

OpreX[™]Control and Safety System

STARDOM FCN-RTU

Autonomous Controller

Process Control PLC/RTU FC | - RTU

High Performance with Low Power Consumption

The FCN-RTU, Yokogawa's STARDOM low power consumption model of autonomous controller FCN, is a robust system that meets the demanding requirements of applications where infrastructure is inadequate and conditions inhospitable and hazardous.

The FCN-RTU controller is a reliable platform that keeps you

STARDOM FCN-RTU

Integration

competitive in a rapidly changing market.

- Same look and feel as Yokogawa's DCS Human Machine Interface (HMI) via gateway station
- OPC, DNP3, and Modbus® support for use with a variety of SCADA Systems
- Asset management via a variety of digital communications

Metwork

- Support of FOUNDATION[™] Fieldbus, HART[®], Modbus, PROFIBUS-DP[®], and CANopen[®] for field device digital communications
- Communication using several types of networks infrastructure such as GPRS and satellite for SCADA communications

- Excellent environmental resistance
- Error Correcting Code (ECC) memory
- Durable designs protect the hardware from harsh environments

Engineering

- Support of all five IEC 61131-3 programming languages
- Extensive regulatory control libraries cultivated throughout Yokogawa's DCS history
- Easy to reuse software architecture

Information

- Web server embedded in CPU module for remote maintenance
- E-mail alarm notification from/to controllers
- Autonomous features such as data logging and FTP transmission on controllers



Providing seamless operation from field to center while enhancing the benefits of digital communications.

STARDOM **FCN-RTU**

One Network... but Multiple Media

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.

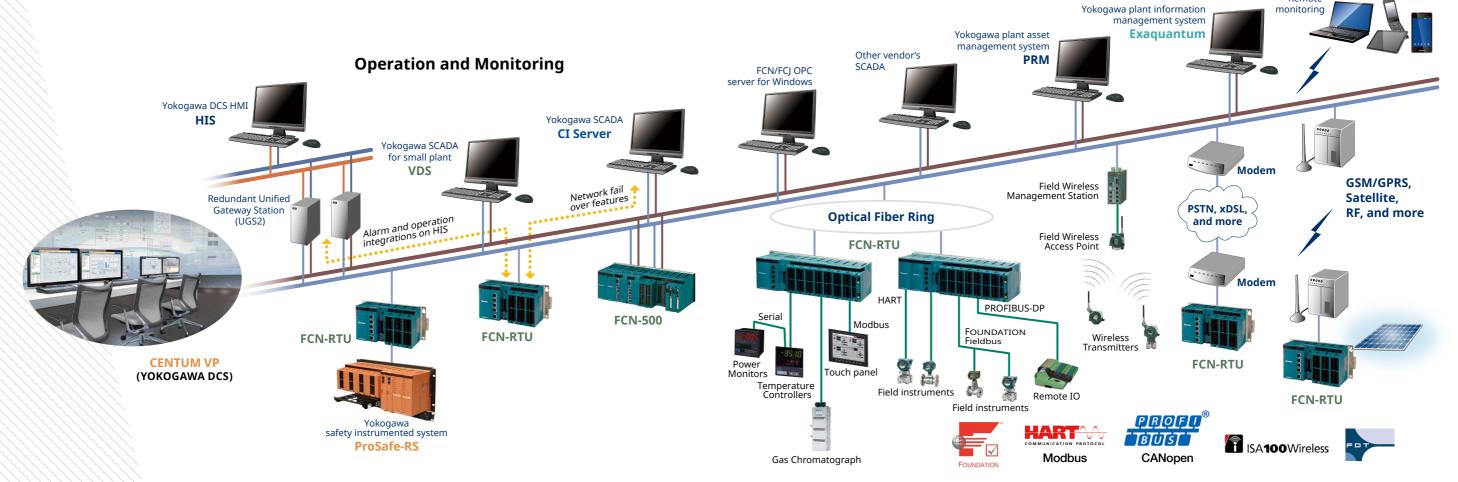
One Window... but Multiple Systems

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.

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), CI Server (TCP/IP, DNP3, Modbus TCP), HIS (Vnet/IP via gateway) other vendor SCADA systems (OPC, DNP3, Modbus TCP)
	Serial (RS-232, RS-422/485)	CI Server (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/ASCIT





STARDOM FCN-RTU controller can be flexibly configured for a wide range of PLC/RTU applications.

Reliable and High Speed CPU

High speed control

• 50 msec analog control, 10 msec CPU scan time

Error correcting code (ECC) memory

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

Time synchronization

• Simple network time protocol (SNTP) enables time synchronization as an SNTP client

X Error output O Correct output STARDOM

Durable Design

Operation in harsh environments

- -40°C to +70°C and up to 3,000 m altitude*
- -20°C to +70°C and up to 2,000 m altitude*
- * Depending on the combination of I/O modules

Failure-proof

- Fanless design with excellent heat dissipation
- IC chips, which have a higher failure rate, are not mounted on the base module

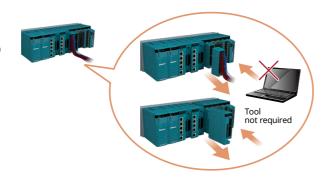
Robust

- · Compliant with EMC standards
- · Optional Explosion Protection
- ATEX Type "n"
- IECEx Type "n"
- FM Non-Incendive Class I Division
- CSA Non-Incendive Class I Division
- Optional G3 coating

Easy Maintenance

Quick start after replacing I/O

- Hot swappable I/O modules
- I/O definitions automatically downloaded to I/O modules without use of tools
- I/O modules can be changed without rewiring
- Continuous output of values (fallback function) if CPU fails



Rich Variety of I/O Modules

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 if supported for your model

DI/O for a diverse range of applications

· 32 or 64 channels for 24 V DC on/off or transistor contact signals

AI/O and DI/O common features

- Corrosion protection coating (ISA standard G3
- Pressure clamp terminal block and MIL connection with surge absorber (option)

Low Power Consumption Model FCN-RTU

Best-in-class CPU module: NFCP050

- ► Enables advanced control applications
 - 256MHz, 32 bit RISC processor
- Error Check and Correct (ECC) memory
- · Power fail-safe file system
- Low power consumption



Short base unit: NFBU050

STARDOM **FCN-RTU**

Fits in small cabinets

- 28 cm (11 inch)* wide
- · DIN rail mount or screw mount
- Three expansion I/O Slots
- * 283 mm (11.14 inch)

Flexible power supply module: NFPW426

► Ideal for solar power applications

• Wide voltage range: 10-30 V DC





More communication choices

► Suitable for various communication protocols

- One 100BASE-TX Ethernet port with automatic power saving mode
- Three RS232 serial ports (one port up to 115 kbps)
- One RS422/485 serial port up to 115 kbps with switchable 120Ω terminator
- Support Modbus protocol

Easy wiring

- MIL connecter cable: KMS40
- MIL connecter terminal block : TAS40



Multiple built-in I/O

► Reduces your initial installation cost

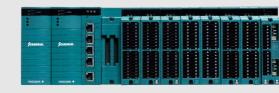
- Twelve analog inputs (1-5 V DC)
- Two analog outputs (4-20 mA)
- Sixteen digital inputs
- Eight digital outputs
- Two pulse inputs (0-10 kHz)
- One battery monitoring input (0-32 V DC)

Please select from the following two types based on your budget and application

► Short base type



▶ Long base type



ENGINEERING Tool

Maximize productivity at your site with excellent engineering tools for all project phases, from system design to commissioning.

