General Specifications

Application Portfolios (FCN-500/FCN-RTU)

GS 34P02P20-02E

■ GENERAL

This GS describes the application portfolios for FCN-500 and FCN-RTU.

The Application Portfolios are series of engineering parts to be used on Logic Designer, which is the FCN-500 and FCN-RTU's engineering tool.
Complicated functions composed of independent programs can be encapsulated into a single part called a Program Organization Unit (POU).
The Application Portfolios are a set of various POUs, developed by Yokogawa, according to their processes and applications.
Thanks to these high-quality, high-performance parts, engineering efficiency is dramatically improved.
(Application Portfolio(s), though written in title cap, is not the name of a specific product, but is a bundle of software parts.)

Notation in this document:

- The term “FCN” refers to the module consisting type autonomous controllers.
- The term “FCN-500” refers to the autonomous controllers with NFCP501/NFCP502 CPU module.
- The term “FCN-RTU” refers to the low power autonomous controllers with NFCP050 CPU module.

■ FEATURES

- Package of software parts (POUs) selected form Yokogawa's expertise of control system.
- Documentation of control specifications and application examples (including an operation monitoring window) is bundled to POUs for further advanced control systems.
- Application portfolios include:
  [Basic Portfolio]
    PAS Portfolio
    Time Synchronization Server Portfolio
  [Communication Portfolio]
    FA-M3 Communication Portfolio
    MELESEC-A Communication Portfolio
    SYSMAC Communication Portfolio
    Modbus Communication Portfolio
    DNP3 Communication Portfolio (GS 34P02P22-02E)
  [Logging Portfolio (Offline mode)]
  [Application-specific Portfolio]
    Gas Flow Calculation Portfolio (GS 34P02P31-02E, GS 34P02P32-01E)
    Liquid Flow Calculation Portfolio (GS 34P02P33-01E)

- Simply copying an application example and modifying it to suit the application will build a complex control system effortlessly and with reliability.

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■ FUNCTION SPECIFICATIONS

The application portfolio can be used in controller type as shown in the following table.

Table Application Portfolio

Application Portfolios	Controller type (CPU Module)		
	FCN-500 Standard (NFCP501-S□□/ NFCP502-S□□)	FCN-500 Extended (NFCP501-W□□/ NFCP502-W□□)	FCN-RTU (NFCP050-S1□)
PAS Portfolio		X	X
Time Synchronization Server Portfolio	X	X	
FA-M3 Communication Portfolio	X	X	X
MELSEC Communication Portfolio	X	X	X
SYSMAC Communication Portfolio	X	X	
Modbus Communication Portfolio	X	X	X
DNP3 Communication Portfolio	X	X	X
Gas Flow Calculation Portfolio		X	X
Liquid Flow Calculation Portfolio		X	X
Logging Portfolio			X

Note: In each CPU module, application portfolios cannot be added later on.

● Basic Portfolios

PAS Portfolio

From among a range of function blocks used in Yokogawa’s distributed control systems, functions that are difficult to achieve with IEC61131-3 are chosen and redesigned for IEC61131-3-stipulated languages. PAS Portfolio provides:

- Regulatory control blocks, such as indicator, PID controller, and manual loader blocks, featuring easy-to-use instrument faceplates as an operation interface.
- Various calculation blocks featuring frequently used functions such as a line-segment function, time-delay, temperature and pressure correction.
- Sequence control blocks such as preset timers/counters and switch instrument blocks facilitating development of sequence logic and operation and monitoring functions.
- Using Logic Designer, simply performing wiring between blocks will achieve complex calculations, mode control logic, tracking logic, and more.
- Faceplates corresponding to each POUs are prepared on VDS. Using VDS together with PAS Portfolios, workloads of engineering for operation and monitoring functions will be reduced.

Time Synchronization Server Portfolio

FCN-500/FCN-RTU enables time synchronization among equipment supporting SNTP (Simple Network Time Protocol). FCN-500 can operate as an SNTP server or an SNTP client.

In FCN-500, when the CPU setup is enabled, a time synchronization server will start automatically.

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

● Communication Portfolios

Communication portfolios provide STARDOM’s controllers with functionality to directly communicate with different controllers and devices.

- Simple settings in communication devices are all needed for bi-directional communication.
- For the DNP3 Communication Portfolio, refer to GS 34P02P22-02E “DNP3 Communication Portfolio (FCN-500/ FCN-RTU).”

● Application-specific Portfolios

Application-specific Portfolios are packages of control functions developed by drawing on Yokogawa’s years of experience configuring control systems and tailored to a specific process or equipment unit.

- Combined with functions in PAS Portfolios, Application-specific Portfolios help achieve especially hard-to-configure calculation assemblies.

● Logging Portfolio

Logging Portfolio runs on an autonomous controller FCN-RTU to accumulate data of the control application.

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■ PAS PORTFOLIO

PAS Portfolio

PAS portfolios provide NPAS POUs that use engineering quantities (*1) for data.

*1: Data with an engineering unit-based value

Table NPAS Input/Output Data Processing POU (*1)

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	DINT data analog input
NPAS_AI_UDINT	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	DINT data analog output
NPAS_AO_UDINT	UDINT data analog output
NPAS_DI_STS	Status input
NPAS_DI_PUSHB	Push button input
NPAS_DI_WORD	WORD data contact input
NPAS_DO_STS	Status output
NPAS_DO_STS_PW	Pulse width output (reset of accumulation type)
NPAS_DO_STS_PW2	Pulse width output (continuation of accumulation type)
NPAS_DO_STS_PWH	High resolution pulse width output
NPAS_DO_STS_TP	Time-proportional ON/OFF output
NPAS_DO_WORD	WORD data contact output
NPAS_FFI_ANLG	FF-H1 analog input
NPAS_FFI_STS	FF-H1 status input
NPAS_FFI_USINT	FF-H1 Discrete Input
NPAS_FFO_ANLG	FF-H1 analog output
NPAS_FFO_STS	FF-H1 status output
NPAS_FFO_USINT	FF-H1 Discrete Output
NPAS_AI_HART	HART variable input

*1: These POUs can be used in the all of CPU modules.

