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

- Adaptable 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

Process Control PLC FCN-500 strengthens your core competencies

- 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 SCADA communications

Integration

Reliability

Network

Maintenance

Engineering

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

- 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

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

- 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 DC5 HMI, operators enjoy seamless and transparent access to all the utilities on these different systems, with complete consolidation of all alarms.

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**Operation and Monitoring**

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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.

---

<table>
<thead>
<tr>
<th>Connection</th>
<th>Physical layer</th>
<th>Devices (protocols)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper-level systems</td>
<td>Ethernet</td>
<td>IODS (TCP/IP), FAST/TOOLS/TCP/IP, DNP3, Modbus TCP, HIS (Vnet/IP via gateway) other vendor SCADA systems (OPC, DNP3, Modbus TCP)</td>
</tr>
<tr>
<td></td>
<td>Serial (RS-422/485)</td>
<td>FAST/TOOLS (Modbus RTU/ASCII), Other vendor SCADA systems (Modbus RTU/ASCII), DNP3</td>
</tr>
<tr>
<td>Other devices</td>
<td>Ethernet</td>
<td>FA-M3 (driver available), CANopen (driver available), others (Modbus TCP)</td>
</tr>
<tr>
<td></td>
<td>Serial (RS-422/485)</td>
<td>FA-M3 (driver available), HART (adapter available), others (Modbus TCP)</td>
</tr>
</tbody>
</table>

**Fieldbus**

- Integrated Fieldbus
- FOUNDATION Fieldbus devices
- HART devices
- PROBUS-DP
- PROBUS-DP devices
- CANopen
- CANopen devices
- ISA100
- ISA100 Wireless™ devices (via gateway)
- Ethernet
- Modbus TCP
- Serial
- Modbus RTU/ASCII

---

**Integration**

**Reliability**

**Network**

**Maintenance**

**Engineering**

**Configurations**

**Specifications**

**Selection Guide**

**Dimensions**
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

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

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

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

<table>
<thead>
<tr>
<th>Ethernet: 2 ports (NFCP501)</th>
<th>Ethernet: 4 ports (NFCP502)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High speed Ethernet (1 Gbps) ports on CPU module</td>
<td>Port 3 and 4 Separated configuration enabled</td>
</tr>
<tr>
<td>Port 1 and 2 Redundant or separated configuration enabled</td>
<td></td>
</tr>
</tbody>
</table>

Redundant control network + separated networks

- Port 1 and 2 Redundant control network to enhance system reliability.
- Port 3 and 4 Separated network for more connections.

All separated networks

- Port 1 Single control network
- Port 2 Network A
- Port 3 Network B
- Port 4 Network C
- Port 4 Engineering PC

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.

  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 standby-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

- **System status window on SCADA**
- **SCADA**
- **Web browser**
- System log files on CPU module

**Simplified sitemaintenance 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

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

- **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

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

**Higher security for operations on site**

- **SD card access status can be confirmed even if the cover is locked.**
- **Security slot locking cable**

**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

**Integration**

Reliability
Network
Maintenance
Engineering
Configurations
Specifications
Selection Guide
Dimensions
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
  - 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.

With Logic Designer, programming and debugging are platform independent, and with Resource Configurator logic can be easily ported to other hardware platforms.

IEC 61131-3 compliant programming

- Supports all five IEC 61131-3 languages
  - Function Block Diagram (FBD)
  - Ladder Diagram (LD)
  - Structured Text (ST)
  - Sequential Function Chart (SFC)
  - Instruction List (IL)

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.

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

User logic is encapsulated into user function blocks for reuse in programs.

Typical engineering process

1. Select template
2. Input key variable name
3. Select function
4. Insert POU and name it
5. Assign variable and name it
6. Drag and drop function blocks to a program sheet
7. Variable names are automatically assigned
8. POUs are automatically laid out and wired
9. Selected function includes several POUs
10. Variable sheets are not copied to avoid variable name collision.

Network template

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

- When you program from the scratch:
  - Assemble variable name
  - Delight function

- When you copy program sheet (*):
  - Assign variable name
  - Delight function
  - Variable sheets are not copied to avoid variable name collision.