Enhanced Application Portability through Division of Logical and Physical Layers

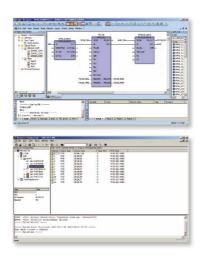
A platform independent architecture enhances application portability.

Logic Designer: Control application development tool

- Supports all five IEC 61131-3 languages
- Intuitive look & feel with automated application layout
- Project comparison function for confirming modifications

Resource Configurator: Environment configuration tool for control applications

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

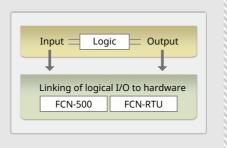




Application portability by separating logic from hardware

- **▶** Logic Designer
- Platform independent programming tool
- **►** Resource Configurator
- Hardware configuration tool for linking logical I/O with hardware

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

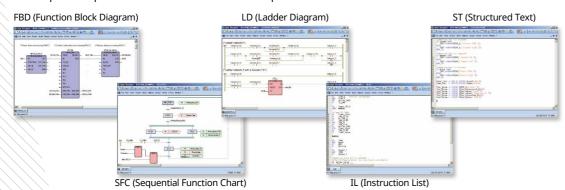


IEC 61131-3 Compliant Programming

IEC 61131-3, the de facto PLC programming standard, is platform independent and allows great reusability.

Support of all five IEC 61131-3 languages

- Choose the language best suited to your logic
- Loop and sequential control with the same development tool

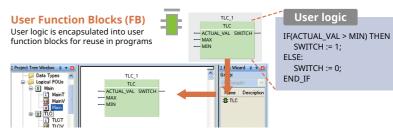


Reusable Programming

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

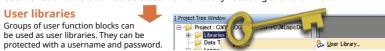
Modularized applications

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



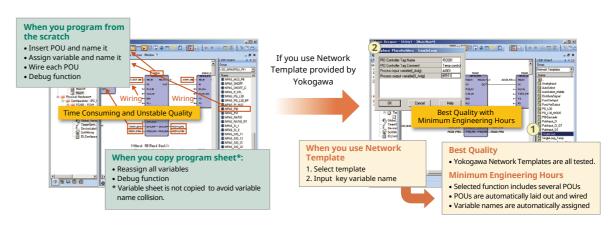
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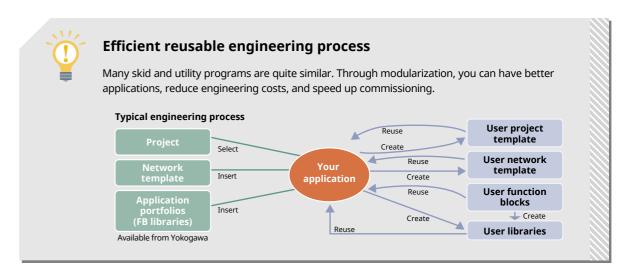
User function blocks can be selected from a library list using the Edit Wizard.



Network Template Function

The network template function enables the use of advanced copy features that eliminate the need to reenter variables. In addition to enabling the creation of network templates from your programs, Yokogawa provides a number of network templates for your convenience.





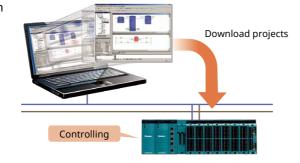
ENGINEERING Maintenance and Debugging Aids

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

Online Download

Modify your application without interfering with a process.

- No need to stop a controller to modify a control application
- · Variables inherited from previous applications

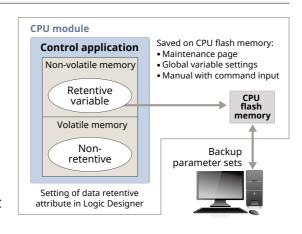


Parameter Saving

Through every phase, from debugging to commissioning, you no longer have to worry about losing essential tuning parameters.

Essential tuning parameters such as P, I, and D in PID control instruments and critical parameters for applications can be retained in a variety of ways.

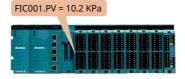
- As a default, essential instrument parameters such as P, I, and D are retentive variables
- In Logic Designer, the retentive attribute can be set for an application variable
- Multiple parameter sets can be backed up to a PC



Industry Quantity Conversion

The intuitive display of data improves programming efficiency.

 Internal analog data (0% to 100%) is converted to industrial quantity such as °C for easy and intuitive programming and debugging



Maintenance

CPU and I/O module information as well as system logs can be confirmed on a Web browser, dramatically improving maintenance efficiency.

System overview

Memory size, OS version, and IP address can be checked online.



System logs

System logs help you identify the cause of an application error.



CPU status

Information on each CPU (in dual redundant mode) including OS version and serial number can be checked.



STARDOM FCN-RTU

Debugging functions for enhanced engineering efficiency

Application Debugging on PCs



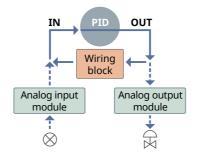
Minimize engineering costs by doing both programming and debugging on one PC.

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

Software Wiring

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.

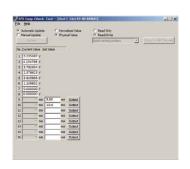
- Wizard available for easy configuration
- · Advanced settings for adjustments to process



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.

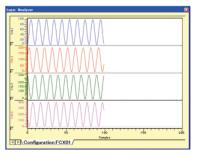
- Confirm the actual input signals for each channel
- Manually output signals to I/O modules



Logic Analyzer

Logic Analyzer saves you time investigating and analyzing software malfunctions.

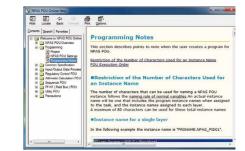
- Records variables in continuous and cycle modes
- · Exports the recorded data to text format files
- Adjusts curve colors and scales/ranges on individual axes



Extensive Help Files

Extensive help files for all of your programming questions are included.

- · More than 3,500 pages
- From IEC 61131-3 basics to specific information on the use of each library
- Instructions on how to use the engineering tool



L NGINEERING Application Portfolio

A variety of application portfolios reduce engineering hours and enhances quality.



All of Yokogawa's long experience with distributed control systems (CENTUM series) has gone into the development of the POUs that are included in the new process automation system portfolios (NPAS POUs). These cover a wide range of functions such as regulatory control, mathematical calculations, and sequencing.