Table NPAS POU (1/2)

POU Name	Description
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 block
NPAS_PID	PID controller block
NPAS_PI_HLD	Sampling PI controller block
NPAS_ONOFF	Two-position on/off controller block
NPAS_ONOFF_G	Three-position on/off controller block
NPAS_MLD	Manual loader block (without output tracking)
NPAS_MLD_PB	Manual loader block (with output pushback)
NPAS_MLD_BT	Manual loader block (with bias tracking)
NPAS_RATIO	Ratio set block (without ratio tracking)
NPAS_RATIO_RT	Ratio set block (with ratio tracking)
NPAS_PG_L30	30-zone program set block (without bumpless switching)
NPAS_PG_L30_BP	30-zone program set block (with bumpless switching)
NPAS_VELLIM	Velocity limiter block (without output pushback)
NPAS_VELLIM_PB	Velocity limiter block (with output pushback)
NPAS_AS_H	Auto-selector block (high signal selector)
NPAS_AS_M	Auto-selector block (medium signal selector)
NPAS_AS_L	Auto-selector block (low signal selector)
NPAS_FOUT	Cascade signal distributor block
NPAS_FFSUM	Feedforward signal summing block (without balancing)
NPAS_FFSUM_BL	Feedforward signal summing block (with balancing)
NPAS_XLMT_S	Single cross-limit
NPAS_XLMT_D	Double cross-limit
NPAS_BSET_F	Batch set block for flow measurement
NPAS_BSET_LW	Batch set block for weight measurement
NPAS_SW13 NPAS_SW31	One-pole three-position selector switch block
NPAS_SW19 NPAS_SW91	One-pole nine-position selector switch block

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Table NPAS POU (2/2)

POU Name	Description
NPAS_BPLS_SW	Bumpless switching block
NPAS_SI_1	Switch instrument block with 1 input
NPAS_SI_2	Switch instrument block with 2 inputs
NPAS_SO_1	Switch instrument block with 1 output
NPAS_SO_2	Switch instrument block with 2 outputs
NPAS_SIO_11	Switch instrument block with 1 input and 1 output
NPAS_SIO_12	Switch instrument block with 1 input and 2 outputs
NPAS_SIO_21	Switch instrument block with 2 inputs and 1 output
NPAS_SIO_22	Switch instrument block with 2 inputs and 2 outputs
NPAS_TM	Timer with preset value
NPAS_CT	Counter with preset value
NPAS_BCD_CI16	16-bit BCD input block
NPAS_BCD_CO16	16-bit BCD output block
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
NPAS_TP_CFL	Temperature and pressure correction
NPAS_T_CFL	Temperature correction
NPAS_P_CFL	Pressure correction
NPAS_ASTM1	Old JIS-based ASTM correction
NPAS_ASTM2	New JIS-based ASTM correction
NPAS_SQRT_LC	Square root extraction with low-input cutoff
NPAS_BDBUF_R	Data buffer for real data
NPAS_BDBUF_T	Data buffer for time data
NPAS_AI2SW_A	Dual signal selector (type A)
NPAS_AI2SW_B	Dual signal selector (type B)
NPAS_AI3SW	Analog-input 2-out-of-3 circuit
NPAS_SL2SW_A	High-low range switching (type A)
NPAS_SL2SW_B	High-low range switching (type B)
NPAS_PB6	Six-pushbutton block
NPAS_RS8_A	Eight-input resource scheduler (permission non-holding)
NPAS_RS8_B	Eight-input resource scheduler (permission holding)

■ FA-M3 COMMUNICATION PORTFOLIO

FA-M3 Communication Portfolio is a POU that enables FCN-500 and FCN-RTU autonomous controllers and FA-M3 to easily acquire and set data from and to each other through serial or Ethernet communications.

For detail of accessible device, refer to “Lists of Devices Compatible with Communication Portfolios“ (TI 34P02P21-01E),

Communication type	Communication function
Serial	Master
Ethernet	Client

● LIST OF POU FUNCTIONS

POU Name	Description
SD_CFAM3E_OPEN (*1)	Communication channel opening (*3)
SD_CFAM3E_BRD256 (*1)	Bit device reading (max. 256 points)
SD_CFAM3E_WRD064 (*1)	Word device reading (max. 64 points)
SD_CFAM3E_WRD502 (*1)	Word device reading (max. 502 points)
SD_CFAM3E_BWR256 (*1)	Bit device writing (max. 256 points)
SD_CFAM3E_WWR064 (*1)	Word device writing (max. 64 points)
SD_CFAM3E_WWR498 (*1)	Word device writing (max. 498 points)
SD_CPCLINKM_OPEN (*2)	Communication channel opening
SD_CPCLINKM_BRD (*2)	Bit device reading
SD_CPCLINKM_WRD (*2)	Word device reading
SD_CPCLINKM_BWR (*2)	Bit device writing
SD_CPCLINKM_WWR (*2)	Word device writing
SD_CPCLINKM_WRW (*2)	Random word device writing

*1: Ethernet communication.
*2: Serial communication.
*3: Total number of the following POUs shall be up to 32 in FCN/FCJ since each POU occupies one channel.
- SD_FCXPE_OPEN (Ethernet Communication Function Block)
- SD_CMELSECE_OPEN and SD_CMELSECE_3E_OPEN (POU of MELSEC Communication Portfolio)
- SD_CFAM3E_OPEN (POU of FA-M3 Communication Portfolio)
- SD_CMDBSE_BC_OPEN (POU of Modbus Communication Portfolio)

● OPERATING ENVIRONMENT

Hardware (FCN-500 and FCN-RTU)

Means of Communication		Module
Serial	RS-232-C	CPU module (*1) (NFCP501 and NFCP502: 1 port, NFCP050: 3 ports)
	RS-422/ RS-485	CPU module (NFCP050: 1 port)
Ethernet	Client	CPU module (NFCP501, NFCP502 and NFCP050, 32 channels maximum)

*1: If the CPU module (Model: NFCP501 and NFCP502) is duplexed, the serial port of the module cannot be used.