- When you use network template:
  - Select template
  - Input key variable name
  - Best quality
  - Yokogawa network templates are all tested.
  - Minimum engineering hours
  - Selected function includes several POUs
  - Variable names are automatically assigned

With Logic Designer, internal analog data (0 % to 100 %) is converted to °C for easy and intuitive programming and debugging.

Available from Yokogawa

* Variable sheet is not copied to avoid variable name collision.

Minimum engineering hours

Best quality

When you use Network template:

- Select template
- Input key variable name

- Best quality
- Yokogawa network templates are all tested.
- Minimum engineering hours
- Selected function includes several POUs
- Variable names are automatically assigned
A variety of application portfolios bundled in the CPU module reduce engineering hours and enhances quality.

Just select a CPU model to use functions

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Functions</th>
<th>With standard function (NFCP50 - V. 3.1)</th>
<th>With extended functions (NFCP50 - V. 4.1)</th>
<th>Software media (**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCN-500</td>
<td>Enhance automation libraries</td>
<td>N/A</td>
<td>✓</td>
<td>NT255A</td>
</tr>
<tr>
<td>Gas Flow Calculation</td>
<td>Gas flow calculation</td>
<td>N/A</td>
<td>✓</td>
<td>NT255A</td>
</tr>
<tr>
<td>Liquid Flow Calculation</td>
<td>Liquid flow calculation</td>
<td>N/A</td>
<td>✓</td>
<td>NT255A</td>
</tr>
<tr>
<td>Modbus communication</td>
<td>Modbus communication</td>
<td>✓</td>
<td>✓</td>
<td>NT255A</td>
</tr>
<tr>
<td>DNP3 communication</td>
<td>DNP3 communication</td>
<td>✓</td>
<td>✓</td>
<td>NT255A</td>
</tr>
<tr>
<td>FA-M3 communication</td>
<td>Communication with FA-M3 PLC</td>
<td>✓</td>
<td>✓</td>
<td>NT255A</td>
</tr>
<tr>
<td>MELSEC communication</td>
<td>Communication with MELSEC PLC</td>
<td>✓</td>
<td>✓</td>
<td>NT255A</td>
</tr>
<tr>
<td>SYSMAC communication</td>
<td>Communication with SYSMAC PLC</td>
<td>✓</td>
<td>✓</td>
<td>NT255A</td>
</tr>
<tr>
<td>Time Synchronization</td>
<td>Simple Network Time Protocol (SNTP)</td>
<td>✓</td>
<td>✓</td>
<td>NT255A</td>
</tr>
</tbody>
</table>

* Please refer to the Software Selection on “SELECTION GUIDE” page.

Modbus communication portfolio for a variety of communication

<table>
<thead>
<tr>
<th>Type</th>
<th>Mode</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial</td>
<td>ASCII</td>
<td>Master/Slave</td>
</tr>
<tr>
<td>Serial</td>
<td>RTU</td>
<td>Master/Slave</td>
</tr>
<tr>
<td>Ethernet</td>
<td>TCP</td>
<td>Client/Server</td>
</tr>
</tbody>
</table>

DNP3 communication portfolio

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial</td>
<td>Type</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Server</td>
</tr>
</tbody>
</table>

* 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
- APS21.1 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 POUs 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 POUs available on PAS APPF

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O processing</td>
<td>NPAS_AI_ANALOG (AI input) and more for analog input and output</td>
</tr>
<tr>
<td></td>
<td>NPAS_DI_STS (Status input) and more for digital input and output</td>
</tr>
<tr>
<td></td>
<td>NPAS_AI_HART (HART variable input) for HART communication</td>
</tr>
<tr>
<td></td>
<td>NPAS_HI (High) FOUNDATION Fieldbus analog input) and more for FOUNDATION Fieldbus data</td>
</tr>
<tr>
<td>Regulatory</td>
<td>NPAS_PID (PID), NPAS_ONOFF (two-position on/off) and more</td>
</tr>
<tr>
<td>Arithmetic</td>
<td>NPAS_AI_HART (HART variable input) for HART communication</td>
</tr>
<tr>
<td></td>
<td>NPAS_AI_HART (HART variable input) for HART communication</td>
</tr>
<tr>
<td>Sequence</td>
<td>NPAS_FFRD_ANLG (FOUNDATION Fieldbus analog input) and more for FOUNDATION Fieldbus data</td>
</tr>
</tbody>
</table>

Integrated control processing in a single POU

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

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

Access and engineering parameters

NPAS POUs 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
**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

---

**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)

Remote distributed extension units have high maintainability through module status indication and hot swappable modules.

