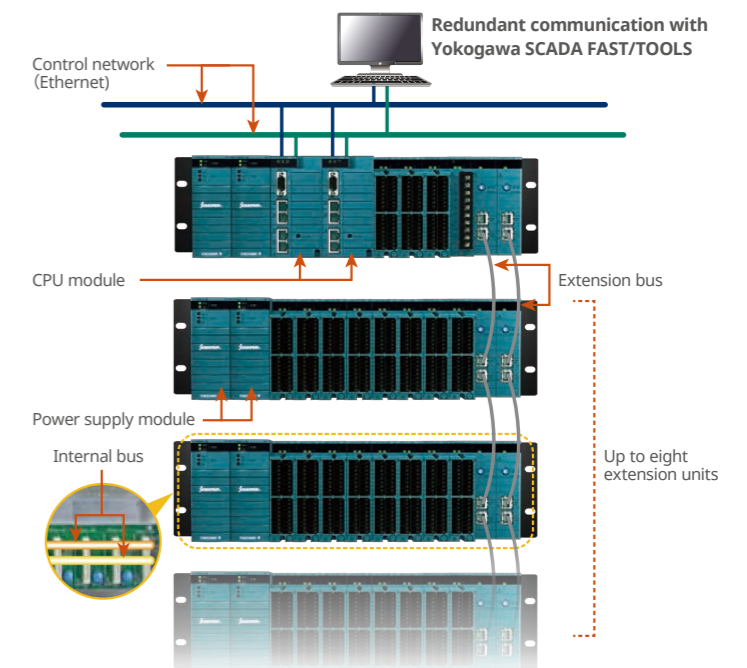


High number of I/O channels on each module reduces the number of modules.

## Even higher reliability with redundant configuration

### Various redundant configurations

- Power supply, CPU, extension unit bus, and control network can be all redundant
- High-speed redundant internal bus on backboard



### Easily change configurations

- Just insert new CPU module, then it is automatically equalized

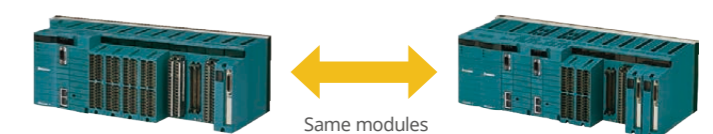


- No software license required
- No special code for redundant configuration in your program
- No special PC tools required for data equalization

## Reliable systems available at lower costs

### Reduce your inventory

- Same CPU modules for single and redundant configurations
- Same power supply, base modules, and I/O modules for single and redundant configurations, also for control and extension units



# Network

The FCN-500 provides flexible system configuration with a wide variety of communication protocols for SCADA and field devices.

## More network ports, more flexibility

### Ethernet: 2 ports (NFCP501)



High speed Ethernet (1 Gbps) ports on CPU module

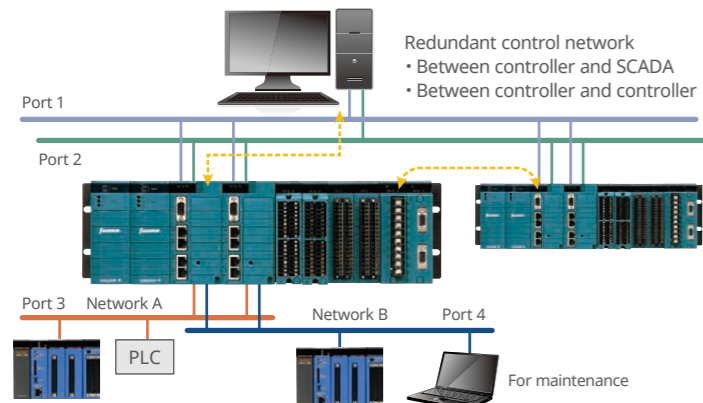
**Port 3 and 4**  
Separated configuration enabled

**Port 1 and 2**  
Redundant or separated configuration enabled

### Ethernet: 4 ports (NFCP502)



## Redundant control network + separated networks

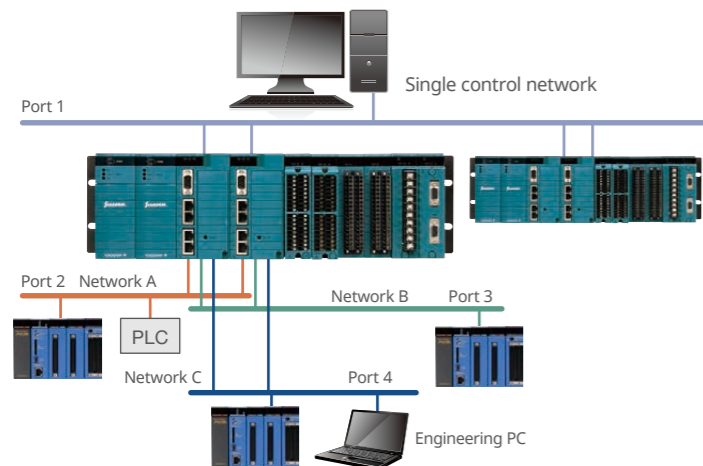


For systems that require reliable communication with SCADA systems

**Port 1 and 2**  
Redundant control network to enhance system reliability.

**Port 3 and 4**  
Separated network for more connections.

## All separated networks



For systems that require more sub-system communications or engineering tools

**Port 1-4**  
Separated network for more connections.

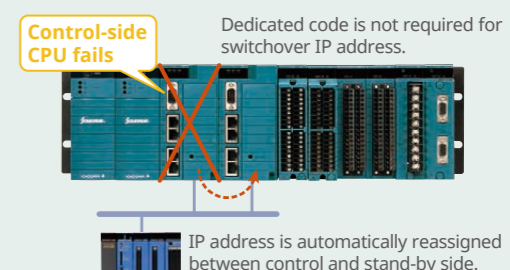
## No extra communication modules, no extra costs

### Communication portfolios on CPU module

- Modbus and DNP3 communications through serial or Ethernet port embedded on the CPU Module\*
- \* The Serial port is disabled when the FCN operates in a redundant CPU configuration.

**Communication is not interrupted by the CPU switchover even on a separated port**

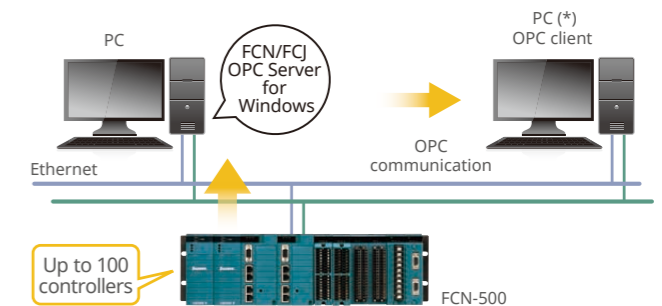
When the control-side CPU is down, IP address on the control-side CPU is automatically reassigned to maintain communication with other systems.



## Reliable network is key to total system reliability

### Communication with other vendor's SCADA software on a duplex network

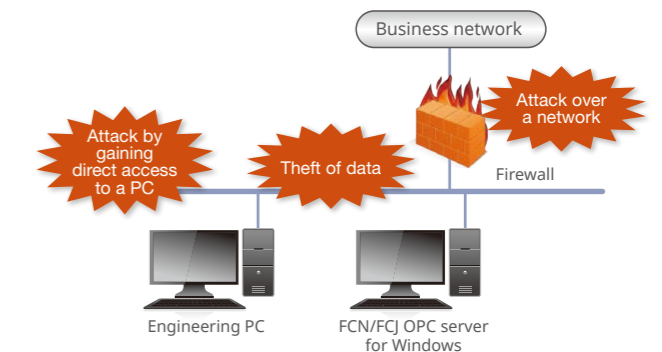
- Compliant with OPC DA2.05a and A&E 1.10
- Duplex network communication between OPC server (FCN/FCJ OPC server for Windows) and FCN-500



\*: OPC client software can be installed on the same PC with FCN/FCJ OPC server for Windows.

### Consistent network security policy

- Yokogawa's standardized IT security tool sets up Windows OS security
- Ensures security settings are consistent with other Yokogawa systems



# Maintenance

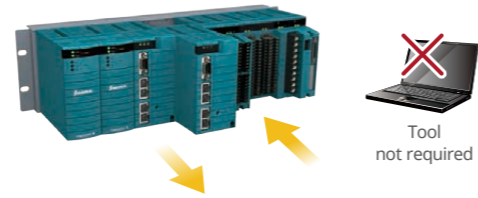
Simple remote and on-site maintenance procedures reduce maintenance hours and prevent human error.

## Replacing modules does not interfere with processes

### All modules are hot-swappable

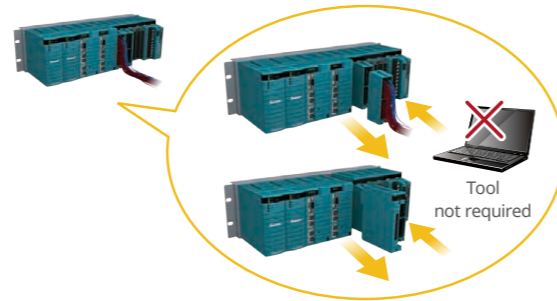
#### Non-stop operation for redundant CPU

- All program copy (APC) synchronizes the control side and stand-by side CPUs without using any PC tools



#### Quick start after replacing I/O

- I/O modules can be changed without rewiring
- I/O definitions automatically downloaded to I/O modules without using any PC tools
- Values (fallback function) are output continuously even if the CPU fails

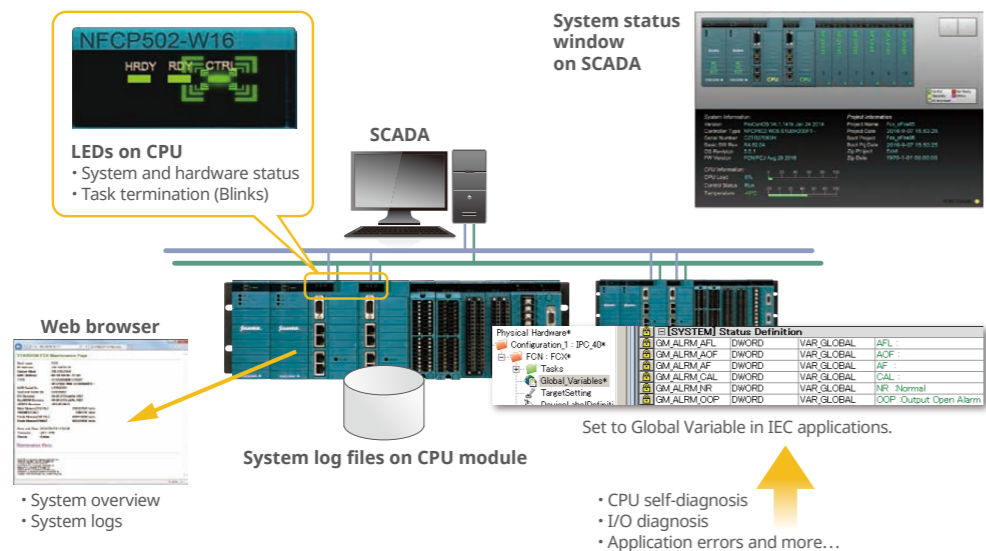


#### Online battery replacement

- Battery accessible from the front
- Online changeable battery
- Self-diagnostic function detecting lower battery