■ MELSEC COMMUNICATION PORTFOLIO

All POUs are for Ethernet communication with MELSEC controllers.

For detail of accessible device, refer to “Lists of Devices Compatible with Communication Portfolios“ (TI 34P02P21-01E),

● LIST OF POU FUNCTIONS

POU Name	Description
SD_CMELSECE_OPEN	Communication channel opening with 1E frame (*1) (*2)
SD_CMELSECE_B_BRD256	Bit device reading with 1E frame (max. 256 points) (*1)
SD_CMELSECE_B_WRD064	Word device reading with 1E frame (max. 64 points) (*1)
SD_CMELSECE_B_WRD256	Word device reading with 1E frame (max. 256 points) (*1)
SD_CMELSECE_B_BWR256	Bit device writing with 1E frame (max. 256 points) (*1)
SD_CMELSECE_B_WWR064	Word device writing with 1E frame (max. 64 points) (*1)
SD_CMELSECE_B_WWR256	Word device writing with 1E frame (max. 256 points) (*1)
SD_CMELSECE_3E_OPEN	Communication channel opening with 3E frame (*2)
SD_CMELSECE_3E_BRD	Bit device reading with 3E frame (max. 2048 points) (*3)
SD_CMELSECE_3E_WRD	Word device reading with 3E frame (max. 512 words) (*3)
SD_CMELSECE_3E_BWR	Bit device writing with 3E frame (max. 2048 points) (*3)
SD_CMELSECE_3E_WWR	Word device writing with 3E frame (max. 512 words) (*3)

*1: For CPU series supporting 1E frame communication. Some devices in a MELSEC controller are inaccessible depending on the MELSEC controller model. For details, refer to “■ List of Accessible Devices” in “2. MELSEC Communication Portfolio” of TI 34P02P21-01E “Lists of Devices Compatible with Communication Portfolios.”
For communication with MELSEC Q Series controllers, 1E frame data access and 3E frame data access are possible.

*2: Total number of the following POUs shall be up to 32 in FCN/FCJ since each POU occupies one channel.
- SD_FCXPE_OPEN (Ethernet Communication Function Block)
- SD_CMELSECE_OPEN and SD_CMELSECE_3E_OPEN (POU of MELSEC Communication Portfolio)
- SD_CFAM3E_OPEN (POU of FA-M3 Communication Portfolio)
- SD_CMDBSE_BC_OPEN (POU of Modbus Communication Portfolio)

*3: The number of points which can be read/written with 3E frame at a time depends on CPU types of access station or relay station. For details, refer to the manual of Mitsubishi Electric Corporation.

● OPERATING ENVIRONMENT

Hardware (FCN-500 and FCN-RTU)

Means of Communication		Module
Ethernet	Client	CPU module (NFCP501, NFCP502 and NFCP050, 32 channels maximum)

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■ SYSMAC COMMUNICATION PORTFOLIO

All POUs are for serial communication with SYSMAC controllers.

For detail of accessible device, refer to “Lists of Devices Compatible with Communication Portfolios“ (TI 34P02P21-01E),

● LIST OF POU FUNCTIONS

POU Name	Description
SD_CSYSMACM_ OPEN	Communication channel opening
SD_CSYSMACM_ BRD464	Bit device reading
SD_CSYSMACM_ WRD029	Word device reading
SD_CSYSMACM_ BWR464	Bit device writing
SD_CSYSMACM_ WWR029	Word device writing
SD_CSYSMACM_ SETRST	Forcible setting/resetting
SD_CSYSMACM_ STSCHG	Status change

Note: For CPU series supporting SYSMAC host link C-mode commands communication.

● OPERATING ENVIRONMENT

Hardware (FCN-500)

Means of Communication		Module
Serial	RS-232-C	CPU module (*1) (NFCP501 and NFCP502: 1 port) RS-232-C communication module (*2) (*3) (NFLR111: 2 ports/module)
	RS-422/ RS-485	RS-422/RS-485 communication module (*2) (*3) (*4) (NFLR121: 2 ports/module)

*1: If the CPU module is duplexed, the serial port of the module cannot be used.
*2: The modules allow the CPU module to be duplexed.
*3: Up to eight RS-232-C and RS-422/RS-485 communication modules can be mounted on each FCN-500.
*4: Up to 31 devices per serial port can be connected.

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■ Modbus Communication Portfolio

● GENERAL

This describes Modbus Communication Portfolio for STARDOM. Modbus Communication Portfolio easily allows FCN-500 and FCN-RTU to be Modbus-capable through serial or Ethernet communications.

● FUNCTION SPECIFICATIONS

Modbus Communication Portfolio

Modbus Communication Portfolio is a POU that enables FCN-500 and FCN-RTU autonomous controllers and Modbus communications protocol support devices to easily acquire and set data from and to each other through serial or Ethernet communications. The following communication modes and types are supported:

Communication type	Communication mode	Communication function
Serial	ASCII mode	Master / Slave
	RTU mode	Master / Slave
Ethernet	Modbus / TCP	Client / Server

Connection with CENTUM CS 3000/CENTUM VP using Modbus Communications

FCN-500 and FCN-RTU connects with CENTUM CS 3000/CENTUM VP Field Control Station (hereinafter referred to as FCS) using Modbus Communication Portfolio. The duplex communication is enabled.