**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

Space in the control panel can be used effectively by selecting the appropriate base modules.

---

**Control unit alone**

**Maximum I/O module configurations**

<table>
<thead>
<tr>
<th>Base Module</th>
<th>Unit Configuration</th>
<th>Standard</th>
<th>Duplexed (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFBU200 base module (long)</td>
<td>Control unit alone</td>
<td>Max.8 modules</td>
<td>Max.6 modules</td>
</tr>
<tr>
<td>N2BU051 base module (short)</td>
<td>Control unit alone</td>
<td>Max.3 modules</td>
<td>Not applicable (*)</td>
</tr>
<tr>
<td>NFBU050 base module (short)</td>
<td>Control unit alone</td>
<td>Max.3 modules</td>
<td>Not applicable (*)</td>
</tr>
<tr>
<td>N2BU030 base module (compact)</td>
<td>Control unit alone</td>
<td>Max.1 modules</td>
<td>Not applicable (*)</td>
</tr>
</tbody>
</table>

*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**
**Specifications**

**CPU**

**FCN CPU Specifications**

<table>
<thead>
<tr>
<th>Items</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>NEFP01: CPU module for FCN (with 2 Ethernet ports)</td>
</tr>
<tr>
<td></td>
<td>NEFP02: CPU module for FCN (with 4 Ethernet ports)</td>
</tr>
<tr>
<td>Processor</td>
<td>Atom E8805 1.48 GHz</td>
</tr>
<tr>
<td>Memory</td>
<td>Main: 256 MB with ECC</td>
</tr>
<tr>
<td></td>
<td>Static RAM: 2,048 MB backed up by battery</td>
</tr>
<tr>
<td>Secondary memory</td>
<td>1 GB on-board flash memory</td>
</tr>
<tr>
<td>External media</td>
<td>1 SD card (1 slot): SDHC (4 to 32 GB) Class 10</td>
</tr>
<tr>
<td>Serial port (*1)</td>
<td>1 RS-232C port: -D-sub 9-pin, male (*2)</td>
</tr>
<tr>
<td></td>
<td>4 Ethernet ports: -RJ45 modular jacks</td>
</tr>
<tr>
<td>Network Interface</td>
<td>2 Ethernet ports: -RJ45 modular jacks</td>
</tr>
<tr>
<td></td>
<td>2 Ethernet ports: -RJ45 modular jacks</td>
</tr>
<tr>
<td>Baud rate</td>
<td>1000, 10, 10 Mbps</td>
</tr>
<tr>
<td></td>
<td>1000BASE-T, 10BASE-T, 10BASE-T, 10BASE-T</td>
</tr>
<tr>
<td>I/O Interface</td>
<td>48 bus (duplex)</td>
</tr>
<tr>
<td>RAS features</td>
<td>Watch dog timer, temperature monitor, etc.</td>
</tr>
<tr>
<td>Battery (*3)</td>
<td>1000 mAh graphite fluoride lithium battery (*4)</td>
</tr>
<tr>
<td>Display</td>
<td>3 LEDs for CPU status indication, 2 LEDs for Ethernet status indication, 1 LED for SD LED, 1 LED for Excel LED</td>
</tr>
<tr>
<td>Switches</td>
<td>RESET switch, SHUT DOWN switch, FUNC switch, EXEC switch</td>
</tr>
<tr>
<td>Protection</td>
<td>CPU cover (with the hole for wire lock)</td>
</tr>
<tr>
<td>Power Supply</td>
<td>Supply voltage: 3.3 V DC ± 5 %</td>
</tr>
<tr>
<td></td>
<td>Current consumption: Max. 1200 mA, Max. 1700 mA</td>
</tr>
<tr>
<td>Duplex configuration</td>
<td>Possible (*)</td>
</tr>
<tr>
<td>Weight</td>
<td>0.9 kg</td>
</tr>
<tr>
<td>Size</td>
<td>Dimensions: W X H X D (mm): 65.8 X 110 X 140.3 mm</td>
</tr>
</tbody>
</table>

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

(*2) A serial port cannot be used when CPU modules are configured in redundancy.

(*3) A battery is exchangeable on-line.