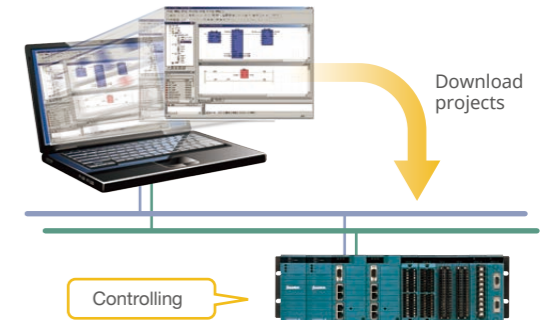
## System information is available locally and remotely



## Simplified site maintenance reduces engineering workload

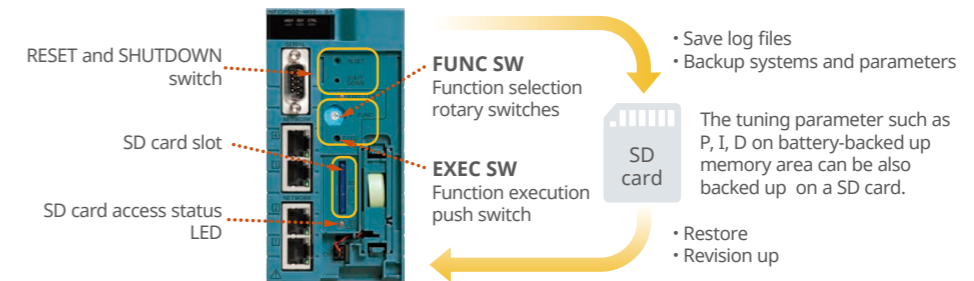
### Online download

- No need to stop a controller to modify the control application
- Automatic application synchronization of dual redundant CPUs when downloading with Logic Designer
- Variables inherited from previous applications



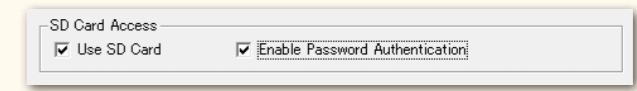
### PC-less maintenance

- SD card for saving and restoring system information
- Select maintenance operations with the FUNC SW then click the EXEC SW to execute



### Higher security for operations on site

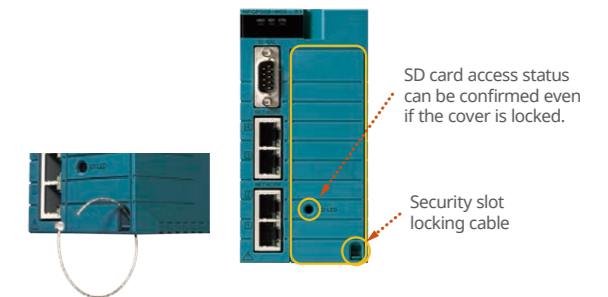
- SD card password can be set on Resource Configurator to prevent illegal access
- Disable EXEC SW to prevent mis-operation



### Sealing for site access authentication

Hardware sealing is important to detect unauthorized access.

- Front cover prevents unauthorized access to the systems
- Seal needs to be broken to open the front cover, confirming illegal or unauthorized access



# Engineering : Engineering Tool

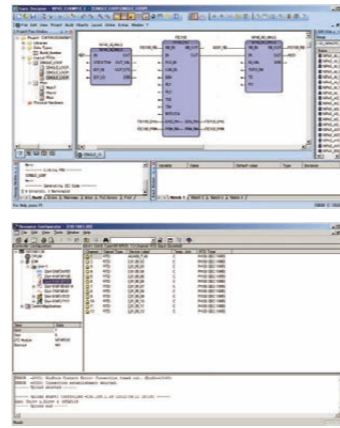
A wealth of libraries and templates provide efficient engineering with IEC 61131-3 compliant programming languages.

## Enhanced application portability through division of logical and physical layers

### A platform independent architecture enhances application portability

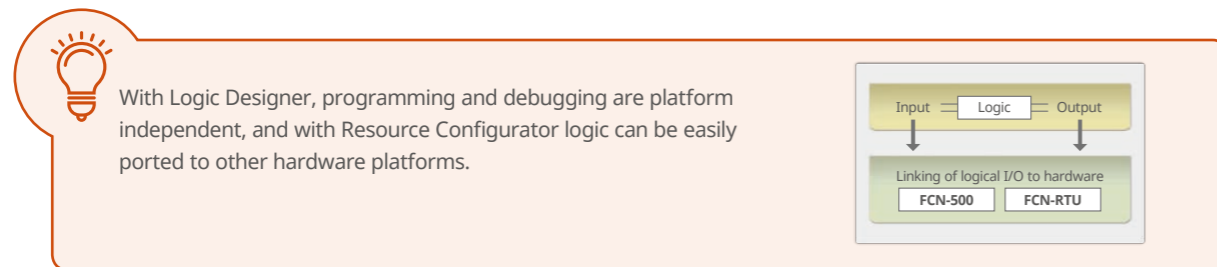
#### Logic Designer: Control application development tool

- Platform independent programming tool
- Loop and sequential control with the same development tool
- Intuitive look & feel with automated application layout
- Project comparison function for confirming modifications



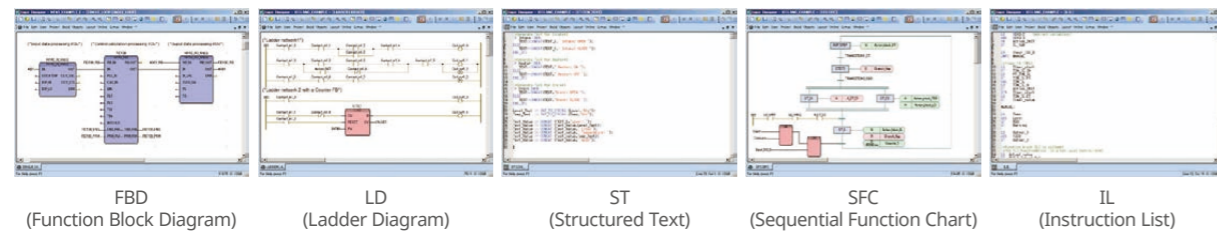
#### Resource Configurator: Hardware configuration tool

- Connects control application logical I/O with actual hardware I/O
- Configures hardware settings for IP addresses, serial ports, etc.



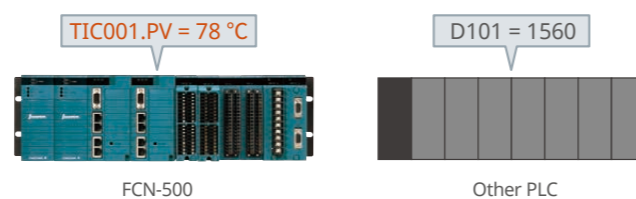
## IEC 61131-3 compliant programming

Supports all five IEC 61131-3 languages



## Industry quantity conversion

- Internal analog data (0 % to 100 %) is converted to industrial quantities such as °C for easy and intuitive programming and debugging
- The intuitive display of data improves programming efficiency



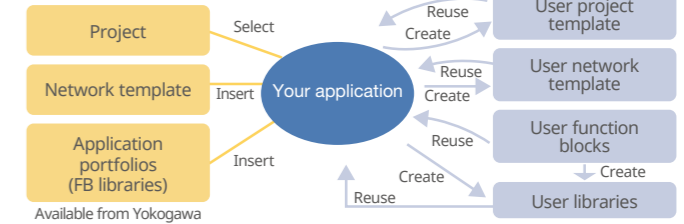
## Reuse of applications reduces engineering costs and speeds up commissioning

### Efficient reusable engineering processes

Many skid and utility programs are quite similar.

Through modularization, you can have better applications, reduce engineering costs, and speed up commissioning.

#### Typical engineering process



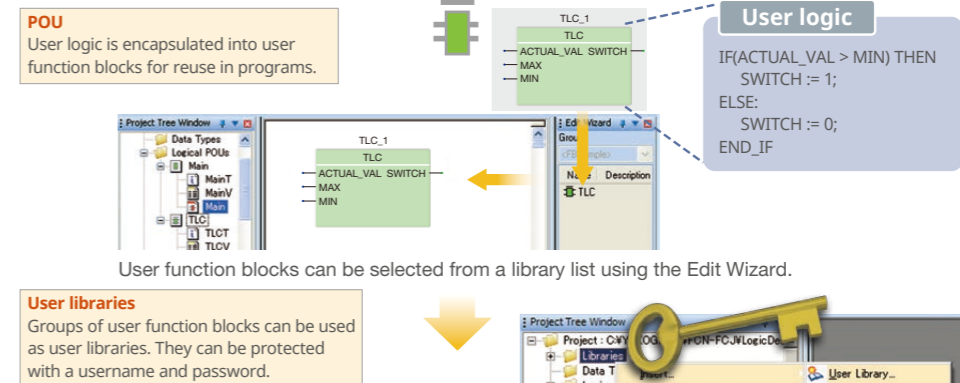
### Make your own APPFs

Applications programmed with IEC 61131-3 languages are well structured and easily modularized.

User logic can be integrated into program organization unit (POU) and provided as a library called application portfolio (APPF).

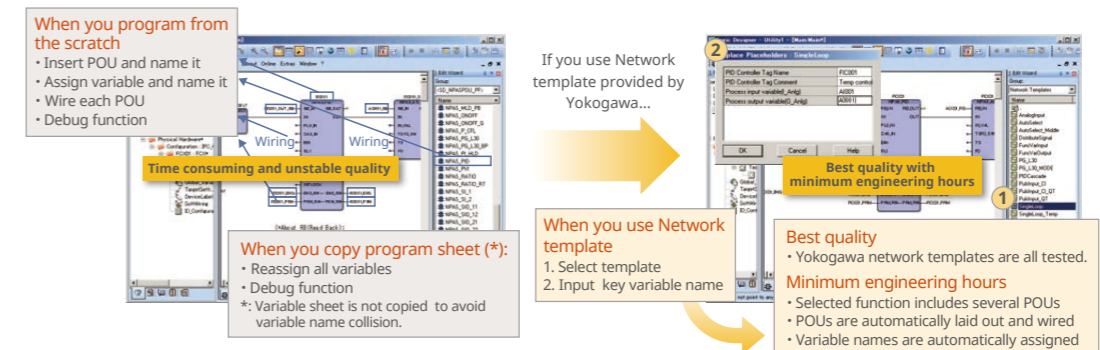
### Modularized applications

- Easy reuse of modularized applications, user function blocks, and libraries
- Password protection of function blocks protecting your industry know-how
- Drag and drop of function blocks to a program sheet



### Network template

The network template function is an advanced copy function that eliminates the need to reenter variables.



Integration  
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# Engineering : Application Portfolio

A variety of application portfolios bundled in the CPU module reduce engineering hours and enhances quality.

## Just select a CPU model to use functions

N/A: Not available

Portfolio	Functions	With standard function (NFCP50□-S□□)	With extended functions (NFCP50□-W□□)	Software media (*)
PAS	Process automation libraries	N/A	✓	NT203AJ
Gas Flow Calculation	Gas flow calculation	N/A	✓	NT205AJ
Liquid Flow Calculation	Liquid flow calculation	N/A	✓	NT205AJ
Modbus communication	Modbus communication	✓	✓	NT205AJ
DNP3 communication	DNP3 communication	✓	✓	NT205AJ
FA-M3 communication	Communication with FA-M3 PLC	✓	✓	NT205AJ
MELSEC communication	Communication with MELSEC PLC	✓	✓	NT205AJ
SYSMAC communication	Communication with SYSMAC PLC	✓	✓	NT205AJ
Time synchronization	Simple Network Time Protocol (SNTP)	✓	✓	NT205AJ

\*: Please refer to the Software Selection on "SELECTION GUIDE" page.