Communication type of FCS or FCN-500/FCN-RTU

Communication type (Communication mode)	Communication function	
	FCS	FCN-500/FCN-RTU
Serial (RTU mode)	Master	Slave
Ethernet (Modbus/TCP)	Client	Server

In CENTUM CS 3000 R3/R4, FCS requires the Communication Package below. In CENTUM VP, sub-system communication function is bundled with the hardware.

Communication Package of FCS (CENTUM CS 3000)

Commucnication type (Communication mode)	Communication Package of FCS
Serial (RTU mode)	Model LFS9153 “Modbus Communication Package (for ALR111, ALR121)” (*1)
Ethernet (Modbus/TCP)	Model LFS2453 “Modbus Communication Package (for ALE111)” (*2) (*3)

*1: For details, see GS 33Q03L40-33E.
*2: For details, see GS 33Q03L40-34E.
*3: To connect FCS with FCN-500 that has duplexed CPU, CENTUM CS 3000 R3.08 or later is necessary.

● ACCESSIBLE RANGE

Each device can be accessed in its suited range.

Accessible Device Ranges as Master or Client

If the FCN-500/FCN-RTU operates as master or client, its accessible device ranges are:

Device	Data Type	Read/Write	Reference No.
Coil	Bit	Read/Write	000001 to 065536
Discrete Input	Bit	Read only	100001 to 165536
Input Register	Word	Read only	300001 to 365536
Holding Register	Word Long Float	Read/Write	400001 to 465536
Exception status	Bit	Read only	1 to 8

Accessible Device Ranges as Slave or Server

If the FCN-500/FCN-RTU operates as slave or server, its accessible device ranges from the master device or the client are:

Device		Data Type	Read/Write	Reference No.
Coil		Bit	Read/Write	00001 to 09999
Discrete Input		Bit	Read only	10001 to 19999
Input Register		Word	Read only	30001 to 39999
Holding Register	Standard	Word	Read/Write	40001 to 49999
	for 32bit	Word Long Float	Read/Write	40001 to 44999 45001 to 46999 47001 to 48999
Exception status		Bit	Read only	1 to 8

● NUMBER OF ACCESSIBLE DATA SETS

The number of data sets accessible in one communication period is:

Function	Function code (Hex)	Data Type	Number of points in one communication period		
			ASCII mode Master/Slave	RTU mode Master/Slave	Modbus/TCP Client/Server
Read Coil	1 (0x01)	Bit	976 points	2000 points	2000 points
Read Discrete Input	2 (0x02)	Bit	976 points	2000 points	2000 points
Read Holding Register	3 (0x03)	Word	61 points	125 points	125 points
		Long (*4) Float (*4)	30 points	62 points	62 points
Read Input Register	4 (0x04)	Word	61 points	125 points	125 points
Write Single Coil (*3)	5 (0x05)	Bit	1 point	1 point	1 point
Write Single Register (*3)	6 (0x06)	Word	1 point	1 point	1 point
		Long (*4) Float (*4)	1 point	1 point	1 point
Read Exception status	7 (0x07)	Bit	8 points	8 points	8 points
Loop-back check (*1)	8 (0x08)	Word	1 point	1 point	1 point
Write Multiple Coils (*3)	15 (0x0F)	Bit	800 points	800 points	800 points
Write Multiple Registers (*3)	16 (0x10)	Word	59 points	100 points	100 points
		Long (*4) Float (*4)	29 points	50 points	50 points
Read Device Identification	43 (0x2B)	ASCII string	(*2)		

*1: The diagnostic code when a command is received is 0 (zero).

*2: Only basic device ID numbers, such as vender names, product codes, and revision numbers, are applicable.

*3: These function codes support broadcast communications. If the station parameter for each POU is set to 0 (zero), broadcast communications are executed. Broadcast communications are not supported in Ethernet.

*4: These function can be used only when Modbus communication protocol support devices is supporting the communication for 32 bit access.

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● LIST OF POU FUNCTIONS

ASCII Mode Master

Tabel Communication task creation POU

POU	Function code (Hex)	Data Type	Function
SD_CMDBSM_AM_OPEN	–	–	ASCII mode master communication task creation

Tabel Reading and Writing POU

POU	Function code (Hex)	Data Type	Function
SD_CMDBSM_AM_BRD	1 (0x01)	Bit	Coil Input Reading
SD_CMDBSM_AM_BRD	2 (0x02)	Bit	Discrete Input Reading
SD_CMDBSM_AM_WRD	3 (0x03)	Word	Holding Register Reading
SD_CMDBSM_AM_I32RD		Long	
SD_CMDBSM_AM_F32RD		Float	
SD_CMDBSM_AM_WRD	4 (0x04)	Word	Input Register Reading
SD_CMDBSM_AM_BWRS	5 (0x05)	Bit	One Bit Coil Writing
SD_CMDBSM_AM_WWRS	6 (0x06)	Word	One Word Holding Register Writing
SD_CMDBSM_AM_I32WRS		Long	
SD_CMDBSM_AM_F32WRS		Float	
SD_CMDBSM_AM_REB	7 (0x07)	Bit	Exception Status Reading
SD_CMDBSM_AM_LPBK	8 (0x08)	Word	Loop-back Check
SD_CMDBSM_AM_BWR	15 (0x0F)	Bit	Coil Writing
SD_CMDBSM_AM_WWR	16 (0x10)	Word	Holding Register Writing
SD_CMDBSM_AM_I32WR		Long	
SD_CMDBSM_AM_F32WR		Float	
SD_CMDBSM_AM_DID	43 (0x2B)	ASCII string	Device ID Reading