List of NPAS POUs

	POU Name	Description
	NPAS_AI_ANLG	Standard analog input
	NPAS_AI_TEMP	Measured temperature input
	NPAS_AI_PULS_QT	Exact totalization pulse train input
	NPAS_AI_PULS_CI	Control priority type pulse train input
	NPAS_AI_PCNT	Regularized data (%) input
	NPAS_AI_FREQ	Frequency input
	NPAS_AI_REAL	Real data input
	NPAS_AI_DINT/UDINT	DINT/UDINT data analog input
	NPAS_AO_ANLG	Standard analog output
	NPAS_AO_PCNT	Regularized data (%) output
	NPAS_AO_REAL	Real data output
	NPAS_AO_DINT/UDINT	DINT/UDINT data analog output
	NPAS_DI_STS	Status input
õ	NPAS_DI_PUSHB	Push button input
Dat	NPAS_DI_WORD	WORD data contact input
יע ע	NPAS_DO_STS	Status output
roc		Pulse width output
I/O Data Processing	NPAS_DO_STS_PW	(reset of accumulation type)
ina	NPAS_DO_STS_PW2	Pulse width output
		(Continuation of accumulation type)
	NPAS_DO_STS_TP	Time-proportional ON/OFF output
	NPAS_DO_STS_PWH	High resolution pulse width output
	NPAS_DO_WORD	WORD data contact output
	NPAS_FFI_ANLG/STS/USINT	FF-H1 analog/status/discrete input
	NPAS_FFO_ANLG/STS/USINT	
	NPAS_AI_HART	HART variable input
	NPAS_FFRD_ANLG	FF-H1 analog data reading
	NPAS_FFRD_STS	FF-H1 status data reading
	NPAS_FFRD_DINT	FF-H1 integer data reading
	NPAS_FFWT_ANLG	FF-H1 analog data writing
	NPAS_FFWT_STS	FF-H1 status data writing
	NPAS_FFWT_DINT	FF-H1 integer data writing
	NPAS_PVI	Indicator
	NPAS_PID	PID controller
	NPAS_PI_HLD	Sampling PI controller
	NPAS_ONOFF	2-postition on/off controller
	NPAS_ONOFF_G	3-postition on/off controller
	NPAS_MLD	Manual loader without output tracking
Rec	NPAS_MLD_PB	Manual loader with output pushback
	NPAS_MLD_BT	Manual loader with bias tracking
tor	NPAS_RATIO(_RT)	Ratio set (with ratio tracking)
v Control	NPAS_PG_L30(_BP)	30-zone program set (with bumpless)
nt	NPAS_VELLIM(_PB)	Velocity limiter (with output pushback)
<u>0</u>	NPAS_AS_H/M/L	Auto-selector High/Medium/Low
	NPAS_FOUT	Cascade signal distributor
	NPAS_FFSUM(_BL)	Feedforward signal summing (with balancing)
	NPAS_XLMT_S/D	Single/Double cross-limit
	NPAS_BSET_F	Batch set block for flow measurement

	POU Name	Description		
	NPAS_LDLAG	Lead/Lag		
	NPAS_DLAY	Dead time		
	NPAS_AVE_M	Moving average		
	NPAS_AVE_C	Cumulative average		
>	NPAS_FUNC_VAR	Variable line-segment function		
Arithmetic Calculation	NPAS_TP_CFL	Temperature and pressure correction		
ıme	NPAS_T_CFL	Temperature correction		
tic (NPAS_P_CFL	Pressure correction		
Calc	NPAS_ASTM1	Old JIS-based ASTM correction		
:Lla	NPAS_ASTM2	New JIS-based ASTM correction		
tion	NPAS_SW13(_SW31)	1-pole 3-position (3-pole 1-position) selector switch block		
	NPAS_SW19(_SW91)	1-pole 9-position (9-pole 1-position) selector switch block		
	NPAS_BDBUF_R	Data buffer for real data		
	NPAS_BDBUF_T	Data buffer for time data		
Sequence	NPAS_SI*/SO*/SIO*	Switch instrument (NPAS_SI_1,NPAS_SI_2, NPAS_SO_1, NPAS_SO_2, NPAS_SIO_11, NPAS_SIO_12, NPAS_SIO_21, NPAS_SIO_22)		
rD	NPAS_TM	Timer with preset value		
	NPAS_CT	Counter with preset value		
	NPAS_SQRT_LC	Square root extraction with low-input cutoff		
	NPAS_CDR_DESTR	Analog de-structuralization		
	NPAS_CDR_STR	Analog structuralization		
	NPAS_BPLS_SW	Bumpless switching block		
	NPAS_CDB_DESTR	Digital de-structuralization		
	NPAS_CDB_STR	Digital structuralization		
	NPAS_CDD_DESTR	Integer de-structuralization		
	NPAS_CDD_STR	Integer structuralization		
	NPAS_BCD_CI16	16-bit BCD input block		
	NPAS_BCD_CO16	16-bit BCD output block		
⊑	NPAS_SIOCHGPLS	Contact signal pulse form conversion		
ij	NPAS_DGFLT	Digital filter		
	NPAS_DFILE	General-purpose data filing		
	NPAS_ADDSW NPAS_ADDINT NPAS_SUBSW NPAS_SUBINT	INT-type parameter support		
	NPAS_AI2SW_A/B	Dual signal selector type A/B		
	NPAS_AI3SW	Analog-input 2-out-of-3 circuit		
	NPAS_SL2SW_A/B	High-low range switching type A/B		
	NPAS_DI3	Digital input 2 out of 3 circuit		
	NPAS_NPS_STR	Totalization structuralization		
	NPAS_PB6	Six-pushbutton block		
	NPAS_RS8_A/B	8-input resource scheduler (pemission non-holding/holding)		

NPAS Features

Straightforward programming for easy maintenance

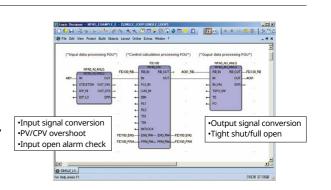
A variety of input, control calculation, and output processing POUs prepared for straight forward programming.

- Input and output POUs include routines for the processing of 4-20 mA, RTD, mV, FOUNDATION fieldbus, and other types of input and output signals
- Input and output POUs can be selected based on signal
- · Read back (RB) connections prevent code nesting in feedback control

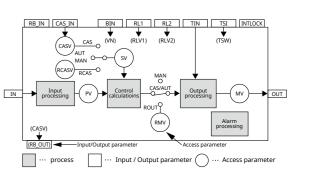
Integrated control processing in a single POU

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
- Individuals POUs can be accessed as a tag by an FCN-RTU application or SCADA system



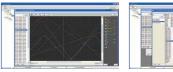
STARDOM FCN-RTU



Logging Portfolio

The application data collected and logged on the controller can be viewed in either a table or trend chart. Data on the FCN-RTU controller can be viewed offline (by FTP file transfer to a PC).

Periodical FTP tool to a PC is prepared.



Logging & Reporting Function	The logging portfolio logs data and creates daily, monthly, and yearly reports.
	Logging of control application data on controllers

Logging of control application data on controllers • Periodic data logging: High speed (every 1 to 60 seconds) or low speed (every 1 to 60 minutes)

• Batch logging: High speed (every 1 to 60 seconds) or low speed (every 1 to 60 minutes)

• Snapshot logging : Continuous or trigger • SOE logging : 100 msec or longer

• Message logging : Alarm and event messages Report file generation

• Report type : Daily, monthly, yearly

• Closing data: Minimum, maximum, average, total

Logging data can be viewed using the Logging Viewer. Logging view Data can be displayed in trend or tabular format. • Trend format: Up to 10 pens can be assigned. • Tabular format: Up to 40 items can be viewed.