## Communication portfolio for a variety of communication

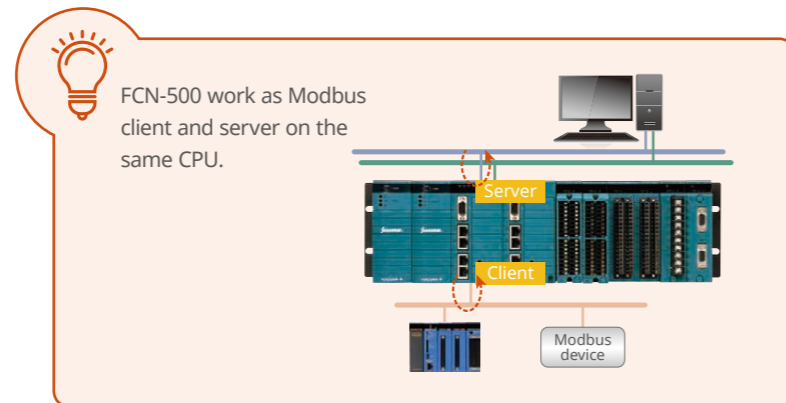
### Modbus communication portfolio

Type	Mode	Function
Serial	ASCII	Master/Slave
	RTU	Master/Slave
Ethernet	TCP	Client/Server

### DNP3 communication portfolio

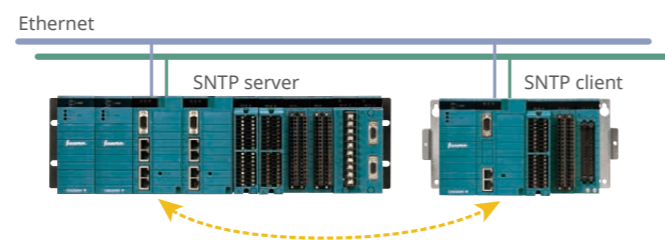
Type	Function
Serial	Slave
Ethernet	Server

- FA-M3 communication portfolio
- MELSEC communication portfolio
- SYSMAC communication portfolio



## Time synchronization for synchronizing time among controllers

Both of simple network time protocol (SNTP) server and client functions embedded on CPU module.



## Industry expertise is concentrated into application portfolio

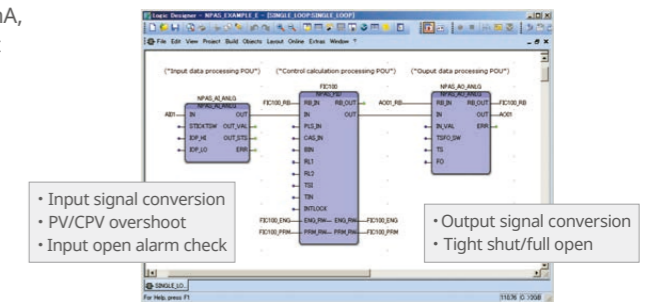
### Gas/Liquid Flow Calculation portfolio

- AGA 3, 7, 8, 9, 10, 11
- GPA2172
- API21.1 compliant
- API MPMS 20.1
- API MPMS 11.1

## PAS portfolio cultivated from Yokogawa's DCS expertise

### Straightforward programming for easy maintenance

- Input and output POU's prepared for processing of 4-20 mA, RTD, mV, FOUNDATION Fieldbus, and other types of input and output signals
- Read back (RB) connections prevent code nesting in feedback control



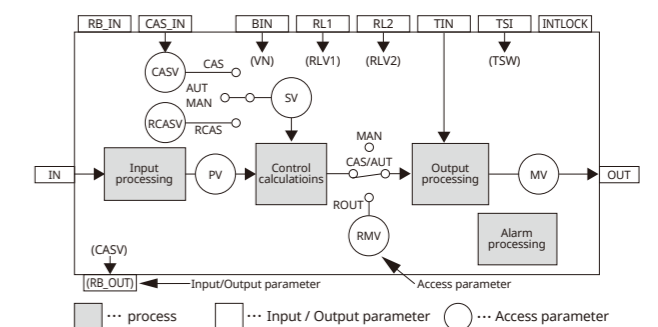
### Wide variety of POU's available on PAS APPF

Type	Example
I/O processing	NPAS_AI_ANLG (AI input) and more for analog input and output NPAS_DI_STS (Status input) and more for digital input and output NPAS_AI_HART (HART variable input) for HART communication NPAS_FFRD_ANLG (FOUNDATION Fieldbus analog input) and more for FOUNDATION Fieldbus data
Regulatory	NPAS_PID (PID), NPAS_PVI (PVI), NPAS_ONOFF (two-position on/off) and more
Arithmetic	NPAS_LAG (Lead/Lag), NPAS_DLAY (Dead time), NMA5_AVE_M (Moving average) and more
Sequence	NPAS_SI/SO/SIO (Switch instrument), NPAS_TM (Timer with preset value) and more
Utility	NPAS_SQRT_LC (Square root extraction with low-input cutoff) and more

### Integrated control processing in a single POU

Input, alarm, control calculation, and output processing can all be integrated in individual POU's for smooth linking between functions.

- The integration of various types of processing in a single POU simplifies the creation of programs
- Individual POU's can be accessed as a tag by an FCN application or SCADA system



### Access and engineering parameters

NPAS POU's have two types of parameters that perform different functions.

- The function of a parameter can be identified by looking at its type
- Access parameters (PV, SV, MV and others) are set on SCADA during the operation phase
- Engineering parameters (tracking definition, control action switch, bypass switch, and others) are specified during the engineering phase and have initial values



# Engineering : Debugging Aids

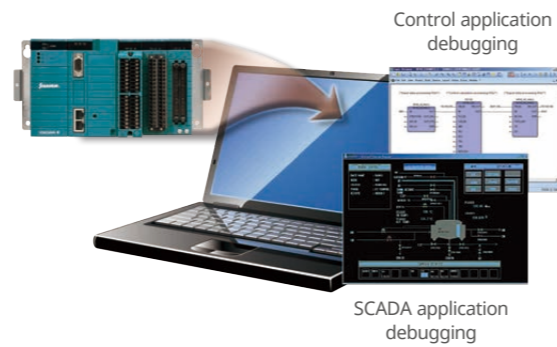
Programming and debugging applications without actual controllers reduces engineering hours and increases efficiency.

## Efficient debugging reduces engineering hours

### Debugging on PCs without actual controllers

Minimize engineering costs by doing both programming and debugging on one PC.

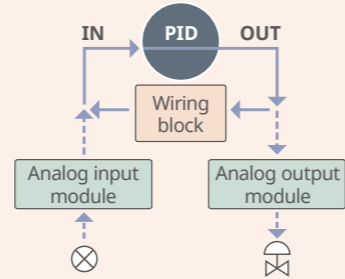
- Simulate control functions
- Program, modify, and debug logic
- Debug both control and SCADA applications



### Debugging IN/OUT process even without actual wiring

A software wiring function simulates the input and output signals without the actual wiring. This eliminates the need for a signal generator and test switches during loop check and logic debugging.

- Wizard available for easy configuration
- With software wiring, input open alarms (IOP) and output open alarms (OOP) are ignored

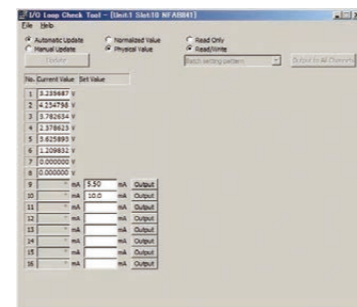


### Debugging on actual controllers

#### Wiring check

Resource Configurator's loop check (wiring check) tool allows you to check the status of your wiring without having to use a calibrator or test switch.

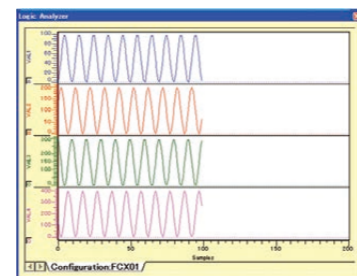
- Confirms the actual input signals for each channel
- Manually outputs signals to I/O modules



#### Logic Analyzer

Logic Analyzer saves you time investigating and analyzing software malfunctions.

- Records variables in continuous and cycle modes
- Exports the recorded data to text format files
- Adjusts curve colors and scales/ranges on individual axes



# SCADA

## Integrated remote control and monitoring distributed utilities

Client and server configuration of Yokogawa's SCADA FAST/TOOLS integrates the remote control and operation of distributed utilities.

### Web-based supervision

A Web-based HMI is a cost effective solution that provides anytime/anywhere access to the information needed to make quick and timely decisions.

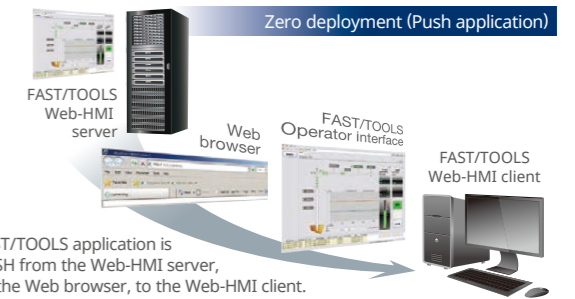
- The Web-based HMI eliminates the need for client software installation and maintenance
- Process and product information can be shared across the enterprise on devices such as notebook PCs and smartphones
- Web security technology on HMI clients ensures that only authorized individuals gain access to data and applications



### Scalable and flexible

At minimum cost, the system can be scaled up to cover applications of any size.

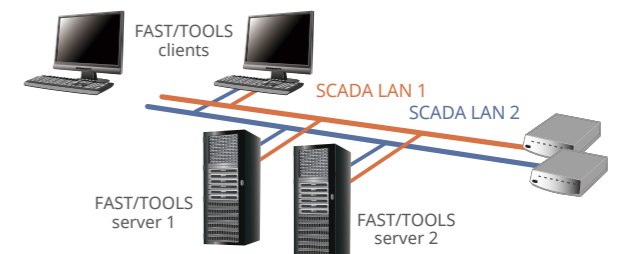
- Capable of handling up to one million I/O points
- Online configuration with no downtime
- Supports a variety of operating systems: Windows, Windows Server, Linux, HP-UX



### Reliable architecture

Continuous operation and zero downtime assured with high availability computing (HAC).

- A HAC package enables the configuration of a standby FAST/TOOLS server
- Real-time data synchronization and watchdog monitoring of system health
- Fast automatic or manual switchover



### SCADA integration with controllers

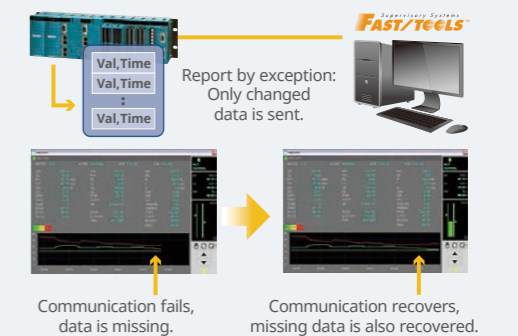
With applications that are distributed over a wide area, GPRS, satellite, and other types of narrow bandwidth wireless communications are often used. However, communications can easily be disrupted and the cost of transferring large amounts of data is often prohibitive. The use of FAST/TOOLS with the FCN/FCJ controllers enables the following:

#### Report by exception

To hold down communications costs, only changed data is sent to FAST/TOOLS.

#### Network fail-over

With the time stamping of data from the FCN/FCJ controllers, a smooth switchover with the recovery of all data is assured in the event of a network failure.