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ASCII Mode Slave

Tabel Open POU for 16Bits Data Access

POU	Function code (Hex)	Data Type	Function
SD_CMDBSM_AS_OPEN	1 (0x01)	Bit	Coil Input Reading
	2 (0x02)	Bit	Discrete Input Reading
	3 (0x03)	Word	Holding Register Reading
	4 (0x04)	Word	Input Register Reading
	5 (0x05)	Bit	One Bit Coil Writing
	6 (0x06)	Word	One Word Holding Register Writing
	7 (0x07)	Bit	Exception Status Reading
	8 (0x08)	Word	Loop-back Check
	15 (0x0F)	Bit	Coil Writing
	16 (0x10)	Word	Holding Register Writing
	43 (0x2B)	ASCII string	Device ID Reading

Tabel Open POU for 32Bits Data Access

POU	Function code (Hex)	Data Type	Function
SD_CMDBSM_AS32_OPEN	1 (0x01)	Bit	Coil Input Reading
	2 (0x02)	Bit	Discrete Input Reading
	3 (0x03)	Word	Holding Register Reading
		Long	
		Float	
	4 (0x04)	Word	Input Register Reading
	5 (0x05)	Bit	One Bit Coil Writing
	6 (0x06)	Word	One Word Holding Register Writing
		Long	
		Float	
	7 (0x07)	Bit	Exception Status Reading
	8 (0x08)	Word	Loop-back Check
	15 (0x0F)	Bit	Coil Writing
	16 (0x10)	Word	Holding Register Writing
	43 (0x2B)	ASCII string	Device ID Reading

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RTU Mode Master

Table Open POU for Data Access

POU	Function code (Hex)	Data Type	Function
SD_CMDBSM_BM_OPEN	–	–	RTU mode master communication task creation

Table Read/Write POU

POU	Function code	Data Type	Function
SD_CMDBSM_BM_BRD	1 (0x01)	Bit	Coil Input Reading
SD_CMDBSM_BM_BRD	2 (0x02)	Bit	Discrete Input Reading
SD_CMDBSM_BM_WRD	3 (0x03)	Word	Holding Register Reading
SD_CMDBSM_BM_I32RD		Long	
SD_CMDBSM_BM_F32RD		Float	
SD_CMDBSM_BM_WRD	4 (0x04)	Word	Input Register Reading
SD_CMDBSM_BM_BWRS	5 (0x05)	Bit	One Bit Coil Writing
SD_CMDBSM_BM_WWRS	6 (0x06)	Word	One Word Holding Register Writing
SD_CMDBSM_BM_I32WRS		Long	
SD_CMDBSM_BM_F32WRS		Float	
SD_CMDBSM_BM_REB	7 (0x07)	Bit	Exception Status Reading
SD_CMDBSM_BM_LPBK	8 (0x08)	Word	Loop-back Check
SD_CMDBSM_BM_BWR	15 (0x0F)	Bit	Coil Writing
SD_CMDBSM_BM_WWR	16 (0x10)	Word	Holding Register Writing
SD_CMDBSM_BM_I32WR		Long	
SD_CMDBSM_BM_F32WR		Float	
SD_CMDBSM_BM_DID	43 (0x2B)	ASCII string	Device ID Reading

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RTU Mode Slave

Table Open POU for 16-bit Data Access

POU	Function code (Hex)	Data Type	Function
SD_CMDBSM_BS_OPEN	1 (0x01)	Bit	Coil Input Reading
	2 (0x02)	Bit	Discrete Input Reading
	3 (0x03)	Word	Holding Register Reading
	4 (0x04)	Word	Input Register Reading
	5 (0x05)	Bit	One Bit Coil Writing
	6 (0x06)	Word	One Word Holding Register Writing
	7 (0x07)	Bit	Exception Status Reading
	8 (0x08)	Word	Loop-back Check
	15 (0x0F)	Bit	Coil Writing
	16 (0x10)	Word	Holding Register Writing
	43 (0x2B)	ASCII string	Device ID Reading

Table Open POU for 32-bit Data Access

POU	Function code (Hex)	Data Type	Function
SD_CMDBSM_BS32_OPEN	1 (0x01)	Bit	Coil Input Reading
	2 (0x02)	Bit	Discrete Input Reading
	3 (0x03)	Word	Holding Register Reading
		Long	
		Float	
	4 (0x04)	Word	Input Register Reading
	5 (0x05)	Bit	One Bit Coil Writing
	6 (0x06)	Word	One Word Holding Register Writing
		Long	
		Float	
	7 (0x07)	Bit	Exception Status Reading
	8 (0x08)	Word	Loop-back Check
	15 (0x0F)	Bit	Coil Writing
	16 (0x10)	Word	Holding Register Writing
	43 (0x2B)	ASCII string	Device ID Reading

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Modbus/TCP Client

Table Open POU for Data Access

POU	Function code (Hex)	Data Type	Function
SD_CMDBSE_BC_OPEN	–	–	Modbus/TCP client communication task creation