Logging can be configured using the Logging Configurator tool. Logging files from multiple controllers can be periodically collected using the Logging File Collector tool. Logging file collection Logging and report files are sent as e-mail attachments.

L NGINEERING Application Portfolio

Communication Portfolios

FCN-RTU controller communicates with other PLCs and SCADA systems using the following communication portfolios:

Ethernet

RTU

Modbus communication portfolio			DNP3 comm	iunication portfolio	FA-M3 communication portfo	
Type	Mode	Function	Туре	Function	MELSEC communication portfo	
	ASCII	Master / Slave	Serial	Slave		

Server

Etherne	et
	~
	Coi

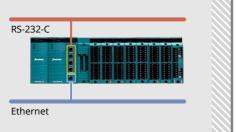
Serial

mmunication ports on CPU module

Master / Slave

Client / Server

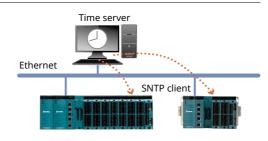
Unlike other PLCs, FCN-RTU utilizes Modbus and DNP3 communications through an RS or Ethernet port embedded on the CPU module. This eliminates the need for dedicated communication modules.



Time Synchronization

Time is synchronized between FCN-RTU using the simple network time protocol (SNTP).

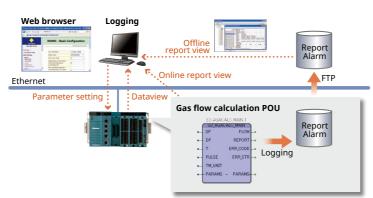
Note: The FCN-RTU does not support SNTP server functions.



Gas Flow Calculation

Gas flow volume is calculated using the following gas flow calculation POUs:

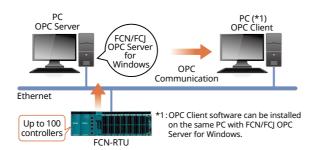
- AGA 3, 7, 8, 9, 10, 11
- GPA2172
- · API21.1 compliant



FCN/FCJ OPC Server for Windows

FCN/FCJ OPC Server for Windows supports the OPC DA 2.05a and A&E 1.10 compliant interfaces.

Via OPC Server for Windows, FCN-RTU controller can connect with a variety of SCADA systems.



SCADA : CI Server

Integrated Remote Control and Monitoring Distributed Utilities

Client and server configuration of Yokogawa's SCADA CI Server 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 guick 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.

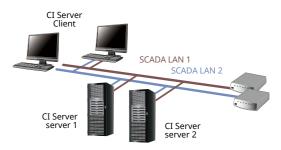
- Capable of handling up to one million I/O points
- · Online configuration with no downtime
- · Supported OS platforms are: Microsoft Windows, RedHat Linux



Reliable Architecture

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

- A HAC package enables the configuration of a standby CI Server
- Real-time data synchronization and watchdog monitoring of system health
- · Fast automatic or manual switchover





SCADA integration with controllers

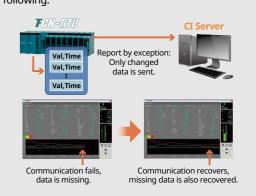
With applications that are distributed over a wide area, GPRS, satellite, and other types of narrow bandwidth wireless communications are often used. However, communications can easily be disrupted and the cost of transferring large amounts of data is often prohibitive. The use of CI Server with the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

▶ Report by exception

To hold down communications costs, only changed data is sent to CI Server.

► Network fail-over

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



SPECIFICATIONS > BASIC MODULE

> FCN-RTU CPU Specifications

	Item	Specification			
Processor		SH-4A (SH7730) 256 MHz			
M	Main	128MB with ECC			
Memory	Static RAM	1MB with ECC, battery backup			
System card		128MB on-board flash memory			
Serial port		3 RS-232 ports (SERIAL: 1, 2, 3), non-isolated, RJ45, 1 RS-422/RS-485 port (SERIAL: 4), non-isolated, RJ45			
	Method	RS-232: Full/Half duplex (software settings), RS-422/RS-485: Full/Half duplex (DIP switch settings)			
	Synchronization	Asynchronous			
	Baud rate	SERIAL1,4: 1.2, 2.4, 4.8, 9.6, 14.4, 19.2, 28.8, 38.4, 57.6, or 115.2 kbps SERIAL2, 3: 1.2, 2.4, 4.8, 9.6, 14.4, 19.2, 28.8, or 38.4 kbps			
Terminating resistance		RS-422/RS-485: 120 Ω built-in, ON/OFF (DIP switch settings)			
Network interface		1 Ethernet port: 100/10 Mbps, 10BASE-T or 100BASE-TX, RJ45 with network power switch (ON/OFF)			
I/O interface		SB bus (Single)			
RAS features		Watchdog timer, temperature monitor, etc.			
Battery		2700 mAH lithium battery (*1)			
LED		3 LEDs for CPU status, 2 LEDs for LAN status, 2 LEDs for each serial port status			
Switches		RESET, SHUTDOWN, ON/OFF (NETWORK)			
Power Supply	Supply voltage	5V DC±5%			
Power Supply	Power consumption	1.16 to 2.30 W			
Weight		0.57kg			
Size	Dimensions (W/H/D)	65.8 x 130 x 142.5 mm			
Size	Slot	Occupy 2 slots			
Duplex Configu	ration	Power supply modules enabled (NFBU200 with NFPW444)			
Built-in I/O		16 DI, 8 DO, 12 AI (1-5 V), 2 AO (4-20 mA), 2 PI, 1 AI (0-32 V) for solar power battery monitoring (*2)			

CPU Function Specification

Common CPU Specifications

Task Execution	
Execution Speed : Number of Tasks : Task Priority : Task Execution Cycle :	Approx. 50 µsec/Ksteps in IL language Max. 16 tasks Possible in 16 levels 10 ms or longer (by 10 msec. increments)
Program Capacit	y on CPU

Control Application : Max. 3 MB (approx. 360 Ksteps in an IL language) (*3)
Duolet (*1) Application: Max. 32 MB

Data Area (*2): Max. 8 MB Retained Data Area (*3): Max. 410 KB

*1 : Duolet functions enable Java applications run on the controller. *2 : The data is not retained when the power is off.

*3: The data is retained even if the power is off. It can be used for tuning

Guideline of Control Application Capacity

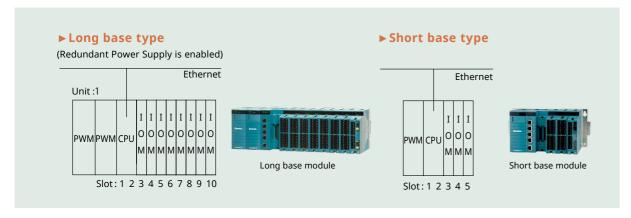
As a guideline, the capacity of the control application is a total of the following:

- ► 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 POUs): Up to 384
- ▶ Sequence program : Up to 180 kilosteps in Ladder (equivalent to 128 sequence tables)

Network (Ethernet) Specification

- ► Compliant with IEEE802.3
- ► Communicate with up to 15 FCNs per FCN-RTU
- ► Communicate with up to 4 upper systems (*1) per FCN-RTU
- *1: Total number of VDS, FCN/FCJ OPC Server and CI Server

> FCN-RTU Configuration



>> FCN-RTU Basic Specifications

CPU Modules

Model	Name	Specification	Embedded I/O
NFCP050	CPU module	Duplex configuration: Not applicable CPU Status LED: HRDY (Hardware Ready), RDY (System Ready), CTRL (Control Ready) LAN Status LED: NETWORK ON/OFF (ON in normal, OFF in power down mode) LINK & ACT (ON for communication established, BLINK for Sending/Receiving) RS Status LED: RCV (Receiving), SND (Sending) Power consumption: 1.6 W to 2.9 W depending on network and embedded I/O configuration Weight: 0.57 kg Operation temperature: -40°C to 70°C	• Ethernet: 1 port • RS-232: 3 ports • RS-422/RS-485: 1 port • AI (1 to 5 V): 12 ch. • AI (0 to 32 V): 1 ch. • AO (4 to 20 mA): 2 ch. • DI (24 V DC): 16 ch. • DO (24 V DC): 8 ch. • PI: 2 ch.