(*4) 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 µs per Katen in an 1L program
- Number of control applications: Max. 16 levels
- Task priority: Can be specified (16 levels)
- Task execution cycle: 5 times or longer (by 5 msec increments) (*)

**CPU Memory Capacity**

- Control application capacity: Max. 3 MB
- Data area (*3): 400 Katen (in an 1L program)
- Retained data area (*3): 8 MB
- Diaper application: Max. 700 KB
- Diaper application: Max. 32 KB

- (*) The data is retained when the power is off.

- (*) The data is retained when the power is off.

**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
- Loop regulator blocks (e.g., indicator blocks, controller blocks, and manual loaders): Up to 128
- Others (e.g., calculation blocks, switch instrument blocks, and communication POUs): Up to 384

**Sequence program:**

Up to 180 Katen 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
### FCN MODULE SPECIFICATIONS

#### CPU MODULES

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Name</th>
<th>Suffix codes</th>
<th>WTR</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFCP501</td>
<td>CPU module for FCN (with 2 Ethernet ports)</td>
<td>-</td>
<td>N/A</td>
<td>• Duplex configuration: Possible (+1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module No.</th>
<th>Name</th>
<th>Suffix codes</th>
<th>WTR</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFCP502</td>
<td>CPU module for FCN (with 4 Ethernet ports)</td>
<td>-</td>
<td>N/A</td>
<td>• Duplex configuration: Possible (+1)</td>
</tr>
</tbody>
</table>

#### DIGITAL I/O MODULES

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Name</th>
<th>Description</th>
<th>WTR</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFDV115</td>
<td>Digital Input</td>
<td>32 ch. - 24 V DC</td>
<td>-</td>
<td>• Functions: Status and Push button (edge count)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Name</th>
<th>Description</th>
<th>WTR</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFDV151</td>
<td>Digital Output</td>
<td>32 ch. - 24 V DC</td>
<td>-</td>
<td>• Output for status: 3 ms or less (for status output)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Name</th>
<th>Description</th>
<th>WTR</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFDV151</td>
<td>Digital Output</td>
<td>32 ch. - 24 V DC</td>
<td>-</td>
<td>• Output for status: 3 ms or less (for status output)</td>
</tr>
</tbody>
</table>

#### POWER SUPPLY MODULES

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Name</th>
<th>Suffix codes</th>
<th>WTR</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFPW441</td>
<td>Power supply module (100-240 V AC input)</td>
<td>-</td>
<td>N/A</td>
<td>• Duplex configuration: Possible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Name</th>
<th>Suffix codes</th>
<th>WTR</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFPW442</td>
<td>Power supply module (220-240 V AC input)</td>
<td>-</td>
<td>N/A</td>
<td>• Duplex configuration: Possible</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Name</th>
<th>Suffix codes</th>
<th>WTR</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFPW444</td>
<td>Power supply module (24 V DC input)</td>
<td>-</td>
<td>N/A</td>
<td>• Duplex configuration: Possible</td>
</tr>
</tbody>
</table>

#### E2 BUS INTERFACE MODULE

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Name</th>
<th>Description</th>
<th>WTR</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>N2B53510</td>
<td>E2 bus interface module</td>
<td>-</td>
<td>N/A</td>
<td>• Duplex configuration: Possible</td>
</tr>
</tbody>
</table>

### SB BUS REPEAT MODULES

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Name</th>
<th>Description</th>
<th>WTR</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFB101</td>
<td>SB bus repeat module</td>
<td>-</td>
<td>N/A</td>
<td>• Duplex configuration: Possible</td>
</tr>
</tbody>
</table>

## COMMON SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>24 V DC</td>
<td>± 5%</td>
</tr>
<tr>
<td>Speed</td>
<td>0.3 to 115.2 kbps</td>
<td></td>
</tr>
<tr>
<td>Margin</td>
<td>± 20 ms</td>
<td></td>
</tr>
<tr>
<td>Pulse width</td>
<td>1 ms</td>
<td></td>
</tr>
<tr>
<td>Pulse output</td>
<td>20 mA (max)</td>
<td></td>
</tr>
<tr>
<td>Output response time</td>
<td>3 ms or less</td>
<td></td>
</tr>
<tr>
<td>Hot-Swap</td>
<td>Possible</td>
<td></td>
</tr>
<tr>
<td>Duplex</td>
<td>Possible</td>
<td></td>
</tr>
</tbody>
</table>