Table Read/Write POU

POU	Function code	Data Type	Function
SD_CMDBSE_BC_BRD	1 (0x01)	Bit	Coil Input Reading
SD_CMDBSE_BC_BRD	2 (0x02)	Bit	Discrete Input Reading
SD_CMDBSE_BC_WRD	3 (0x03)	Word	Holding Register Reading
SD_CMDBSE_BC_I32RD		Long	
SD_CMDBSE_BC_F32RD		Float	
SD_CMDBSE_BC_WRD	4 (0x04)	Word	Input Register Reading
SD_CMDBSE_BC_BWRS	5 (0x05)	Bit	One Bit Coil Writing
SD_CMDBSE_BC_WWRS	6 (0x06)	Word	One Word Holding Register Writing
SD_CMDBSE_BC_I32WRS		Long	
SD_CMDBSE_BC_F32WRS		Float	
SD_CMDBSE_BC_REB	7 (0x07)	Bit	Exception Status Reading
SD_CMDBSE_BC_LPBK	8 (0x08)	Word	Loop-back Check
SD_CMDBSE_BC_BWR	15 (0x0F)	Bit	Coil Writing
SD_CMDBSE_BC_WWR	16 (0x10)	Word	Holding Register Writing
SD_CMDBSE_BC_I32WR		Long	
SD_CMDBSE_BC_F32WR		Float	
SD_CMDBSE_BC_DID	43 (0x2B)	ASCII string	Device ID Reading

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Modbus/TCP Server

Table Open POU for 16-bit Data Access

POU	Function code (Hex)	Data Type	Function
SD_CMDBSE_BS_OPEN	1 (0x01)	Bit	Coil Input Reading
	2 (0x02)	Bit	Discrete Input Reading
	3 (0x03)	Word	Holding Register Reading
	4 (0x04)	Word	Input Register Reading
	5 (0x05)	Bit	One Bit Coil Writing
	6 (0x06)	Word	One Word Holding Register Writing
	7 (0x07)	Bit	Exception Status Reading
	8 (0x08)	Word	Loop-back Check
	15 (0x0F)	Bit	Coil Writing
	16 (0x10)	Word	Holding Register Writing
	43 (0x2B)	ASCII string	Device ID Reading

Table Open POU for 32-bit Data Access

POU	Function code (Hex)	Data Type	Function
SD_CMDBSE_BS32_OPEN	1 (0x01)	Bit	Coil Input Reading
	2 (0x02)	Bit	Discrete Input Reading
	3 (0x03)	Word	Holding Register Reading
		Long	
		Float	
	4 (0x04)	Word	Input Register Reading
	5 (0x05)	Bit	One Bit Coil Writing
	6 (0x06)	Word	One Word Holding Register Writing
		Long	
		Float	
	7 (0x07)	Bit	Exception Status Reading
	8 (0x08)	Word	Loop-back Check
	15 (0x0F)	Bit	Coil Writing
	16 (0x10)	Word	Holding Register Writing
	43 (0x2B)	ASCII string	Device ID Reading

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● OPERATING ENVIRONMENT

Hardware (FCN-500)

Means of Communication		Module
Serial	RS-232-C	CPU module (*1) (NFCP501 and NFCP502: 1 port) RS-232-C communication module (*2) (*3) (NFLR111: 2 ports/module)
	RS-422/ RS-485	RS-422/RS-485 communication module (*2) (*3) (*5) (NFLR121: 2 ports/module)
Ethernet	Client	CPU module (NFCP501 and NFCP502: 32 channels maximum) (*4)
	Server	CPU module (NFCP501 and NFCP502: 4 clients maximum)

*1: If the CPU module is duplexed, the serial port of the module cannot be used.
*2: The modules allow the CPU module to be duplexed.
*3: Up to eight RS-232-C and RS-422/RS-485 communication modules can be mounted on each FCN-500.
*4: Total number of the following POUs shall be up to 32 in FCN-500 since each POU occupies one channel.
- SD_FCXPE_OPEN (Ethernet Communication Function Block)
- SD_CMELSECE_OPEN and SD_CMELSECE_3E_OPEN (POU of MELSEC Communication Portfolio)
- SD_CFAM3E_OPEN (POU of FA-M3 Communication Portfolio)
- SD_CMDBSE_BC_OPEN (POU of Modbus Communication Portfolio)
*5: Up to 31 devices per serial port can be connected.

Hardware (FCN-RTU)

Means of Communication		Module
Serial	RS-232	CPU module (NFCP050: 3 ports)
	RS-422/ RS-485	CPU module (NFCP050: 1 port)
Ethernet	Client	CPU module (NFCP050: 32 channels maximum) (*1)
	Server	CPU module (NFCP050: 4 clients maximum)

*4: Total number of the following POUs shall be up to 32 in FCN-RTU since each POU occupies one channel.
- SD_FCXPE_OPEN (Ethernet Communication Function Block)
- SD_CMELSECE_OPEN and SD_CMELSECE_3E_OPEN (POU of MELSEC Communication Portfolio)
- SD_CFAM3E_OPEN (POU of FA-M3 Communication Portfolio)
- SD_CMDBSE_BC_OPEN (POU of Modbus Communication Portfolio)

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■ LOGGING PORTFOLIO

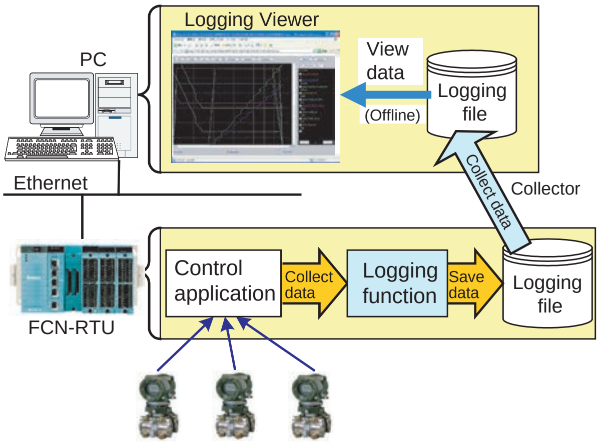
● GENERAL

Logging Portfolio is a software package that runs in an autonomous controller FCN-RTU and that is designed to log process data.