Base Modules

Model	Name	Specification	
NFBU200-S0	Base module (19-inch rack-mounted)	Max current consumption: 0.4 A (5 V) (Self-consumption)	Weight: 1.9kg
NFBU200-S1	Base module (DIN rail-mounted)	Operation temperature: -20°C to 70°C	Weight: 1.0kg
NFBU050-S1	Short base module (DIN rail-mounted)	Max current consumption: 0.025 A (5 V) (Self-consumption) Operation temperature: -40°C to 70°C	Weight: 0.58kg

Power Supply Modules

Model	Name	Specification
NFPW444	Power supply module (24 V DC input)	Duplex configuration: Possible Hot-Swap: Possible Rated output: + 5.1 V DC, 7.8 A Analog field power supply: Input: 24 V DC ± 10 %, 4 A, Duplexed (matching-diode) LED: SYS (5 V system power output ON), FLD (24 V field power supply ON) Checking terminals: + 5 V, + 24 V Weight: 0.6 kg Operation temperature: 0°C to 55°C (-20°C to 70°C for NFPW444)
NFPW426	Power supply module (12 V DC input or 24 V DC input)	 Duplex configuration: Not applicable Hot-Swap: Not applicable Rated output: +5.1 V DC (2.4 A) and +24 V DC (0.54 A) LED: SYS (5 V system power output ON), FLD (24 V field power supply ON) Checking terminals: +5 V, +24 V Weight: 0.61 kg Operation temperature: -40 °C to 70 °C

>> FCN-RTU Module Specifications

 $\textbf{Digital I/O Modules} \quad \text{WTR: Wider Temperature Range (-40°C to +70°C or -20°C to +70°C)} \quad \text{PCT: Pressure Clamp Terminal available}$

Model	Description	WTR*	PCT*	MIL	Basic Specification	Specification	Common
NFDV151	Digital Input • 32 ch. • 24 V DC • Isolated	√ -20	√	√ 50 pins	Functions: Status and Push button (edge count) Max current consumption: 500 mA (5 V DC) Weight: 0.3 kg	Input response time: 8 ms or less (for status input) Min. ON detection time: 20 ms (for push button input) Max. ON/OFF cycle: 25 Hz (for push button input)	per 16 ch. (Plus or Minus)
NFDV551	Digital Output • 32 ch. • 24 V DC • Isolated	√ -20	√	√ 50 pins	Output fallback: Set to all channels Max current consumption: 700 mA (5 V DC), 60 mA (24V DC) Weight: 0.2 kg	Output response time: 3 ms or less (for status output)	per 16 ch. (Minus)
NFDR541 (*1)	Relay Output • 16 ch. • 24 to 110 V DC or 100 to 240 V AC • Isolated	√ -20	✓	N/A	Rated applied voltage: 24 to 110 V DC, 100 to 240 V AC Output fallback:Set to all channels Max current consumption:780 mA (5 V DC) Weight: 0.3 kg	Output response time: 12 ms or less (for status output)	per 8 ch. (Plus or Minus)

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

^{*1 :} With battery exhaustion detecting function.
*2 : MIL 40-pin x 2 (KMS40 cable and TAS40 terminal block can be used.)

^{*1:} NFDR541 is not compliant with RoHS directive and will not be compliant with CE marking from July 22, 2017.

>> FCN-RTU Module Specifications

Analog I/O Modules WTR: Wider Temperature Range (-40°C to +70°C or -20°C to +70°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.	√	√ -20	√	√ 40 pins	Withstanding voltage: 500 V AC between input and system, 500 V AC between channels Transmitter power supply: 20.2 to 29.3 V (Output current limit: 25 mA) Two wire and four wire transmitter setting per channel with connected terminal Max current consumption: 360 mA (5 V DC), 450 mA (24 V DC) Weight: 0.3 kg	• Accuracy: ±0.1 % of full scale • Data refresh cycle: 10 ms • Input step response time: 100 ms • Temperature drift: Max. ±0.01 % /°C
NFAI141	Analog Input • 4 to 20 mA • 16 ch. • Non-Isolated	✓	√ -20	√	√ 40 pins	Transmitter power supply: 22.8 to 26.4 V (Output current limit: 27 mA) Two wire and four wire transmitter setting per channel with pins Max current consumption: 310 mA (5 V DC), 450 mA (24 V DC) Weight: 0.2 kg	Accuracy: ±0.1 % of full scale Data refresh cycle: 10 ms Input step response time: 100 ms Temperature drift: Max. ±0.01 % /*C
NFAI143	Analog Input • 4 to 20 mA • 16 ch. • Isolated	J	√ -20	V	√ 40 pins	Withstanding voltage: 1500 V AC between input and system Transmitter power supply: 24.0 to 25.5 V (Output current limit: 25 mA) Two wire and four wire transmitter setting per channel with pins Max current consumption: 230 mA (5 V DC), 540 mA (24 V DC) Weight: 0.3 kg	• Accuracy: ±0.1 % of full scale • Data refresh cycle: 10 ms • Input step response time: 100 ms • Temperature drift: Max. ±0.01 % /°C
NFAV141	Analog Input • 1 to 5 V • 16 ch. • Non-Isolated	N/A	N/A	√	√ 40 pins	Input: Differential input (allowable common mode viltage ±1V or less) Max current consumption: 350 mA (5 V DC) Weight: 0.2 kg	Accuracy: ±0.1 % of full scale Data refresh cycle: 10 ms Input step response time: 100 ms Temperature drift: Max. ±0.01 % /*C
NFAV144	Analog Input •-10 to +10 V or 1 to 5 V ·16 ch. • Isolated	N/A	√ -20	J	√ 40 pins	 Input signal: 1 to 5 V or -10 to +10 V set for all channels Withstanding voltage: 1500 V AC between input and system Max current consumption: 500 mA (5 V DC) Weight: 0.2 kg 	Accuracy: ±0.1 % of full scale Data refresh cycle: 10 ms Input step response time: 100 ms Temperature drift: Max. ±0.01 % /*C
NFAT141	TC/mV Input • 16 ch. • Isolated	N/A	N/A	√	√ 40 pins (*1)	Input signal: Thermocouple or mV set for each channel from CH1 to CH16 Burn out detection: Possible (all channels together), Detection time: 60 s Withstanding voltage: 1500 V AC between input and system Max current consumption: 450 mA (5 V DC) Weight: 0.2 kg	TC input accuracy: ±0.03 % of full scale (-20 to 80 mV) mV input accuracy: ±0.032 % of full scale (-100 to 150 mV) Data refresh cycle: 15 TC input temperature drift: Max.±30 ppm/*C mV input temperature drift: Max.±32 ppm/*C
NFAR181	RTD Input • 12 ch. • Isolated	N/A	√ -40	V	N/A	Input signal: Set for each channel Burn out detection: Possible (all channels together), Detection time: 60 s Withstanding voltage: 1500 V AC between input and system Max current consumption: 450 mA (5 V DC) Weight: 0.2 kg	 Accuracy: ±0.03 % of full scale (0 to 400 Ω) Data refresh cycle: 1 s Temperature drift: Max. ±30 ppm/°C

Common Specification • LED: STATUS (Hardware normal), ACT (Operating) • Hot-Swap: Possible *1: Use a MIL connector cable only for mV input.