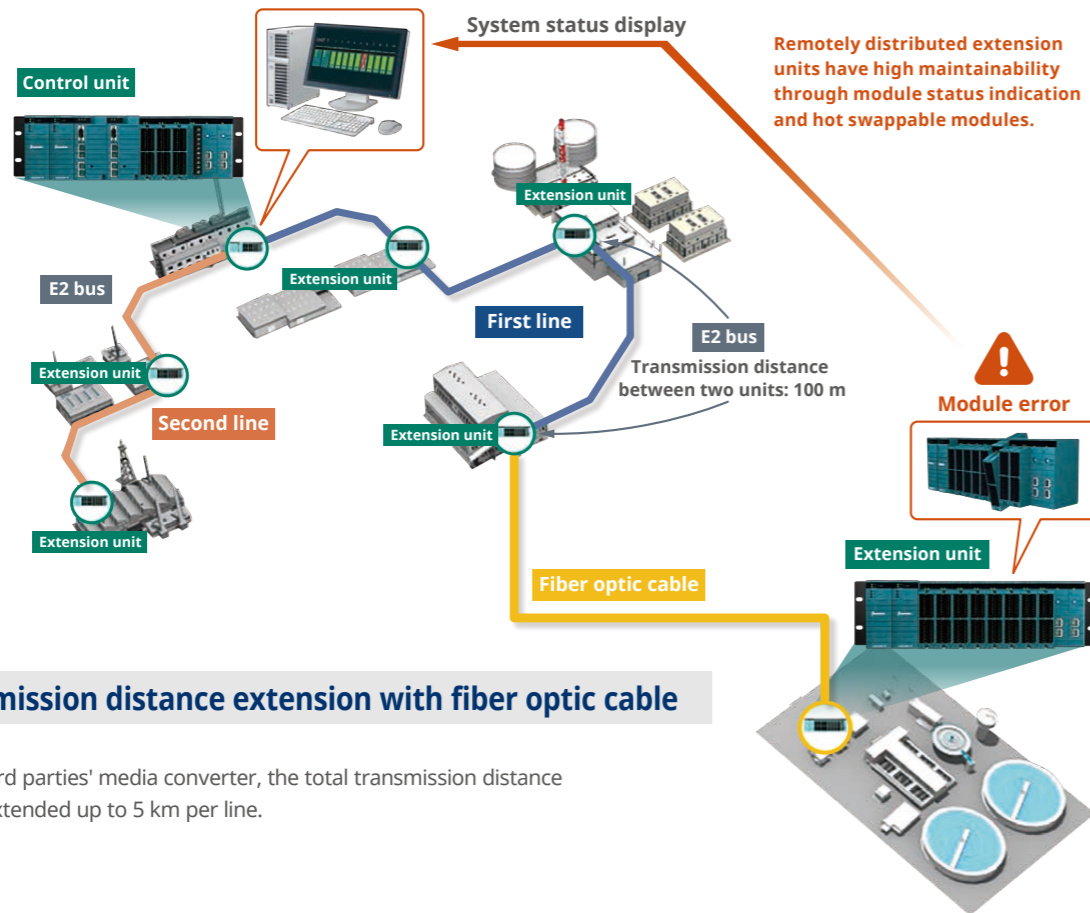


# Configurations

I/O unit extension bus (E2 bus) with 3 types of base module enable various system configurations.

## Extension units as remote I/O

Max. transmission distance between two units: 100 m  
 Max. total transmission distance per line: 800 m (with 8 extension units in 1 line)

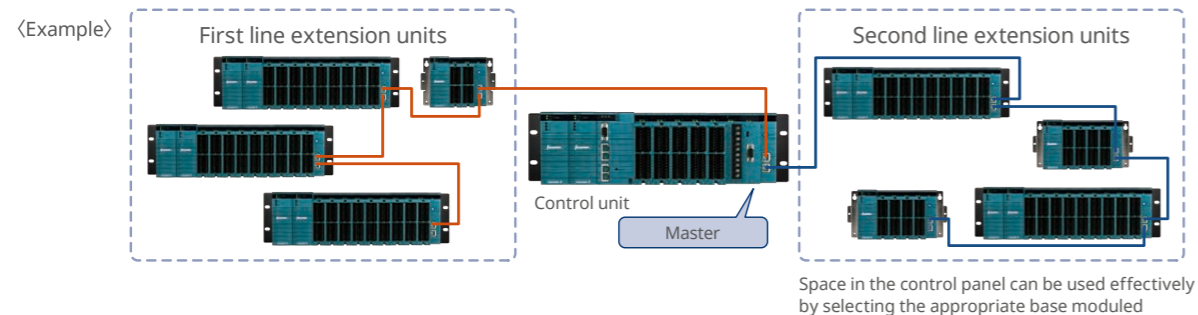


## Transmission distance extension with fiber optic cable

Using third parties' media converter, the total transmission distance can be extended up to 5 km per line.

## Flexible arrangement

- Long, short, and compact base module are selectable depending on the installation space
- 2 lines of daisy-chain connection



## Control unit alone

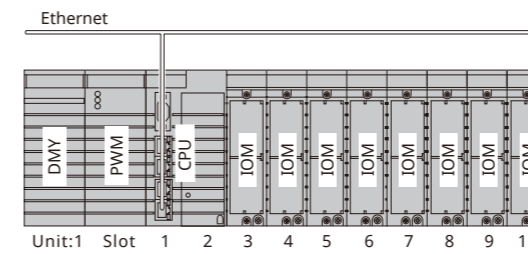
### Maximum I/O module configurations

Base Module	Unit Configuration	Standard	Duplexed (*1)
NFBU200 base module (long)	Control unit alone	Max.8 modules	Max.6 modules
N2BU051 base module (short)	Control unit alone	Max.3 modules	Not applicable (*2)
NFBU050 base module (short)	Control unit alone	Max.3 modules	Not applicable (*2)
N2BU030 base module (compact)	Control unit alone	Max.1 modules	Not applicable (*2)

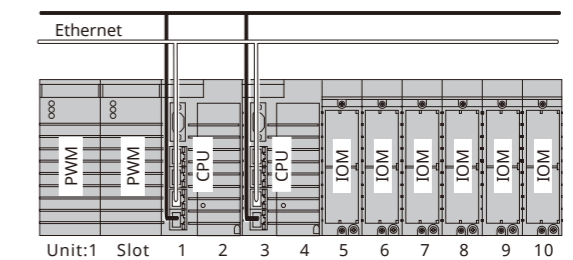
\*1 : When CPU modules are duplexed.

\*2 : Neither power supply nor CPU modules can be duplexed on N2BU051, NFBU050, or N2BU030.

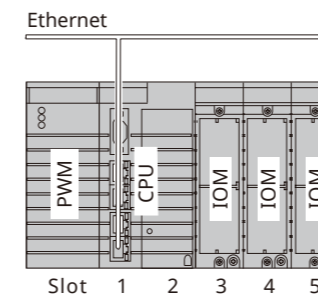
### Standard control unit



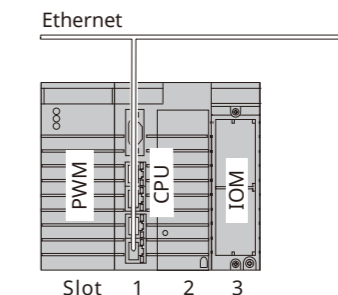
### Control unit with duplexed CPU and power supply modules



### Short control unit



### Compact control unit



### I/O expansion with E2 bus

#### Maximum I/O module configurations

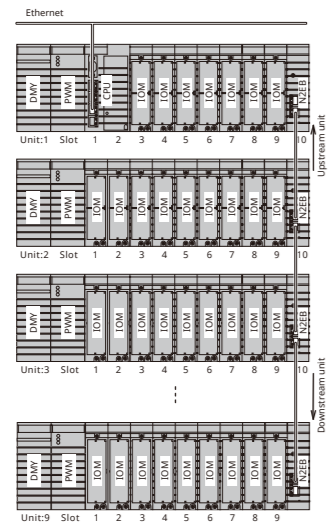
Base Module	Unit Configuration	Standard	Duplexed(*1)
NFBU200 base module (long)	Control unit with 8 extension units(*2)	Max.79 modules	Max.68 modules

Note : NFBU200 CPU modules style S2 or later is required to use the E2 bus interface module.

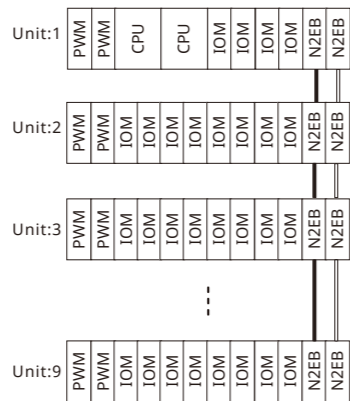
\*1 : When CPU and E2 bus interface module are duplexed.

\*2 : When NFBU200 base modules are used in all extension units.

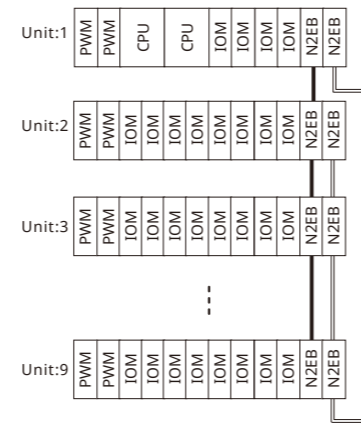
#### Standard control unit + 8 extension units with E2 bus interface modules / 1 lines



#### Control unit with duplexed CPU modules, power supply modules, and E2 bus + 8 extension units / 1 lines



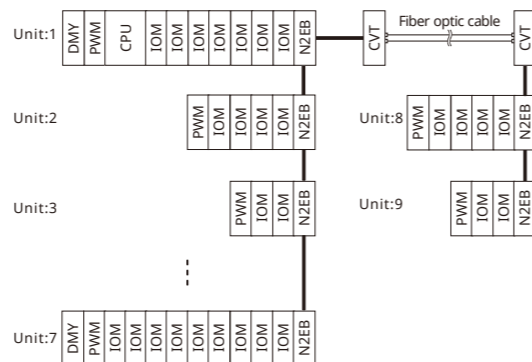
#### Control unit with duplexed CPU modules, power supply modules, and E2 bus + 8 extension units / 1 lines (Ring like topology)



#### Control unit with duplexed CPU modules, power supply modules, and E2 bus + 8 extension units / 2 lines





#### Mixed base module configuration, E2 bus + 8 extension units / 2 lines (with fiber optic cable)



Abbreviation	Description
PWM	Power supply module
CPU	CPU module
IOM	I/O module
N2EB	E2 bus interface module
NFSB	SB bus repeat module
DMY	Dummy cover for power supply Module Slot

### FCN CPU SPECIFICATIONS

Items	Specification
Model	NFCP501 CPU module for FCN (with 2 Ethernet ports)  NFCP502 CPU module for FCN (with 4 Ethernet ports) 
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 32 GB) Class 10
Serial port (*1)	1 RS-232-C port : D-sub 9 pins, male (*2)
Network interface	Communication Method: Full/Half duplex (software settings)
	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 : RJ45 modular jacks
	Baud rate: 1000, 100, 10 Mbps, (1000BASE-T, 100BASE-TX, 10BASE-T)
I/O interface	SB bus (duplex)
RAS features	Watch dog 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, 1 LED 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 ± 5 %
	Current consumption: Max.1200 mA
Duplex configuration	Possible (*5)
Weight	0.9 kg
Size	Dimensions (W × H × D): 65.8 × 130 × 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 and same suffix codes) for the CPU module duplex configuration.