---

* N/A: Not applicable
* ±: Plus or minus
* *: Note

---

**Notes:**
- Channels 1 to 32 can be push button inputs.
- NFDR541 is not compliant with CE marking.

---

**Common Specifications:**
- LED: STATUS (Hardware Ready), SND (Sending), RCV (Receiving)
- HOT-SWAP: Possible
- Duplex: Possible
- LED: STATUS (Hardware Ready), SND (Sending), RCV (Receiving)
- MAX CURRENT: 500 mA (5 V DC)
- Weight: 0.2 kg
## FCN MODULE SPECIFICATIONS

### ANALOG I/O MODULES

**WTR**: Higher temperature range (+20°C to +70°C), N.A. (-10°C to +55°C), PCT: Pressure Clamp Terminal available

#### Model | Description | HART | WTR | PCT | MSL | Basic Specification | Specification
--- | --- | --- | --- | --- | --- | --- | ---
NFAV135 | Analog Input | ✓ | ✓ | ✓ | 40 pins | • Withstanding voltage: 500 V AC between input and system, 550 V AC between channels | • Minimum input pulse width: 40 μs
• Transmitter power supply: 20.2 to 29.3 V (Output current limit: 25 mA) | • Data refresh cycle: 2 ms
• Two wire and four wire transmitter setting per channel with connected terminal | • Input type: Dry contact pulse (Open collector contact)
• Max current consumption: 380 mA (5 V DC), 450 mA (24 V DC) | • Dry contact pulse (Relay contact)
• Weight: 0.2 kg | • Voltage pulse: Current pulse (Two-wired transmitter)
• Data refresh cycle: 10 ms | • Voltage pulse: Pulse (Three-wired transmitter)
• Isolated ch. | • Isolated ch. | • Isolated ch.

NFAV141 | Analog Input | ✓ | ✓ | ✓ | 40 pins | • Withstanding voltage: 22.8 to 26.4 V (Output current limit: 27 mA) | • Minimum input pulse width: 40 μs
• Two wire and four wire transmitter setting per channel with pins | • Data refresh cycle: 10 ms | • Data refresh cycle: 2 ms
• Max current consumption: 310 mA (5 V DC), 450 mA (24 V DC) | • Input type: Dry contact pulse (Open collector contact)
• Weight: 0.2 kg | • Dry contact pulse (Relay contact)
• Isolated ch. | • Voltage pulse: Current pulse (Two-wired transmitter)
• Data refresh cycle: 10 ms | • Voltage pulse: Pulse (Three-wired transmitter)
• Isolated ch. | • Isolated ch. | • Isolated ch.

NFAV143 | Analog Input | ✓ | ✓ | ✓ | 40 pins | • Withstanding voltage: 1500 V AC between input and system | • Minimum input pulse width: 40 μs
• Transmitter power supply: 24.0 to 25.5 V (Output current limit: 25 mA) | • Data refresh cycle: 2 ms
• Two wire and four wire transmitter setting per channel with pins | • Input type: Dry contact pulse (Open collector contact)
• Max current consumption: 230 mA (5 V DC, 540 mA (24 V DC) | • Dry contact pulse (Relay contact)
• Weight: 0.2 kg | • Voltage pulse: Current pulse (Two-wired transmitter)
• Data refresh cycle: 10 ms | • Voltage pulse: Pulse (Three-wired transmitter)
• Isolated ch. | • Isolated ch. | • Isolated ch.

NFAV141 | Analog Input | N/A N/A | ✓ | ✓ | 40 pins | • Input: Differential input (allowable common-mode voltage ±1 V) | • Minimum input pulse width: 50 μs
• Max current consumption: 350 mA (5 V DC) | • Data refresh cycle: 10 ms | • Data refresh cycle: 2 ms
• Weight: 0.2 kg | • Isolated ch. | • Isolated ch. | • Isolated ch.

NFAV144 | Analog Input | N/A N/A | ✓ | ✓ | 40 pins | • Input signal: 1 to 5 V and 0 to 10 V or 1 to 5 V and 0 to 10 V for all channels | • Minimum input pulse width: 50 μs
• Max current consumption: 350 mA (5 V DC) | • Data refresh cycle: 10 ms | • Data refresh cycle: 2 ms
• Weight: 0.2 kg | • Isolated ch. | • Isolated ch. | • Isolated ch.