Analog I/O Modules WTR: Wider Temperature Range (-40°C to +70°C or -20°C to +70°C) PCT: Pressure Clamp Terminal available

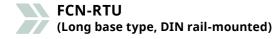
Model	Description	HART	WTR*	PCT*	MIL	Basic Specification	Specification
NFAP135	Pulse Input • 0 to 10kHz • 8 ch. • Isolated ch.	N/A	√ -40	√	√ 40 pins	Withstanding voltage: 500 V AC between input and system, 500 V AC between channels Transmitter power supply: 24 V (30 mA) / 12 V (40 mA) Selectable Max current consumption: 300 mA (5 V DC), 400 mA (24 V DC) Weight: 0.3 kg	Minimum input pulse width: 40µs Data refresh cycle: 2 ms Input type:Dry contact pulse (Open collector contact) Dry contact Voltage pulse Current pulse (Two-wired transmitte Voltage pulse (Three-wired transmit
NFAI835	Analog I/O • 4 ch. input (4 to 20 mA) • 4 ch. output (4 to 20 mA) • Isolated ch.	✓	√ -20	√	√ 40 pins	Withstanding voltage: 500 V AC between input/output and system, 500 V AC between channels Output fallback: Set for each channel Transmitter power supply: 20.2 to 29.3 V (Output current limit: 25 mA) Two wire and four wire transmitter setting per channel with connected terminal Max current consumption: 360 mA (5 V DC), 450 mA (24 V DC) Weight: 0.3 kg	Input accuracy: ±0.1 % of full scale Output accuracy: ±0.3 % of full scale Data refresh cycle: 10 ms Input step response time: 100 ms, Output step response time: 100 ms Temperature drift: Max. ±0.01 % /*C
NFAI841	Analog I/O • 8 ch. input (4 to 20 mA) • 8 ch. output (4 to 20 mA) • Non-Isolated	√	√ -20	V	√ 40 pins	Output fallback: Set for each channel Transmitter power supply: 22.8 to 26.4 V (Output current limit: 27 mA) Two wire and four wire transmitter setting per channel with pins Max current consumption: 310 mA (5 V DC), 500 mA (24 V DC) Weight: 0.3 kg	Input accuracy: ±0.1 % of full scale Output accuracy: ±0.3 % of full scale Data refresh cycle: 10 ms Input step response time: 100 ms, Output step response time: 40 ms Temperature drift: Max. ±0.01 % /*C
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	Input: Differential input (allowable common mode voltage is ±1 V or less) Output fallback: Set for each channel Max current consumption: 310 mA (5 V DC), 250 mA (24 V DC) Weight: 0.3 kg	Input accuracy: ±0.1 % of full scale Output accuracy: ±0.3 % of full scale Data refresh cycle: 10 ms Input step response time: 100 ms, Output step response time: 40 ms Temperature drift: Max. ±0.01 % / °C
NFAI543	Analog Output • 4 to 20 mA • 16 ch. • Isolated	✓	√ -20	✓	√ 40 pins	Withstanding voltage: 1500 V AC between output and system Output fallback: Set for each channel Max current consumption: 230 mA (5 V DC), 540 mA (24 V DC) Weight: 0.4 kg	Output accuracy: ±0.3 % of full scale Data refresh cycle: 10 ms Output step response time: 100 ms Temperature drift: Max. ±0.01 % /°C

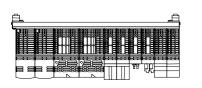
Common Specification • LED: STATUS (Hardware normal), ACT (Operating) • Hot-Swap: Possible

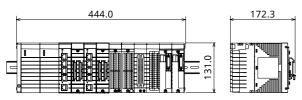
Communication Modules WTR: Wider Temperature Range (-40 to +70°C)

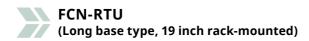
Model	Description	WTR*	Basic Specification	Specification	Remarks
NFLF111	FOUNDATION fieldbus communication module	√ -40	Max current consumption: 500 mA (5 V DC) Weight: 0.4 kg	Port: 4 ports16 devices per portSpeed: 31.25kbpsLink Active Scheduler (LAS)	Clamp terminal
NFLP121	PROFIBUS-DP communication module	N/A • Max current consumption: 700 mA (5 V DC) • Weight: 0.3 kg • Port: 1 port • 123 devices per module (if repeaters used)		• 123 devices per module	D-sub 9 pins (female)
NFLC121	CANopen communication module			Port: 1 port CiA 301 compliant 126 devices per module	D-sub 9 pins (male)

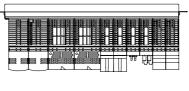
Common Specification • LED: STATUS (Hardware normal), ACT (Operating), RCV (Receiving), SND (Sending)

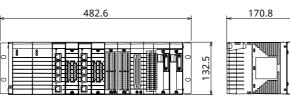


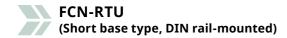




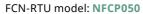


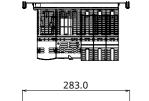




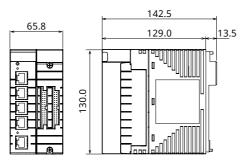






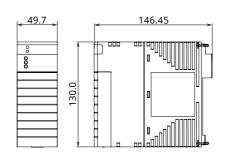






Power Supply Module

Model: NFPW444/NFPW426





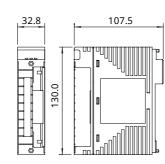
Analog I/O Module

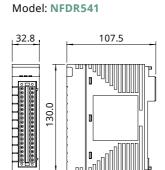
Model: NFAI135/NFAI141/NFAI143/NFAV141/ NFAV144/NFAT141/NFAR181/NFAP135/ NFAI835/NFAI841/NFAB841/NFAI543