### CPU FUNCTION SPECIFICATIONS

#### Common CPU specifications

##### TASK EXECUTION

Execution speed:	Approx. 10 μ per Ksteps in an IL program
Number of control applications:	Max.16 tasks
Task priority:	Can be specified (in 16 levels)
Task execution cycle:	5 msec or longer (by 5 msec. increments) (*1)

##### CPU MEMORY CAPACITY

Control application capability:	Max.3 MB (approx. 400 Ksteps in an IL program)
Data area (*2):	Max.8 MB
Retained data area (*3):	Max.700 KB
Duolet application:	Max.32 MB

\*1 : When using the I/O module, task execution cycle is recommended more than 20 msec.

\*2 : The data is not retained when the power is off.

\*3 : The data is retained even if the power is off. The data is retained during a power failure (can be used to store tuning parameter settings for the control application).

#### Guideline of control application capability

As a guideline, the capacity of the control application is a total of the following:

##### Function blocks (POUs): Up to 512

- Regulator control blocks (e.g., indicator blocks, controller blocks, and manual loaders): Up to 128
- Others (e.g., calculation blocks, switch instrument blocks, and communication POU): Up to 384

##### Sequence program:

Up to 180 Ksteps in Ladder or up to 128 sequence tables each of which has 32 condition and 32 action rows.

#### Network (Ethernet) specifications

##### Communicate with up to 15 FCN per FCN

##### Communicate with up to 8 upper systems (\*1) per FCN

\*1 : Total number of VDS, FCN/FCJ OPC Server and FAST/TOOLS. The FCN/FCJ OPC server counts as 2 units. The FAST/TOOLS with duplexed network counts as 2 units.

FCN MODULE SPECIFICATIONS

CPU MODULES

WTR: Wider temperature range (-20 °C to +70 °C), N/A: (0 °C to 55 °C)

Model	Name	Suffix codes	WTR	Specification
NFCP501	CPU module for FCN (with 2 Ethernet ports)	- □ 0 □	N/A	<ul style="list-style-type: none"> <li>Duplex configuration: Possible (*1)</li> <li>Hot-Swap: Possible</li> <li>CPU Status LED: HRDY (Hardware Ready), RDY (System Ready), CTRL (Control Ready)</li> <li>LAN Status LED: LINK (Connection Normal), ACT (Sending/Receiving)</li> <li>SD Status LED: Lights (Mounted), Blinks (Accessed)</li> <li>EXEC Status LED: Lights (Maintenance function Error), Blinks (Maintenance function Executed)</li> <li>Max current consumption: 1200 mA (5 V DC ±5 %)</li> <li>Weight: 0.9 kg</li> <li>Ethernet: 2 ports</li> <li>RS-232-C: 1 port</li> </ul>
		- □ 1 □	✓	
NFCP502	CPU module for FCN (with 4 Ethernet ports)	- □ 0 □	N/A	<ul style="list-style-type: none"> <li>Duplex configuration: Possible (*1)</li> <li>Hot-Swap: Possible</li> <li>CPU Status LED: HRDY (Hardware Ready), RDY (System Ready), CTRL (Control Ready)</li> <li>LAN Status LED: LINK (Connection Normal), ACT (Sending/Receiving)</li> <li>SD Status LED: Lights (Mounted), Blinks (Accessed)</li> <li>EXEC Status LED: Lights (Maintenance function Error), Blinks (Maintenance function Executed)</li> <li>Max current consumption: 1700 mA (5 V DC ±5%)</li> <li>Weight: 0.9 kg</li> <li>Ethernet: 4 ports</li> <li>RS-232-C: 1 port</li> </ul>
		- □ 1 □	✓	

\*1 : Use a couple of the CPU module of the same type (same Model and same suffix codes) for the CPU module duplex configuration.

BASE MODULES

WTR: Wider temperature range (-20 °C to +70 °C), N/A: (0 °C to 55 °C)

Model	Name	Suffix codes	WTR	Specification
NFBU200	Base module (19-inch rack-mounted)	-S0 □	✓	<ul style="list-style-type: none"> <li>Max current consumption: 0.4 A (5 V) (Self-consumption)</li> <li>Weight: 1.9 kg</li> </ul>
	Base module (DIN rail-mounted)	-S1 □	✓	<ul style="list-style-type: none"> <li>Max current consumption: 0.4 A (5 V) (Self-consumption)</li> <li>Weight: 1.0 kg</li> </ul>
NFBU050	Short base module (DIN rail-mounted)	-S1 □	✓	<ul style="list-style-type: none"> <li>Max current consumption: 0.025 A (5 V) (Self-consumption)</li> <li>Weight: 0.6 kg</li> </ul>
N2BU051	Short base module (For E2 bus, DIN rail-mounted)	-S1 □	✓	<ul style="list-style-type: none"> <li>Max current consumption: 0.035 A (5 V) (Self-consumption)</li> <li>Weight: 0.6 kg</li> </ul>
N2BU030	Compact base module (DIN rail-mounted)	-S1 □	✓	<ul style="list-style-type: none"> <li>Max current consumption: 0.025 A (5 V) (Self-consumption)</li> <li>Weight: 0.5 kg</li> </ul>

POWER SUPPLY MODULES

WTR: Wider temperature range (-20 °C to +70 °C), N/A: (0 °C to 55 °C)

Model	Name	WTR	Specification
NFPW441	Power supply module (100-120 V AC input)	N/A	<ul style="list-style-type: none"> <li>Duplex configuration: Possible</li> <li>Hot-Swap: Possible</li> <li>Rated output: +5.1 V DC, 7.8 A</li> </ul>
NFPW442	Power supply module (220-240 V AC input)	N/A	<ul style="list-style-type: none"> <li>Analog field power supply: Input: 24 V DC ±10 %, 4 A, Duplexed (matching-diode)</li> <li>LED: SYS (5 V system power output ON), FLD (24 V field power supply ON)</li> </ul>
NFPW444	Power supply module (24 V DC input)	✓	<ul style="list-style-type: none"> <li>Checking terminals: +5 V, +24 V</li> <li>Weight: 0.6 kg</li> </ul>

E2 BUS INTERFACE MODULE

WTR: Wider temperature range (-20 °C to +70 °C), N/A: (0 °C to 55 °C)

Model	Name	WTR	Specification
N2EB100	E2 bus interface module	✓	<ul style="list-style-type: none"> <li>Duplex configuration: Possible</li> <li>Hot-Swap: Possible</li> <li>Method: Serial communication (100 Mbps)</li> <li>Distance: Max.100 m between two units</li> <li>Extension units: Max.8 units</li> <li>LED: RDY (Hardware Normal), ACT (In transmission), LNK (Connection Normal)</li> <li>Max current consumption: 500 mA (5 V DC)</li> <li>Weight: 0.2 kg</li> </ul>

SB BUS REPEAT MODULES

WTR: Wider temperature range (-20 °C to +70 °C), N/A: (0 °C to 55 °C)

Model	Name	WTR	Specification
NFSB100	SB bus repeat module	N/A	<ul style="list-style-type: none"> <li>Duplex configuration: Possible</li> <li>Hot-Swap: Possible</li> <li>Method: Serial communication (128 Mbps)</li> <li>Distance: Max.8 m per segment</li> <li>LED: STATUS (Hardware Ready), SND (Sending), RCV (Receiving)</li> <li>Max current consumption: 500 mA (5 V DC)</li> <li>Weight: 0.2 kg</li> </ul>

DIGITAL I/O MODULES

WTR: Wider temperature range (-20 °C to +70 °C), N/A: (0 °C to 55 °C), PCT: Pressure Clamp Terminal available

Model	Description	WTR	PCT	MIL	Basic Specification	Specification	Common
NFDV151	Digital Input • 32 ch. • 24 V DC • Isolated	✓	✓	✓ 50 pins	<ul style="list-style-type: none"> <li>Functions: Status and Push button (edge count)</li> <li>Max current consumption: 500 mA (5 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Input response time: 8 ms or less (for status input)</li> <li>Min. ON detection time: 20 ms (for push button input)</li> <li>Max. ON/OFF cycle: 25 Hz (for push button input)</li> </ul>	per 16 ch. (Plus or Minus)
NFDV161	Digital Input • 64 ch. • 24 V DC • Isolated	N/A	N/A	✓ 50 pins 2 sets	<ul style="list-style-type: none"> <li>Functions: Status and Push button (edge count) (*2)</li> <li>Max current consumption: 550 mA (5 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Input response time: 8 ms or less (for status input)</li> <li>Min. ON detection time: 20 ms (for push button input)</li> <li>Max. ON/OFF cycle: 25 Hz (for push button input)</li> </ul>	per 16 ch. (Plus or Minus)
NFDV551	Digital Output • 32 ch. • 24 V DC • Isolated	✓	✓	✓ 50 pins	<ul style="list-style-type: none"> <li>Output fallback: Set to all channels</li> <li>Max current consumption: 700 mA (5 V DC), 60 mA (24 V DC)</li> <li>Weight: 0.2 kg</li> </ul>	<ul style="list-style-type: none"> <li>Output response time: 3 ms or less (for status output)</li> </ul>	per 16 ch. (Minus)
NFDV561	Digital Output • 64 ch. • 24 V DC • Isolated	N/A	N/A	✓ 50 pins 2 sets	<ul style="list-style-type: none"> <li>Output fallback: Set to all channels</li> <li>Max current consumption: 780 mA (5 V DC), 120 mA (24 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Output response time: 3 ms or less (for status output)</li> </ul>	per 16 ch. (Minus)
NFDV532	Pulse Width Output • 4 ch.: UP/DOWN Pulse • 24 V DC • Isolated	N/A	✓	✓ 50 pins	<ul style="list-style-type: none"> <li>Output fallback: Set to all channels</li> <li>Max current consumption: 550 mA (5 V DC), 25 mA (24 V DC)</li> <li>Weight: 0.2 kg</li> </ul>	<ul style="list-style-type: none"> <li>Pulse output accuracy: Min.2 ms, 2 ms increments (error: Max. ±1 ms)</li> </ul>	for all ch. (Minus)
NFDR541 (*3)	Relay Output • 16 ch. • 24 V DC • Isolated	✓	✓	N/A	<ul style="list-style-type: none"> <li>Rated applied voltage: 24 V DC</li> <li>Output fallback: Set to all channels</li> <li>Max current consumption: 780 mA (5 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Output response time: 12 ms or less (for status output)</li> </ul>	per 8 ch. (Plus or Minus)

Common Specification • LED: STATUS (Hardware normal), ACT (Operating) • Hot-Swap: Possible

\*2 : Channels from 1 to 32 can be push button inputs.

\*3 : NFDR541 is not compliant with CE marking.