NFAV147 | TC,RV input | N/A N/A | ✓ | ✓ | 40 pins | • Input signal: Thermocouple or mV set for each channel from CH1 to CH16 | • Minimum input pulse width: 50 μs
• Burn-in detection: Possible (All channels together), Detection time: 60 s | • Data refresh cycle: 10 ms | • Data refresh cycle: 2 ms
• Withstanding voltage: 1500 V AC between input and system | • Weight: 0.2 kg | • Isolated ch. | • Isolated ch. | • Isolated ch.

NFAV181 | RTD Input | N/A N/A | ✓ | ✓ | 40 pins | • Input signal: Set for each channel | • Minimum input pulse width: 50 μs
• Burn-in detection: Possible (All channels together), Detection time: 60 s | • Data refresh cycle: 10 ms | • Data refresh cycle: 2 ms
• Withstanding voltage: 1500 V AC between input and system | • Weight: 0.2 kg | • Isolated ch. | • Isolated ch. | • Isolated ch.

#### Model Description HART WTR PCT MSL Basic Specification Specification

NFAA135 | Pulse Input | N/A N/A | ✓ | ✓ | 40 pins | • Withstanding voltage: 500 V AC between input and system, 550 V AC between channels | • Minimum input pulse width: 40 μs
• Transmitter power supply: 24 to 30 mA / 12 to 30 mA Selectable (4 to 20 mA) | • Data refresh cycle: 2 ms
• Max current consumption: 300 mA (5 V DC), 400 mA (24 V DC) | • Input type: Dry contact pulse (Open collector contact)
• Weight: 0.3 kg | • Dry contact pulse (Relay contact)
• Isolated ch. | • Voltage pulse: Current pulse (Two-wired transmitter)
• Data refresh cycle: 10 ms | • Voltage pulse: Pulse (Three-wired transmitter)

NFAA135 | Frequency Input | N/A N/A | ✓ | ✓ | 40 pins | • Withstanding voltage: 500 V AC between input and system, 550 V AC between channels | • Minimum input pulse width: 40 μs
• Transmitter power supply: 24 to 30 mA / 12 to 30 mA Selectable (4 to 20 mA) | • Data refresh cycle: 2 ms
• Max current consumption: 300 mA (5 V DC), 400 mA (24 V DC) | • Input type: Dry contact pulse (Open collector contact)
• Weight: 0.3 kg | • Dry contact pulse (Relay contact)
• Isolated ch. | • Voltage pulse: Current pulse (Two-wired transmitter)
• Data refresh cycle: 10 ms | • Voltage pulse: Pulse (Three-wired transmitter)

NFAA315 | Analog I/O | N/A N/A | ✓ | ✓ | 40 pins | • Input accuracy: ±1 V (5 V DC) | • Minimum input pulse width: 40 μs
• Output step response time: 40 ms | • Data refresh cycle: 10 ms | • Input type: Dry contact pulse (Open collector contact)
• Max current consumption: 310 mA (5 V DC), 500 mA (24 V DC) | • Dry contact pulse (Relay contact)
• Output fallback: Set for each channel | • Voltage pulse: Current pulse (Two-wired transmitter)
• Weight: 0.3 kg | • Voltage pulse: Pulse (Three-wired transmitter)

NFAA315 | Analog I/O | N/A N/A | ✓ | ✓ | 40 pins | • Input accuracy: ±1 V (5 V DC) | • Minimum input pulse width: 40 μs
• Output step response time: 40 ms | • Data refresh cycle: 10 ms | • Input type: Dry contact pulse (Open collector contact)
• Max current consumption: 310 mA (5 V DC), 500 mA (24 V DC) | • Dry contact pulse (Relay contact)
• Output fallback: Set for each channel | • Voltage pulse: Current pulse (Two-wired transmitter)
• Weight: 0.3 kg | • Voltage pulse: Pulse (Three-wired transmitter)