Digital I/O Module

Model: NFDV151/NFDV551

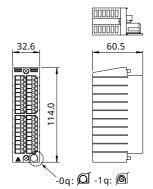


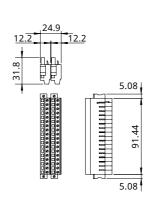


Terminal Block

Model: NFTA4S/NFTT4S/NFTR8S/

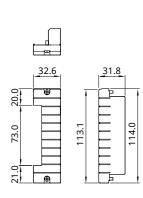
NFTB5S/NFTD5S/NFTI3S





Model: NFTC4S

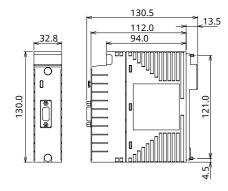




SELECTION GUIDE > SOFTWARE

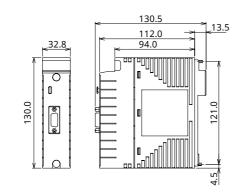
PROFIBUS-DP Communication Module

Model: NFLP121



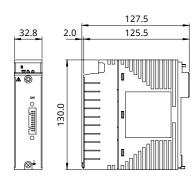


Model: NFLC121

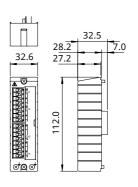


FOUNDATION fieldbus Communication Module

Model: NFLF111



Model: NFLF111



Software Selection

Name		Model	Suff	ix Codes/Option (odes
Software Media					
FCN/FCJ Software Media		NT203AJ	PC11E		
FCN/FCJ APPF Software Media		NT205AJ	PC11E		
				Softwa	re Media
Embedded Software				NT205AJ	NT203AJ
PAS portfolio					✓
Logging portfolio				✓	
FA-M3 communication portfolio				✓	
MELSEC communication portfolio				✓	
Modbus communication portfolio				✓	
DNP3 communication portfolio				✓	
Gas flow calculation portfolio				√	
Liquid flow calculation portfolio				√	
FCN/FCJ Engineering Tool Linense					
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		✓
FCN/FCJ OPC Server License					
FCN/FCJ OPC Server for Windows	Run on PC	NT781AJ	LW11A		

>> Hardware Selection

Name	Model	Model Suffix Codes/Options Codes						
FCN-RTU Common Mod	ules				11 700			
Terr Kro common mod		Stan	ıdard	with ISA standard G3 option				
		CPU Type	Exte	nded	Exte	nded		
CPU module for FCN-RTU		NFCP050-	S	15	S16			
Power supply module	10-30VDC	NFPW426-	5	50	5	51		
Power supply module	24VDC	NFPW444-	5	50	51			
		Installation	19inch rack	DIN rail	19inch rack	DIN rail		
Base module (long)		NFBU200-	S05	S15	S06	S16		
Base module (short)		NFBU050-	N/A	S15	N/A	S16		

Input Output Modules (*1) (*2)		Standard			with ISA standard G3 option		
_	Terminal Block	Pressure Cla	mp Terminal	MIL	Pressure Cla	mp Terminal	MIL
	Surge Absorber (SA)	non SA	SA	with cover	non SA	SA	with cover
Analog Input module (4 to 20mA, 8-channels, Isolated channels)	NFAI135-	S50/13S00	S50/13S10	S50/CCC01	S51/13S00	S51/13S10	S51/CCC01
Analog Input module (4 to 20mA, 16-channels, Non-Isolated)	NFAI141-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Analog Input module (4 to 20mA, 16-channels, Isolated)	NFAI143-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Analog Input module (1 to 5V, 16-channels, Non-Isolated)	NFAV141-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Analog Input module (-10 to +10V, 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-	S50/R8S00	S50/R8S10	N/A	S51/R8S00	S51/R8S10	N/A
Pulse Input module (Pulse Count, 0~10kHz, 8-channels, Isolated chan	nels) NFAP135-	S50/13S00	S50/13S10	S50/CCC01	S51/13S00	S51/13S10	S51/CCC01
Analog I/O module (4 to 20mA input/output, 4-ch input/output, Isolated channels)	annels NFAI835-	S50/13S00	S50/13S10	S50/CCC01	S51/13S00	S51/13S10	S51/CCC01
Analog I/O module (4 to 20mA input/output, 8-ch input/output, Non-Isolated)	annels NFAI841-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Analog I/O module (1 to 5V input, 4 to 20mA outp 8-channels input/output, Non-Isolated)	ut, NFAB841-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Analog Output module (4 to 20mA, 16-channels, Isolated)	NFAI543-	S50/A4S00	S50/A4S10	S50/CCC01	S51/A4S00	S51/A4S10	S51/CCC01
Digital Input module (32-channels, 24VDC, Isolated)	NFDV151-	P60/B5S00	P60/B5S10	P60/CCC01	P61/B5S00	P61/B5S10	P61/CCC01
Digital Output module (32-channels, 24VDC, Isolated)	NFDV551-	P60/D5S00	P60/D5S10	P60/CCC01	P61/D5S00	P61/D5S10	P61/CCC01
Relay Output module (16-channels, 24 to 110VDC/100 to 240VAC, Isolate	ed) (*3) NFDR541-	P50/C4S70	N/A	N/A	P51/C4S70	N/A	N/A

Name	Model		Su	iffix Codes/	Codes/Options Codes				
Communication Modules (*2)			Standard		with ISA	standard	G3 option		
Pressure clan with su	np terminal block rge absorber (SA)	non S/	A	SA	non SA	A	SA		
Foundation Fieldbus communication module (4-ports)	NFLF111-	S50	St	50/F9S00	S51	9	51/F9S00		
PROFIBUS-DP communication module	NFLP121-	500		N/A	S01		N/A		
CANopen communication module	NFLC121-	500		N/A	S01		N/A		
MIL Connector Cables	Cable Length	0.5m	1.0m	1.5m	2.0m	2.5m	3.0m (*5		
MIL connector cable for analog, NFCP050 built-in I/O (40 pole plug types) (*4)	KMS40-	005	010	015	020	025	030		

KMS50-

005

010

015

MIL Connector Terminal Blocks					
MIL connector terminal block for analog I/O modules except for NFAR181 and NFCP050 built-in I/O (40 pole plug types, M3.0) (*4)	TAS40-	1N			
MIL connector terminal block for digital I/O modules (50 pole plug types, M3.0)	TAS50-	1N			

MIL connector cable (50 pole plug types) NFDV151,NFDV551

Pressure Clamp Terminal Blocks Surge A	Absorber (SA)	non SA	SA
Pressure clamp terminal block for analog (16-channels): NFAI141,NFAV141,NFAV144,NFAI143,NFAI841,NFAB841,NFAI543	NFTA4S-	00	10
Pressure clamp terminal block for thermocouple/mV (16-channels) NFAT141	NFTT4S-	00	10
Pressure clamp terminal block for RTD (12-channels) NFAR181	NFTR8S-	00	10
Pressure clamp terminal block for digital input (32-channels) NFDV151	NFTB5S-	00	10
Pressure clamp terminal block for digital output (32-channels) NFDV551	NFTD5S-	00	10
Pressure clamp terminal block for analog isolated channels (8-channels): NFAI135,NFAP135,NFAI835	NFTI3S-	00	10
Pressure clamp terminal block for relay output (16-channels) NFDR541	NFTC4S-	70	N/A
Pressure clamp terminal block for FOUNDATION fieldbus NFLF111	NFTF9S-	00	N/A

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

025

030

020

Cover

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

^{*2 :} Suffix code for extended temperature model is prepared for the following models:NFAR181, NFAP135, NFLF111.

^{*3:} NFDR541 is not compliant with RoHS directive and will not be compliant with CE marking from July 22, 2017.