Logging Portfolio provides a logging function that is indispensable for managing the utilities and equipment. It collects data from the control application in an autonomous controller FCN-RTU in various forms ideal for use by the system, and saves it in a logging file (in CSV format). The logging file can also be sent by e-mail.

Use of software for a PC that is included in the package allows for the acquisition of logging files periodically from the PC via a network for further use.

Note: Logging Portfolio (infoWell) can be used in FCN-RTU (low power autonomous controllers with NFCP050 CPU module).



F01E.ai

Figure Logging Function

● FEATURES

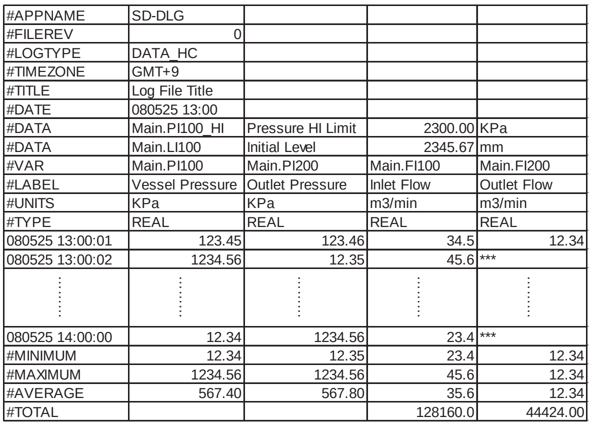
Simple Configuration without PC
A highly reliable logging function can be implemented at low cost without using a PC. There is no need to maintain a dedicated PC running 24 hours a day. Moreover, there is no need of communication between FCN-RTU and PC, although a large amount of data can be logged at a high speed.

Simple Logging Configuration
A simple setup makes it possible to log the data of the control application.

Rich Data Logging Functions
In addition to a basic function to periodically log and save data in a logging file, there are various functions such as a batch logging for recipe management, snapshot logging for reducing total amount of data, SOE (Sequence of Events) logging for collecting data before and after an event such as event is detected, or message logging function for recording failures and recovery of devices and controllers. The most suitable recording method can be selected according to the purpose.

Rich View Functions and E-mail Transmission
Logged data can be viewed on the logging viewer in a variety of forms such as trend view and table format view. Logged data (Simple report) can also be transmitted by e-mail.

Advanced Use of Data
A logging file collector running on a PC allows for periodically collecting logging files (in CSV format) on a PC. This makes it simple to analyze data using MS Excel, for example.



#APPNAME	SD-DLG			
#FILEREV	0			
#LOGTYPE	DATA_HC			
#TIMEZONE	GMT+9			
#TITLE	Log File Title			
#DATE	080525 13:00			
#DATA	Main.PI100_HI	Pressure HI Limit	2300.00	KPa
#DATA	Main.LI100	Initial Level	2345.67	mm
#VAR	Main.PI100	Main.PI200	Main.FI100	Main.FI200
#LABEL	Vessel Pressure	Outlet Pressure	Inlet Flow	Outlet Flow
#UNITS	KPa	KPa	m3/min	m3/min
#TYPE	REAL	REAL	REAL	REAL
080525 13:00:01	123.45	123.46	34.5	12.34
080525 13:00:02	1234.56	12.35	45.6	***
⋮	⋮	⋮	⋮	⋮
080525 14:00:00	12.34	1234.56	23.4	***
#MINIMUM	12.34	12.35	23.4	12.34
#MAXIMUM	1234.56	1234.56	45.6	12.34
#AVERAGE	567.40	567.80	35.6	12.34
#TOTAL			128160.0	44424.00

F02E.ai

Figure Example of Logging File

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● FUNCTION OVERVIEW

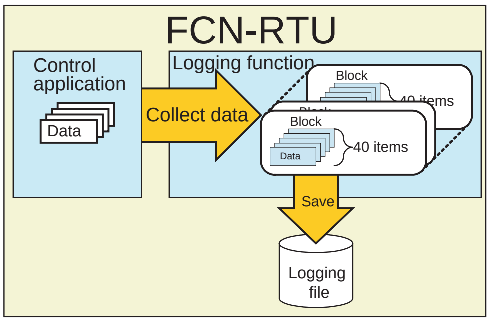
Logging Portfolio (InfoWell) provides the following functions.

- Logging function
- Logging File View function
- Logging File Collection function
- Logging File (Simple report) Transmission (E-mail) function
- Logging Configuration function

● LOGGING FUNCTION

The logging function has the following functions.

- Data Logging
- SOE (Sequence of Events) Logging
- Message Logging



F03E.ai

Figure Data Logging Function

Note: The logging type can be set on a block basis.
Note: Logging files are created on a block basis.
Note: One logging file is created on each closing process.

- Data Logging

There are the following types of data logging.

Table Data Logging

Logging type		Periodic data collection		Closing timing	Simple report (*4)
		High speed (*5)	Low speed		
Hourly logging		1 to 60 seconds (*1) (*3)	1 to 60 minutes (*2)	Every hour	Daily, monthly, yearly report
Daily logging		-	1 to 60 minutes (*2)	Every day	Monthly, yearly report
Batch logging		1 to 60 seconds (*1) (*3)	1 to 60 minutes (*2)	Batch start/stop switch	-
Snapshot logging	Continuous	-	Trigger	Every hour or every day	Daily, monthly, yearly report
	Triggered			Closing trigger	-

*1: Any of the fixed values (1, 2, 5, 10, 15, 30, and 60 seconds) can be set.
*2: Any of the fixed values (1, 2, 5, 10, 15, 30, and 60 minutes) can be set.
*3: To collect data, a program organization unit (POU) for logging is required when programming a control application. Periodic collection depends on the scan period of the task.
*4: A simple report, including daily, monthly and yearly report, is a CSV format file consisting of closing values (maximum, minimum, average and total).
*5: Not supported by FCN-RTU (NFCP050) style S1.