COMMUNICATION MODULES

WTR: Wider temperature range (-20 °C to +70 °C), N/A: (0 °C to 55 °C)

Model	Description	WTR	Basic Specification	Specification	Remarks
NFLR111	RS-232-C communication module (2 ports, 300 bps to 115.2 kbps)	N/A	<ul style="list-style-type: none"> <li>Max current consumption: 500 mA (5 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Port: RS-232-C (2 ports)</li> <li>Speed: 0.3 to 115.2 kbps</li> </ul>	D-sub 9 pins (female x 2)
NFLR121	RS-422/RS-485 communication module (2 ports, 300 bps to 115.2 kbps)	✓	<ul style="list-style-type: none"> <li>Max current consumption: 500 mA (5 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Port: RS-422/485 (2 ports)</li> <li>Speed: 0.3 to 115.2 kbps</li> </ul>	Clamp terminal with M4 screws (5 poles x 2)
NFLF111	FOUNDATION Fieldbus communication module	✓ (*4)	<ul style="list-style-type: none"> <li>Max current consumption: 500 mA (5 V DC)</li> <li>Weight: 0.4 kg</li> </ul>	<ul style="list-style-type: none"> <li>Port: 4 ports • 16 devices per port</li> <li>Speed: 31.25 kbps</li> <li>Link Active Scheduler (LAS)</li> </ul>	Clamp terminal
NFLP121	PROFIBUS-DP communication module	N/A	<ul style="list-style-type: none"> <li>Max current consumption: 700 mA (5 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Port: 1 port</li> <li>123 devices per module (if repeaters used)</li> </ul>	D-sub 9 pins (female)
NFLC121	CANopen communication module	N/A	<ul style="list-style-type: none"> <li>Max current consumption: 700 mA (5 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Port: 1 port • CiA 301 compliant</li> <li>126 devices per module</li> </ul>	D-sub 9 pins (male)

Common Specification • LED: STATUS (Hardware normal), ACT (Operating), RCV (Receiving), SND (Sending)

\*4 : The module with suffix codes -S□4 or -S□5 are required for wide temperature range.

FCN MODULE SPECIFICATIONS

ANALOG I/O MODULES

WTR : Wider temperature range (-20 °C to +70 °C), N/A: (0 °C to 55 °C), PCT : Pressure Clamp Terminal available

Model	Description	HART	WTR	PCT	MIL	Basic Specification	Specification
NFAI135	Analog Input • 4 to 20 mA • 8 ch. • Isolated ch.	✓	✓	✓	✓ 40 pins	<ul style="list-style-type: none"> <li>Withstanding voltage: 500 V AC between input and system, 500 V AC between channels</li> <li>Transmitter power supply: 20.2 to 29.3 V (Output current limit: 25 mA)</li> <li>Two wire and four wire transmitter setting per channel with connected terminal</li> <li>Max current consumption: 360 mA (5 V DC), 450 mA (24 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Accuracy: ±0.1 % of full scale</li> <li>Data refresh cycle: 10 ms</li> <li>Input step response time: 100 ms</li> <li>Temperature drift: Max. ±0.01 % /°C</li> </ul>
NFAI141	Analog Input • 4 to 20 mA • 16 ch. • Non-Isolated	✓	✓	✓	✓ 40 pins	<ul style="list-style-type: none"> <li>Transmitter power supply: 22.8 to 26.4 V (Output current limit: 27 mA)</li> <li>Two wire and four wire transmitter setting per channel with pins</li> <li>Max current consumption: 310 mA (5 V DC), 450 mA (24 V DC)</li> <li>Weight: 0.2 kg</li> </ul>	<ul style="list-style-type: none"> <li>Accuracy: ±0.1 % of full scale</li> <li>Data refresh cycle: 10 ms</li> <li>Input step response time: 100 ms</li> <li>Temperature drift: Max. ±0.01 % /°C</li> </ul>
NFAI143	Analog Input • 4 to 20 mA • 16 ch. • Isolated	✓	✓	✓	✓ 40 pins	<ul style="list-style-type: none"> <li>Withstanding voltage: 1500 V AC between input and system</li> <li>Transmitter power supply: 24.0 to 25.5 V (Output current limit: 25 mA)</li> <li>Two wire and four wire transmitter setting per channel with pins</li> <li>Max current consumption: 230 mA (5 V DC), 540 mA (24 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Accuracy: ±0.1 % of full scale</li> <li>Data refresh cycle: 10 ms</li> <li>Input step response time: 100 ms</li> <li>Temperature drift: Max. ±0.01 % /°C</li> </ul>
NFAV141	Analog Input • 1 to 5 V • 16 ch. • Non-Isolated	N/A	N/A	✓	✓ 40 pins	<ul style="list-style-type: none"> <li>Input: Differential input (allowable common mode voltage ±1 V or less)</li> <li>Max current consumption: 350 mA (5 V DC)</li> <li>Weight: 0.2 kg</li> </ul>	<ul style="list-style-type: none"> <li>Accuracy: ±0.1 % of full scale</li> <li>Data refresh cycle: 10 ms</li> <li>Input step response time: 100 ms</li> <li>Temperature drift: Max. ±0.01 % /°C</li> </ul>
NFAV144	Analog Input • -10 to +10 V or 1 to 5 V • 16 ch. • Isolated	N/A	✓	✓	✓ 40 pins	<ul style="list-style-type: none"> <li>Input signal: 1 to 5 V or -10 to +10 V set for all channels</li> <li>Withstanding voltage: 1500 V AC between input and system</li> <li>Max current consumption: 500 mA (5 V DC)</li> <li>Weight: 0.2 kg</li> </ul>	<ul style="list-style-type: none"> <li>Accuracy: ±0.1 % of full scale</li> <li>Data refresh cycle: 10 ms</li> <li>Input step response time: 100 ms</li> <li>Temperature drift: Max. ±0.01 % /°C</li> </ul>
NFAT141	TC/mV Input • 16 ch. • Isolated	N/A	N/A	✓	✓ 40 pins (*1)	<ul style="list-style-type: none"> <li>Input signal: Thermocouple or mV set for each channel from CH1 to CH16</li> <li>Burn out detection: Possible (all channels together), Detection time: 60 s</li> <li>Withstanding voltage: 1500 V AC between input and system</li> <li>Max current consumption: 450 mA (5 V DC)</li> <li>Weight: 0.2 kg</li> </ul>	<ul style="list-style-type: none"> <li>TC input accuracy: ±0.03 % of full scale (-20 to 80 mV)</li> <li>mV input accuracy: ±0.032 % of full scale (-100 to 150 mV)</li> <li>Data refresh cycle: 1 s</li> <li>TC input temperature drift: Max. ±30 ppm/°C</li> <li>mV input temperature drift: Max. ±32 ppm/°C</li> </ul>
NFAR181	RTD Input • 12 ch. • Isolated	N/A	✓ (*2)	✓	N/A	<ul style="list-style-type: none"> <li>Input signal: Set for each channel</li> <li>Burn out detection: Possible (all channels together), Detection time: 60 s</li> <li>Withstanding voltage: 1500 V AC between input and system</li> <li>Max current consumption: 450 mA (5 V DC)</li> <li>Weight: 0.2 kg</li> </ul>	<ul style="list-style-type: none"> <li>Accuracy: ±0.03 % of full scale (0 to 400 Ω)</li> <li>Data refresh cycle: 1 s</li> <li>Temperature drift: Max. ±30 ppm/°C</li> </ul>

\*1 : Use a MIL connector cable only for mV input.

\*2 : The module with suffix codes -S□4 or -S□5 are required for wide temperature range.

ANALOG I/O MODULES

WTR : Wider temperature range (-20 °C to +70 °C), N/A: (0 °C to 55 °C), PCT : Pressure Clamp Terminal available

Model	Description	HART	WTR	PCT	MIL	Basic Specification	Specification
NFAP135	Pulse Input • 0 to 10kHz • 8 ch. • Isolated ch.	N/A	✓ (*3)	✓	✓ 40 pins	<ul style="list-style-type: none"> <li>Withstanding voltage: 500 V AC between input and system, 500 V AC between channels</li> <li>Transmitter power supply: 24 V (30 mA) / 12 V (40 mA) Selectable</li> <li>Max current consumption: 300 mA (5 V DC), 400 mA (24 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Minimum input pulse width: 40 μs</li> <li>Data refresh cycle: 2 ms</li> <li>Input type: Dry contact pulse (Open collector contact) Dry contact pulse (Relay contact) Voltage pulse Current pulse (Two-wired transmitter) Voltage pulse (Three-wired transmitter)</li> </ul>
NFAF135	Frequency Input • 0.1 Hz to 10 kHz • 8 ch. • Isolated ch.	N/A	N/A	✓	✓ 40 pins	<ul style="list-style-type: none"> <li>Withstanding voltage: 500 V AC between input and system, 500 V AC between channels</li> <li>Transmitter power supply: 24 V (30 mA) / 12 V (40 mA) Selectable</li> <li>Max current consumption: 300 mA (5 V DC), 400 mA (24 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Minimum input pulse width: 40 μs</li> <li>Data refresh cycle: 10 ms</li> <li>Input type: Dry contact pulse (Open collector contact) Dry contact pulse (Relay contact) Voltage pulse</li> </ul>
NFAI835	Analog I/O • 4 ch. input (4 to 20 mA) • 4 ch. output (4 to 20 mA) • Isolated ch.	✓	✓	✓	✓ 40 pins	<ul style="list-style-type: none"> <li>Withstanding voltage: 500 V AC between input/output and system, 500 V AC between channels</li> <li>Output fallback: Set for each channel</li> <li>Transmitter power supply: 20.2 to 29.3 V (Output current limit: 25 mA)</li> <li>Two wire and four wire transmitter setting per channel with connected terminal</li> <li>Max current consumption: 360 mA (5 V DC), 450 mA (24 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Input accuracy: ±0.1 % of full scale</li> <li>Output accuracy: ±0.3 % of full scale</li> <li>Data refresh cycle: 10 ms</li> <li>Input step response time: 100 ms, Output step response time: 100 ms</li> <li>Temperature drift: Max. ±0.01 % /°C</li> </ul>
NFAI841	Analog I/O • 8 ch. input (4 to 20 mA) • 8 ch. output (4 to 20 mA) • Non-Isolated	✓	✓	✓	✓ 40 pins	<ul style="list-style-type: none"> <li>Output fallback: Set for each channel</li> <li>Transmitter power supply: 22.8 to 26.4 V (Output current limit: 27 mA)</li> <li>Two wire and four wire transmitter setting per channel with pins</li> <li>Max current consumption: 310 mA (5 V DC), 500 mA (24 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Input accuracy: ±0.1 % of full scale</li> <li>Output accuracy: ±0.3 % of full scale</li> <li>Data refresh cycle: 10 ms</li> <li>Input step response time: 100 ms, Output step response time: 40 ms</li> <li>Temperature drift: Max. ±0.01 % /°C</li> </ul>
NFAB841	Analog I/O • 8 ch. input (1 to 5 V) • 8 ch. output (4 to 20 mA) • Non-Isolated	N/A	N/A	✓	✓ 40 pins	<ul style="list-style-type: none"> <li>Input: Differential input (allowable common mode voltage is ±1 V or less)</li> <li>Output fallback: Set for each channel</li> <li>Max current consumption: 310 mA (5 V DC), 250 mA (24 V DC)</li> <li>Weight: 0.3 kg</li> </ul>	<ul style="list-style-type: none"> <li>Input accuracy: ±0.1 % of full scale</li> <li>Output accuracy: ±0.3 % of full scale</li> <li>Data refresh cycle: 10 ms</li> <li>Input step response time: 100 ms, Output step response time: 40 ms</li> <li>Temperature drift: Max. ±0.01 % /°C</li> </ul>
NFAI543	Analog Output • 4 to 20 mA • 16 ch. • Isolated	✓	✓	✓	✓ 40 pins	<ul style="list-style-type: none"> <li>Withstanding voltage: 1500 V AC between output and system</li> <li>Output fallback: Set for each channel</li> <li>Max current consumption: 230 mA (5 V DC), 540 mA (24 V DC)</li> <li>Weight: 0.4 kg</li> </ul>	<ul style="list-style-type: none"> <li>Output accuracy: ±0.3 % of full scale</li> <li>Data refresh cycle: 10 ms</li> <li>Output step response time: 100 ms</li> <li>Temperature drift: Max. ±0.01 % /°C</li> </ul>
NFAV544	Analog Output • -10 to +10 V • 16 ch. • Isolated	N/A	N/A	✓	✓ 40 pins	<ul style="list-style-type: none"> <li>Withstanding voltage: 1500 V AC between output and system</li> <li>Output fallback: Set for each channel</li> <li>Max current consumption: 860 mA (5 V DC)</li> <li>Weight: 0.2 kg</li> </ul>	<ul style="list-style-type: none"> <li>Output accuracy: ±0.3 % of full scale</li> <li>Data refresh cycle: 10 ms</li> <li>Output step response time: 40 ms</li> <li>Temperature drift: Max. ±0.01 % /°C</li> </ul>

Common Specification • LED: STATUS (Hardware normal), ACT (Operating) • Hot-Swap: Possible

\*3 : The module with suffix codes -S□4 or -S□5 are required for wide temperature range.