NFAA315 | Analog I/O | N/A N/A | ✓ | ✓ | 40 pins | • Input accuracy: ±1 V (5 V DC) | • Minimum input pulse width: 40 μs
• Output step response time: 40 ms | • Data refresh cycle: 10 ms | • Input type: Dry contact pulse (Open collector contact)
• Max current consumption: 310 mA (5 V DC), 500 mA (24 V DC) | • Dry contact pulse (Relay contact)
• Output fallback: Set for each channel | • Voltage pulse: Current pulse (Two-wired transmitter)
• Weight: 0.3 kg | • Voltage pulse: Pulse (Three-wired transmitter)

NFAA315 | Analog I/O | N/A N/A | ✓ | ✓ | 40 pins | • Input accuracy: ±1 V (5 V DC) | • Minimum input pulse width: 40 μs
• Output step response time: 40 ms | • Data refresh cycle: 10 ms | • Input type: Dry contact pulse (Open collector contact)
• Max current consumption: 310 mA (5 V DC), 500 mA (24 V DC) | • Dry contact pulse (Relay contact)
• Output fallback: Set for each channel | • Voltage pulse: Current pulse (Two-wired transmitter)
• Weight: 0.3 kg | • Voltage pulse: Pulse (Three-wired transmitter)

NFAA315 | Analog I/O | N/A N/A | ✓ | ✓ | 40 pins | • Input accuracy: ±1 V (5 V DC) | • Minimum input pulse width: 40 μs
• Output step response time: 40 ms | • Data refresh cycle: 10 ms | • Input type: Dry contact pulse (Open collector contact)
• Max current consumption: 310 mA (5 V DC), 500 mA (24 V DC) | • Dry contact pulse (Relay contact)
• Output fallback: Set for each channel | • Voltage pulse: Current pulse (Two-wired transmitter)
• Weight: 0.3 kg | • Voltage pulse: Pulse (Three-wired transmitter)

### Common Specifications:
- ±0.01 % of full scale
- ±0.003 % of full scale
- ±0.02 % of full scale
- ±0.03 % of full scale
- ±0.05 % of full scale
- ±0.1 % of full scale
- ±0.3 % of full scale

### Important Notes:
- Use a MIL connector cable only for HART input.
- The module with suffix codes -S or -L is required for wide temperature range.
### Selection Guide

#### Software Selection

<table>
<thead>
<tr>
<th>Software Name</th>
<th>Model</th>
<th>Suffix Codes/Options Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCN/FCJ software media</td>
<td>NT203A</td>
<td>PC10E</td>
</tr>
<tr>
<td>FCN/FCJ APP software media*</td>
<td>NT205A</td>
<td>PC11E</td>
</tr>
</tbody>
</table>

#### Configuration Selection Guide

**Power supply module 24 V DC**
- NFPW444 - 5051
- FCN/FCJ Duolet AP Development Kit License (*)
- Run on PC NT755FJ LW11A
- CPU module with 4 Ethernet port (*2)
- Standard temp. NFCP502 - S05 W05 S06 W06
- 40 pole plug types) (*3)
- KM S40 - 005 010 015 020 025 030
- MIL connector cable (50 pole plug types) (*4)
- NFDV532, NFDV551, NFDV161 (64-channels type)
- Pressure clamp terminal block for relay output (32-channels)
- NFDV151 (24 V DC, Isolated)
- Digital Output module (-64-channels type)
- NFDR557 - S50 N/A N/A S51 N/A N/A
- Pressure clamp terminal block for digital input modules (-32-channels type)
- Pulse Width Output module (+4-channels, Pulse/Pulse, Pulse/Current, Pulse/DC, Isolated)
- NFDV161 or NFDV561 (64-channels type).
- Extension unit is 1 m.
- NFDR515 - P50/4570 N/A N/A P51/4570 N/A N/A

#### Hardware Selection (Non Explosion Model)

**FCN/FCJ OPC server for Windows**
- Run on PC NT781AJ LW11A
- MIL connector cables (2-ports, 300 bps to 115.2 kbps)
- NF LR111 - S50 N/A S51 N/A

### Communication modules

**Pressure clamp terminal block with surge absorber (SA)**
- Standard: NFCP501 - 5050
- Standard with ISA standard G3 option: NFCP501 - 5050, S55 W05 S56 W06
- Installation: 10 inch rack, OVR rack, 10 inch rack, DIN rack