^{*4 :} mV input is only applicable for NFAT141.

^{*5 :} Cable length to 25.0m is available. Cable can be ordered by the one meter.

^{*6:} It can be directly mounted or connected with cable (A1417WL).

>> Hardware Selection

Name	Model	Model Suffix Codes/Options Codes						
FCN-RTU Common Mod		Stan	ıdard	with ISA stan	dard G3 option			
		CPU Type	Exte	nded	Exte	nded		
CPU module for FCN-RTU		NFCP050-	S	1E	S	1F		
Power supply module	10-30VDC	NFPW426-	E	:0	E1			
Power supply module	24VDC	NFPW444-	E	:0	E1			
		Installation	19inch rack	DIN rail	19inch rack	DIN rail		
Base module (long)		NFBU200-	SOE	S1E	SOF	S1F		
Base module (short)		NFBU050-	N/A	S1E	N/A S1F			

nput Output Modules (*1) (*2)		Standard			with ISA standard G3 option			
_	Terminal Block	Pressure Cla	mp Terminal	MIL	Pressure Clamp Terminal		MIL	
Su	rge Absorber (SA)	non SA	SA	with cover	non SA	non SA SA		
Analog Input module (4 to 20mA, 8-channels, Isolated channels)	NFAI135-	SE0/13S00	SE0/13S10	SE0/CCC01	SE1/13S00	SE1/13S10	SE1/CCC01	
Analog Input module (4 to 20mA, 16-channels, Non-Isolated)	NFAI141-	SE0/A4S00	SE0/A4S10	SE0/CCC01	SE1/A4S00	SE1/A4S10	SE1/CCC01	
Analog Input module (4 to 20mA, 16-channels, Isolated)	NFAI143-	SE0/A4S00	SE0/A4S10	SE0/CCC01	SE1/A4S00	SE1/A4S10	SE1/CCC01	
Analog Input module (1 to 5V, 16-channels, Non-Isolated)	NFAV141-	SE0/A4S00	SE0/A4S10	SE0/CCC01	SE1/A4S00	SE1/A4S10	SE1/CCC01	
Analog Input module (-10 to +10V, 16-channels, Isolated)	NFAV144-	SE0/A4S00	SE0/A4S10	SE0/CCC01	SE1/A4S00	SE1/A4S10	SE1/CCC01	
TC/mV Input module (16-channels, Isolated)	NFAT141-	SE0/T4S00	SE0/T4S10	SE0/CCC01	SE1/T4S00	SE1/T4S10	SE1/CCC01	
RTD Input module (12-channels, Isolated)	NFAR181-	SE0/R8S00	SE0/R8S10	N/A	SE1/R8S00	SE1/R8S10	N/A	
Pulse Input module (Pulse Count, 0 ~ 10kHz, 8-channels, Isolated chann	els) NFAP135-	SE0/13S00	SE0/13S10	SE0/CCC01	SE1/13S00	SE1/13S10	SE1/CCC01	
Analog I/O module (4 to 20mA input/output, 4-chanr input/output, Isolated channels)	els NFAI835-	SE0/13S00	SE0/13S10	SE0/CCC01	SE1/13S00	SE1/13S10	SE1/CCC01	
Analog I/O module (4 to 20mA input/output, 8-channels input/output, Non-Isola	nFAI841-	SE0/A4S00	SE0/A4S10	SE0/CCC01	SE1/A4S00	SE1/A4S10	SE1/CCC01	
Analog I/O module (1 to 5V input, 4 to 20mA output, 8-channels input/output, Non-Isolated)	NFAB841-	SE0/A4S00	SE0/A4S10	SE0/CCC01	SE1/A4S00	SE1/A4S10	SE1/CCC01	
Analog Output module (4 to 20mA, 16-channels, Isolated)	NFAI543-	SE0/A4S00	SE0/A4S10	SE0/CCC01	SE1/A4S00	SE1/A4S10	SE1/CCC01	
Digital Input module (32-channels, 24VDC, Isolated)	NFDV151-	PF0/B5S00	PF0/B5S10	PF0/CCC01	PF1/B5S00	PF1/B5S10	PF1/CCC01	
Digital Output module (32-channels, 24VDC, Isolated)	NFDV551-	PF0/D5S00	PF0/D5S10	PF0/CCC01	PF1/D5S00	PF1/D5S10	PF1/CCC01	
Relay Output module (16-channels, 24 to 110VDC/100 to 240VAC, Isolated)	(*3) NFDR541-	PE0/C4S70	N/A	N/A	PE1/C4S70	N/A	N/A	

Name	Model	Suffix Codes/Options Codes							
Communication Modules (*2)			Standa	ard		with ISA	stand	ard G	3 option
Pressure clam with sur	terminal block ge absorber (SA)	non SA SA		non SA			SA		
Foundation Fieldbus communication module (4-ports)	NFLF111-	SE0	SE0/F9S00		SE1		SE1/F9S00		
MIL Connector Cables	Cable Length	0.5m	1.0n	n	1.5m	2.0m	2.51	m	3.0m (*5)
MIL connector cable for analog, NFCP050 built-in I/O (40 pole plug types) (*4)	KMS40-	005	010		015	020	02!	5	030
MIL connector cable (50 pole plug types) NFDV151, NFDV551	KMS50-	005	010		015	020	02	5	030

MIL Connector Terminal Blocks				
MIL connector terminal block for analog I/O modules except for NFAR181 and NFCP050 built-in I/O (40 pole plug types, M3.0) (*4)	TAS40-	1N		
MIL connector terminal block for digital I/O modules (50 pole plug types, M3.0)	TAS50-	1N		

Pressure Clamp Terminal Blocks Surge A	bsorber (SA)	non SA	SA
Pressure clamp terminal block for analog (16-channels) NFAI141, NFAV141, NFAV144, NFAI143, NFAI841, NFAB841, NFAI543	NFTA4S-	00	10
Pressure clamp terminal block for thermocouple/mV (16-channels) NFAT141	NFTT4S-	00	10
Pressure clamp terminal block for RTD (12-channels) NFAR181	NFTR8S-	00	10
Pressure clamp terminal block for digital input (32-channels) NFDV151	NFTB5S-	00	10
Pressure clamp terminal block for digital output (32-channels) NFDV551	NFTD5S-	00	10
Pressure clamp terminal block for analog isolated channels (8-channels) NFAI135, NFAP135, NFAI835	NFTI3S-	00	10
Pressure clamp terminal block for relay output (16-channels) NFDR541	NFTC4S-	70	N/A
Pressure clamp terminal block for FOUNDATION fieldbus NFLF111	NFTF9S-	00	N/A

- *1 : Suffix Code for the following HART module is changed from "S \(\square\) " to "H \(\square\) ":NFAI135, NFAI835, NFAI141, NFAI143,NFAI543, NFAI841.
- *2 : Suffix code for extended temperature model is prepared for the following models:NFAR181, NFAP135,NFLF111.
- *3 : NFDR541 is not compliant with RoHS directive and will not be compliant with CE marking from July 22, 2017.
- *4 : mV input is only applicable for NFAT141.
- *5 : Cable length to 25.0m is available. Cable can be ordered by the one meter.

Cover

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

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