Software Selection

Name	Model	Suffix Codes/Options Codes
<b>Software media</b>		
FCN/FCJ software media	NT203AJ	PC11E
FCN/FCJ APPF software media (*1)	NT205AJ	PC11E

FCN/FCJ engineering tool license (FCN/FCJ software media: NT203AJ)

Logic Designer license	Run on PC	NT751FJ	LW11A
FCN/FCJ simulator license	Run on PC	NT752AJ	LW11A
FCN/FCJ Duolet AP Development Kit License (*)	Run on PC	NT755FJ	LW11A

\*: Duolet functions enable Java applications run on the controller.

FCN/FCJ OPC server license (FCN/FCJ software media: NT203AJ)

FCN/FCJ OPC server for Windows	Run on PC	NT781AJ	LW11A
Duplexed network function license for FCN/FCJ OPC Server	Run on PC	NT783AJ	LW11A

Hardware Selection (Non Explosion Model)

For the list of Explosion Protection Model, please refer to the General Specification.

Name	Model	Suffix Codes/Options Codes				
		Standard		with ISA standard G3 option		
		Standard func.	Extended func.	Standard func.	Extended func.	
<b>FCN common modules</b>						
CPU module with 2 Ethernet port (*2)	NFCP501	Std temp.	S05	W05	S06	W06
		Exd temp.	S15	W15	S16	W16
CPU module with 4 Ethernet port (*2)	NFCP502	Std temp.	S05	W05	S06	W06
		Exd temp.	S15	W15	S16	W16
Power supply module	100 to 120 V AC	NFPW441	50		51	
Power supply module	220 to 240 V AC	NFPW442	50		51	
Power supply module	24 V DC	NFPW444	50		51	
	Installation	19 inch rack	DIN rail	19 inch rack	DIN rail	
Base module (long)	NFBU200	S05	S15	S06	S16	
Base module (short)	NFBU050	N/A	S15	N/A	S16	
Base module (short, for E2 bus)	N2BU051	N/A	S15	N/A	S16	
Base module (compact)	N2BU030	N/A	S15	N/A	S16	
		Standard		with ISA standard G3 option		
E2 bus interface module	N2EB100	50		51		
	Attachment	T-joint	T-joint with built-in terminator	T-joint	T-joint with built-in terminator	
SB bus repeat module for FCN	NFSB100	S50/SBT01	S50/SBT02	S51/SBT01	S51/SBT02	
	Cable Length	0.3 m	1 m	2 m	4 m	8 m
SB bus cable	NFCB301	C030	C100	C200	C400	C800

Communication modules

Name	Model	Std temp.	Standard		with ISA standard G3 option	
			non SA	SA	non SA	SA
FOUNDATION Fieldbus communication module (4-ports)	NFLF111	Std temp.	S50	S50/F9S00	S51	S51/F9S00
		Exd temp.	S54	S54/F9S00	S55	S55/F9S00
RS-232-C communication module (2-ports, 300 bps to 115.2 kbps)	NFLR111		S50	N/A	S51	N/A
RS-422/RS-485 communication module (2-ports, 300 bps to 115.2 kbps)	NFLR121		S50	N/A	S51	N/A
PROFIBUS-DP communication module	NFLP121		S00	N/A	S01	N/A
CANopen communication module	NFLC121		S00	N/A	S01	N/A

MIL connector cables

Name	Model	Cable Length	Standard					
			0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m (*5)
MIL connector cable for analog, NFCP050 built-in I/O (40 pole plug types) (*3)	KMS40		005	010	015	020	025	030
MIL connector cable (50 pole plug types) (*4)	KMS50		005	010	015	020	025	030

MIL connector terminal blocks

Name	Model	Standard
MIL connector terminal block for analog I/O modules except for NFAR181 and NFCP050 built-in I/O (40 pole plug types, M3.5) (*3)	TAS40	0N
MIL connector terminal block for digital I/O modules (50 pole plug types, M3.5) (*4)	TAS50	0N

Cover

Dummy cover for I/O module slots	NFDCV01
Dummy cover for power supply module slots	NFDCV02
MIL cable connector cover	NFCCC01

Test switch and lamp

Test switch for FCN digital input module NFDV151, NFDV161 (*6)	S9105FA
Test lamp for FCN digital output module NFDV532, NFDV551, NFDV561 (*7)	S9106FA
Cable for test switch / test lamp	A1417WL

SB bus T-joint

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

Name	Model	Suffix Codes/Options Codes						
		Standard		with ISA standard G3 option		with ISA standard G3 option		
		Terminal Block Surge Absorber (SA)	Pressure Clamp Terminal non SA	MIL with cover	Pressure Clamp Terminal non SA	MIL with cover	Pressure Clamp Terminal non SA	
<b>Input output modules (*8)</b>								
Analog Input module (4 to 20 mA, 8-channels, Isolated channels)	NFAI135	-	S50/13S00	S50/13S10	S50/CCC01	S51/13S00	S51/13S10	S51/CCC01
Analog Input module (4 to 20 mA, 16-channels, Non-Isolated)	NFAI141	-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Analog Input module (4 to 20 mA, 16-channels, Isolated)	NFAI143	-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Analog Input module (1 to 5 V, 16-channels, Non-Isolated)	NFAV141	-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Analog Input module (-10 to +10 V, 16-channels, Isolated)	NFAV144	-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
TC/mV Input module (16-channels, Isolated)	NFAT141	-	S50/T4S00	S50/T4S10	S50/CCC01	S51/T4S00	S51/T4S10	S51/CCC01
RTD Input module (12-channels, Isolated)	NFAR181	Std temp.	S50/R8S00	S50/R8S10	N/A	S51/R8S00	S51/R8S10	N/A
		Exd temp.	S54/R8S00	S54/R8S10	N/A	S55/R8S00	S55/R8S10	N/A
Pulse Input module (Pulse Count, 0 ~ 10 kHz, 8-channels, Isolated channels)	NFAP135	Std temp.	S50/13S00	S50/13S10	S50/CCC01	S51/13S00	S51/13S10	S51/CCC01
		Exd temp.	S54/13S00	S54/13S10	S54/CCC01	S55/13S00	S55/13S10	S55/CCC01
Frequency Input module (Pulse Count, 0.1 Hz to 10 kHz, 8-channels, Isolated channels)	NFAF135	-	S50/13S00	S50/13S10	S50/CCC01	S51/13S00	S51/13S10	S51/CCC01
Analog I/O module (4 to 20 mA input/output, 4-channels input/output, Isolated channels)	NFAI835	-	S50/13S00	S50/13S10	S50/CCC01	S51/13S00	S51/13S10	S51/CCC01
Analog I/O module (4 to 20 mA input/output, 8-channels input/output, Non-Isolated)	NFAI841	-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Analog I/O module (1 to 5 V input, 4 to 20 mA output, 8-channels input/output, Non-Isolated)	NFAB841	-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Analog Output module (4 to 20 mA, 16-channels, Isolated)	NFAI543	-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Analog Output module (-10 to +10 V, 16-channels, Isolated)	NFAV544	-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Digital Input module (32-channels, 24 V DC, Isolated)	NFDV151	-	P60/B5S00	P60/B5S10	P60/CCC01	P61/B5S00	P61/B5S10	P61/CCC01
Digital Input module (64-channels, 24 V DC, Isolated)	NFDV161	-	N/A	N/A	P50	N/A	N/A	P51
Digital Output module (32-channels, 24 V DC, Isolated, Pressure Clamp Terminal only)	NFDV557	-	S50	N/A	N/A	S51	N/A	N/A
Digital Output module (64-channels, 24 V DC, Isolated)	NFDV561	-	N/A	N/A	P50	N/A	N/A	P51
Pulse Width Output module (4-channels, Up Pulse/Down Pulse, 24 V DC, Isolated)	NFDV532	-	P10/D5S00	P10/D5S10	P10/CCC01	P11/D5S00	P11/D5S10	P11/CCC01
Relay Output module (*9) (16-channels, 24 V DC, Isolated)	NFDR541	-	P50/C4S70	N/A	N/A	P51/C4S70	N/A	N/A

Pressure clamp terminal blocks

Name	Model	Surge Absorber (SA)	
		non SA	SA
Pressure clamp terminal block for analog (16-channels): NFAI141, NFAV142, NFAV144, NFAI143, NFAI841, NFAB841, NFAI543	NFTA45	00	10
Pressure clamp terminal block for thermocouple/mV 16-channels) NFAT141	NFTT45	00	10
Pressure clamp terminal block for RTD (12-channels) NFAR181	NFTR85	00	10
Pressure clamp terminal block for digital input (32-channels) NFDV151	NFTB55	00	10
Pressure clamp terminal block for digital output (32-channels) NFDV532, NFDV551	NFTD55	00	10
Pressure clamp terminal block for analog isolated channels (8-channels): NFAI135, NFAP135, NFAI835	NFTI35	00	10
Pressure clamp terminal block for relay output (16-channels) NFDR541	NFTC45	70	N/A
Pressure clamp terminal block for FOUNDATION Fieldbus NFLF111	NFTF95	00	N/A

\*1: Please refer to the detailed applicable portfolios in FCN/FCJ APPF software media on "Engineering: Application Portfolio" page.

\*2: Two suffix codes specifying the applicable portfolios are prepared for NFCP501 and NFCP502.

Please refer to the detailed applicable portfolios for each suffix (-S: with Standard functions, -W: with Extended functions) on "Engineering: Application Portfolio" page.

\*3: mV input is only applicable for NFAT141.

\*4: Two terminal blocks can be connected with NFDV161 or NFDV561 (64-channels type).

\*5: Cable length to 25.0 m is available. Extension unit is 1 m.

\*6: As for NFDV161, cable (A1417WL) is required and two sets of switches are required when all channels (1 to 32 ch and 33 to 64 ch) are used at the same time. As for NFDV151, it can be directly mounted or connected with cable (A1417WL).

\*7: As for NFDV561, cable (A1417WL) is required and two sets of switches are required when all channels (1 to 32 ch and 33 to 64 ch) are used at the same time. As for NFDV551, it can be directly mounted or connected with cable (A1417WL).