**Base modules (40 pole plug types)**
- NBFU520
- NBFU530
- NBFU540

**Base modules (75 pole plug types)**
- NBDO51
- NBDO52
- NBDO53

**SB bus interface module**
- Standard: NBDG100

**SB bus repeater module for FCN**
- NSBD100 - S50/SBT01 S50/SBT02 S50/SBT01 S50/SBT02

**SB bus cable**
- NCBR501 - C100 C101 C200 C400 C800

**Terminal Block Pressure Clamp Terminal MIL**

#### MIL connector cables

**MIL connector cable for analog, NFDV532 in 1 to 32 pole plug types**
- KM450 - 005 010 015 020 025 030

**MIL terminal block connectors**

**SB bus T-joint**
- NFDV535, NFDV551

**SB bus T-joint**
- NFDV535, NFDV551

### Pressure clamp terminal blocks

**Surge Absorber (SA)**

<table>
<thead>
<tr>
<th>Name</th>
<th>Model</th>
<th>Suffix Codes/Options Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure clamp terminal block for analog (16-channels)</td>
<td>NFDV144</td>
<td>S50/13S00 S50/13S10 S50/13S00 S51/13S00 S51/13S10 S51/13S10</td>
</tr>
<tr>
<td>Pressure clamp terminal block for digital (32-channels)</td>
<td>NFDV561</td>
<td>P50 N/A N/A P51 N/A N/A</td>
</tr>
</tbody>
</table>

### Test switch and lamp

**Test switch for FCN digital input module NFDV515, NFDV535, NFDV541**
- S9105A

**Cable for test switch / test lamp**
- ASBE79L
### FCN (Long type, DIN rail-mounted)
Base module: NFBU200-50

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>444.0</td>
<td>mm</td>
<td>172.3</td>
<td>170.8</td>
</tr>
</tbody>
</table>

### FCN (Long type, 19 inch rack-mounted)
Base module: NFBU200-50

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>482.6</td>
<td>mm</td>
<td>170.8</td>
<td>170.8</td>
</tr>
</tbody>
</table>

### FCN (Short type, DIN rail mounted)
Base module: NFBU050, N2BU051 (for E2 bus)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>444.0</td>
<td>mm</td>
<td>172.3</td>
<td>170.8</td>
</tr>
</tbody>
</table>

### FCN (Compact type, DIN rail-mounted)
Base module: N2BU030

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>283</td>
<td>mm</td>
<td>150.9</td>
<td>16.1</td>
</tr>
</tbody>
</table>

### CPU module
FCN model: NFCPS02/NCEPS02

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>65.8</td>
<td>mm</td>
<td>149.3</td>
<td>132.5</td>
</tr>
</tbody>
</table>

### Power supply module
Model: NFPW441/NFPW442/NFPW444

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>49.7</td>
<td>mm</td>
<td>146.6</td>
<td>150.0</td>
</tr>
</tbody>
</table>

### E2 bus interface module
Model: N2EB100

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>146.4</td>
<td>mm</td>
<td>146.4</td>
<td>107.5</td>
</tr>
</tbody>
</table>

### SB bus repeat module
Model: NFSB100

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>107.5</td>
<td>mm</td>
<td>107.5</td>
<td>32.8</td>
</tr>
</tbody>
</table>

### Analog I/O module
Model: NFAI143/NFAI141/NFAI145/NFAI142/NFAV144/NFAV141/NFAV145/NFAV143/NFAV144

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.8</td>
<td>mm</td>
<td>142.5</td>
<td>142.5</td>
</tr>
</tbody>
</table>

### Digital I/O module
Model: NFDV151/NFDV152/NFDV153

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>32.8</td>
<td>mm</td>
<td>107.5</td>
<td>107.5</td>
</tr>
</tbody>
</table>

### Terminal block
Model: NFTC45/NFTC45S/NFTC45SS/NFTC45SSS

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.9</td>
<td>mm</td>
<td>31.8</td>
<td>31.8</td>
</tr>
</tbody>
</table>

### Analog I/O module
Model: NFTC45/NFTC45S/NFTC45SS/NFTC45SSS

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.08</td>
<td>mm</td>
<td>5.08</td>
<td>5.08</td>
</tr>
</tbody>
</table>

### Terminal block
Model: NFTC45/NFTC45S/NFTC45SS/NFTC45SSS

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Unit</th>
<th>Width</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.9</td>
<td>mm</td>
<td>31.8</td>
<td>31.8</td>
</tr>
</tbody>
</table>
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.