\*8: Suffix Code for the following HART module is changed from "S□□" to "H□□": NFAI135, NFAI835, NFAI141, NFAI143, NFAI543, NFAI841

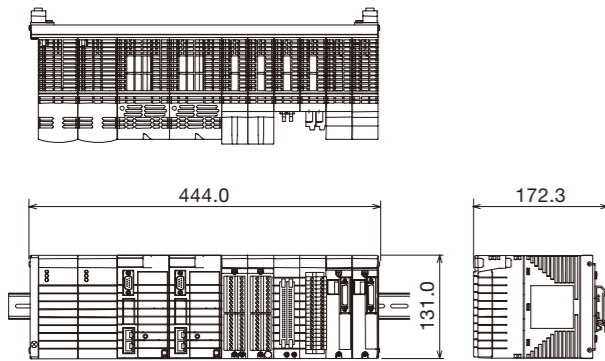
\*9: NFDR541 is not compliant with CE marking.

Integration  
Reliability  
Network  
Maintenance  
Engineering  
Configurations  
Specifications  
Selection Guide  
Dimensions

# DIMENSIONS

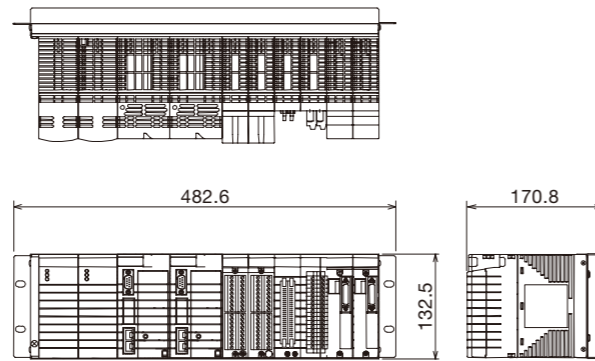
## FCN (Long type, DIN rail-mounted)

Base module: NFBU200-S1 □



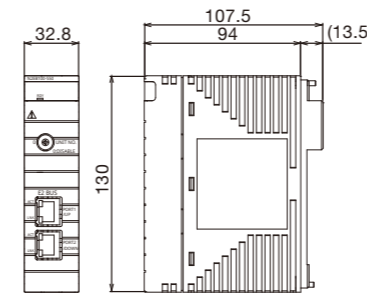
## FCN (Long type, 19 inch rack-mounted)

Base module: NFBU200-S0 □



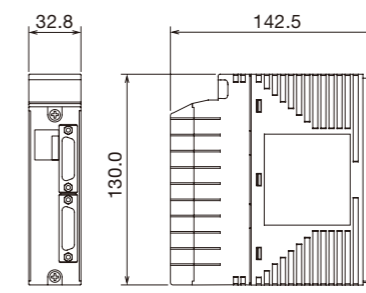
## E2 bus interface module

Model: N2EB100



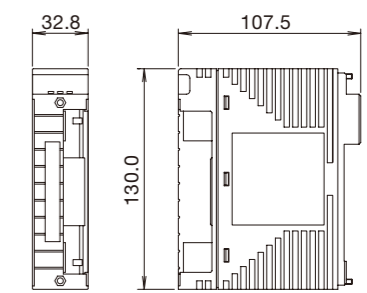
## SB bus repeat module

Model: NFSB100



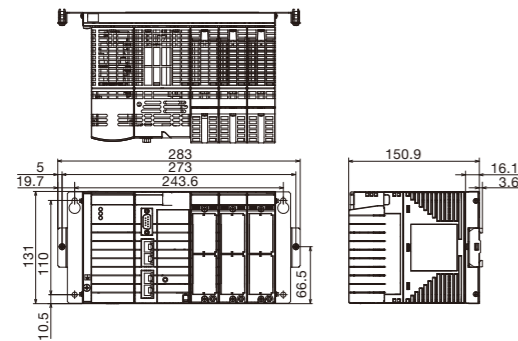
## Analog I/O module

Model: NFAI135/NFAI141/NFAI143/NFAV141/  
NFAV144/NFAT141/NFAR181/  
NFAP135/NFAF135/NFAI835/  
NFAI841/NFAB841/NFAI543/NFAV544



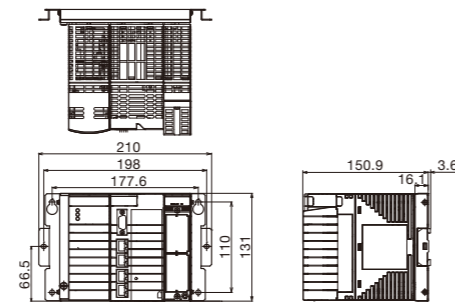
## FCN (Short type, DIN rail mounted)

Base module: NFBU050, N2BU051 (for E2 bus)



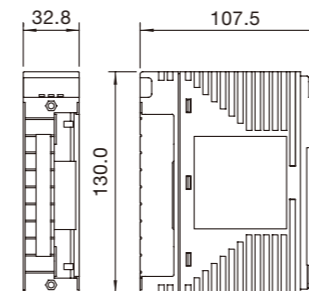
## FCN (Compact type, DIN rail-mounted)

Base module: N2BU030

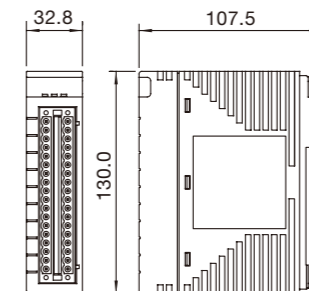


## Digital I/O module

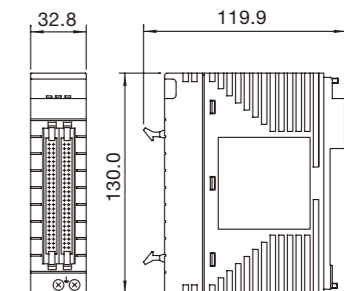
Model: NFDV151/NFDV551/NFDV532



Model: NFRD541

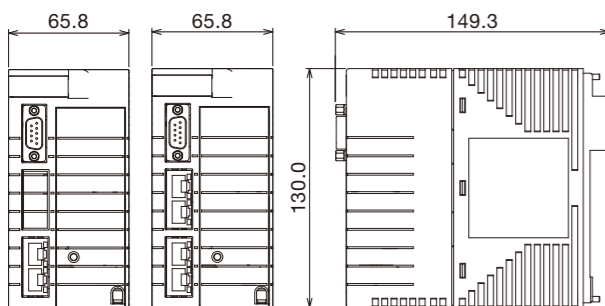


Model: NFDV161/NFDV561



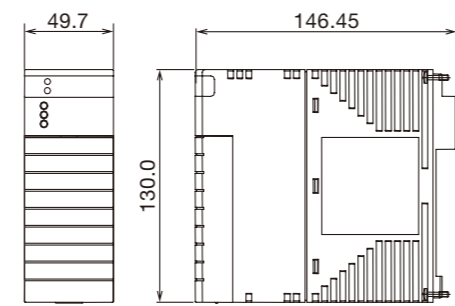
## CPU module

FCN model: NFPC501/NFPC502



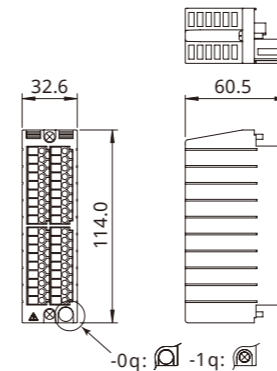
## Power supply module

Model: NFPW441/NFPW442/NFPW444

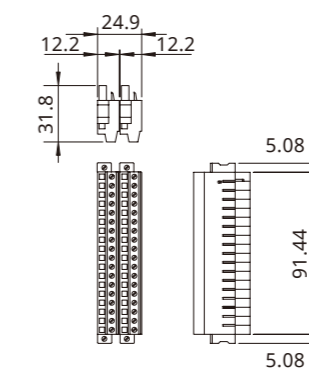


## Terminal block

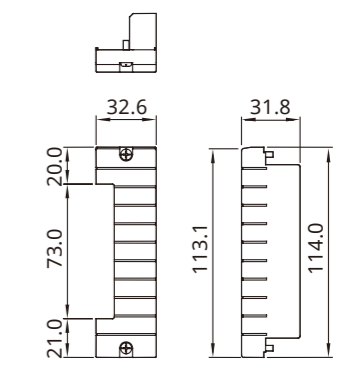
Model: NFTA4S/NFTT4S/NFTR8S/NFTB5S/  
NFTD5S/NFTI3S



Model: NFTA4S



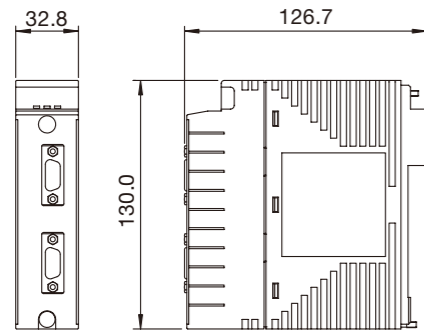
Model: NFCCC01



# DIMENSIONS

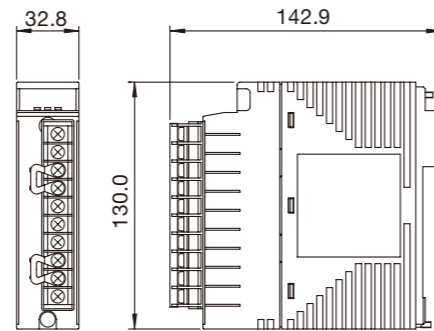
## RS-232-C communication module

Model: NFLR111



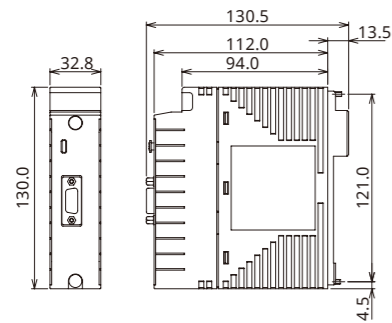
## RS-422/RS-485 communication module

Model: NFLR121



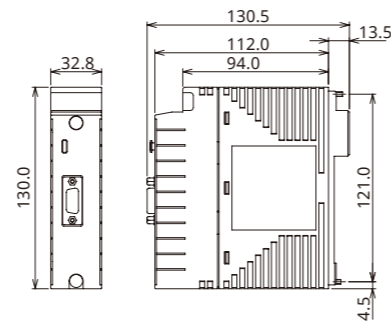
## PROFIBUS-DP communication module

Model: NFLP121



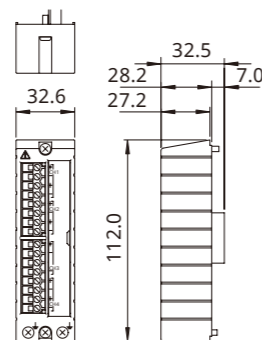
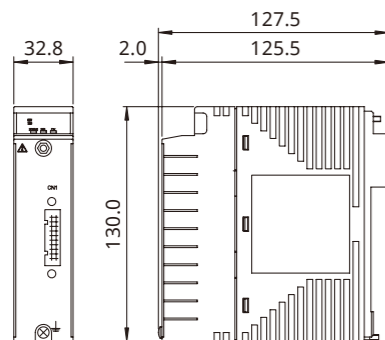
## CANopen communication module

Model: NFLC121



## FOUNDATION fieldbus communication module

Model: NFLF111



Synaptic Business Automation underlies a process of co-innovation and collaboration with customers that leverages Yokogawa's domain knowledge and digital automation technologies to create sustainable value.

Synaptic takes its name from the synapse, a structure in the nervous system that plays a role in the transfer of signals to other parts of the body. *With Synaptic*, we help customers create new value by connecting and integrating everything such as data, organizations, business processes and supply chains with domain knowledge and digital automation technologies, like neural networks.

*With Business Automation*, we co-create value with customers by improving their business performance through optimization of supply chains and operations, and maximization of asset performance through co-innovation and digitalization.

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