Hourly Logging

Hourly logging collects data in a specified collection period, closes processing once every hour, and creates an hourly logging file.

Periodic data collection options are high speed (1 to 60 -second period) or low speed (1 to 60-minute period).

The closing processing of hourly logging calculates the maximum, minimum, average, and total values and saves them along with the collected data in the logging file. The saved logging file is compressed in Zip format.

Simple reports (daily report, monthly report, or yearly report) can also be created based on the collected data.

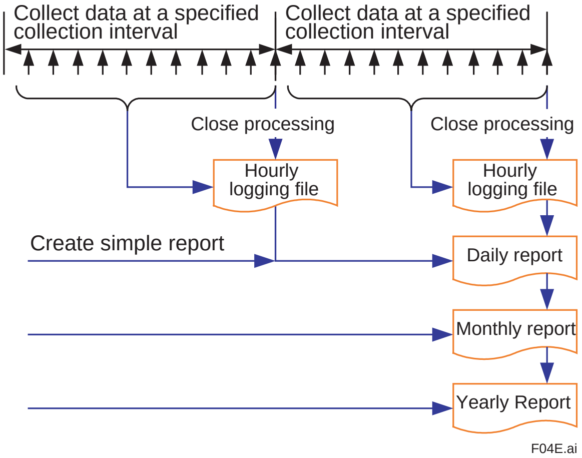


Figure Operation Example of Hourly Logging (with a Simple Report)

Daily Logging

Daily logging collects data in a specified collection period (1- to 60-minute period), closes processing once every day and creates a daily logging file.

The closing processing of daily logging calculates the maximum, minimum, average, and total values and saves them along with the collected data in a logging file. The saved logging file is compressed in Zip format.

Simple reports (monthly report and yearly report) can also be created based on the collected data.

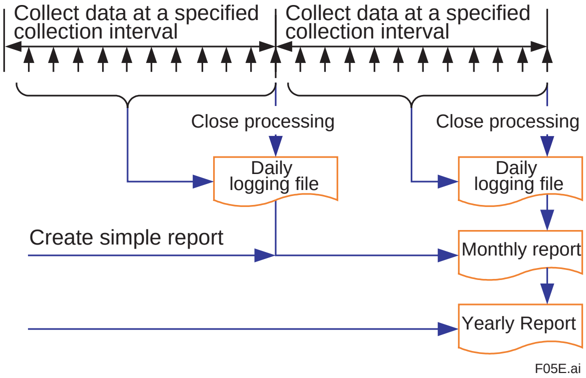
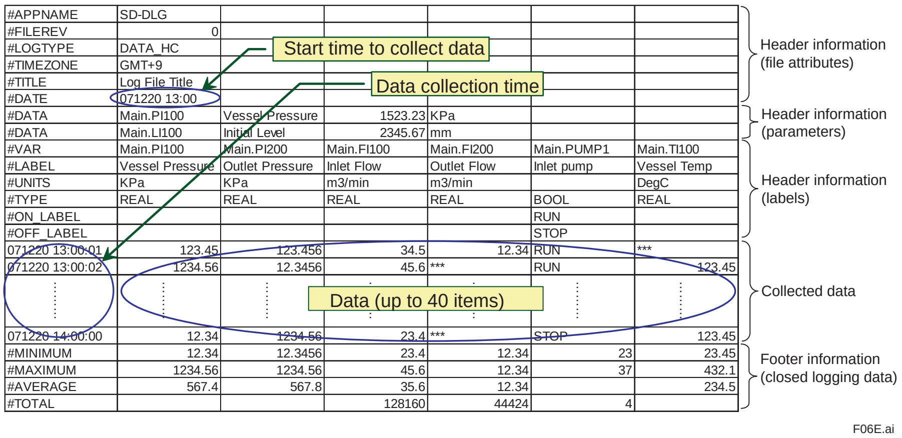


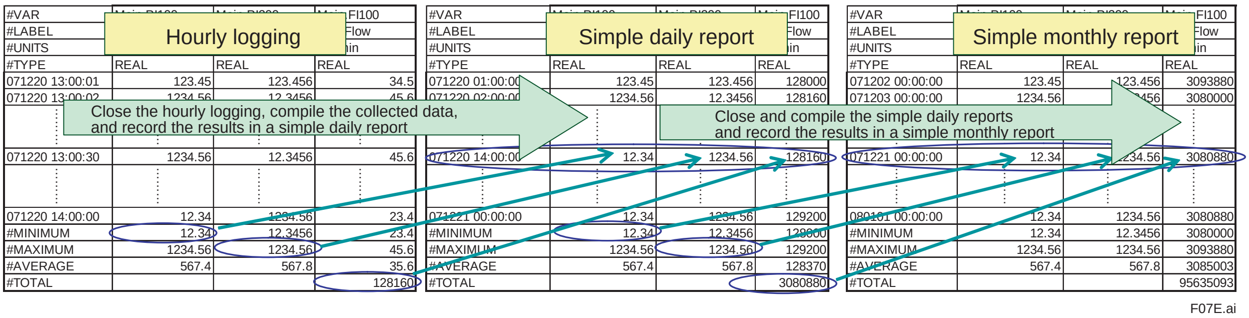
Figure Operation Example of Daily Logging (with a Simple Report)



#APPNAME	SD-DLG						
#FILEREV	0						
#LOGTYPE	DATA_HC						
#TIMEZONE	GMT+9						
#TITLE	Log File Title						
#DATE	071220 13:00						
#DATA	Main.PI100	Vessel Pressure	1523.23	KPa			
#DATA	Main.LI100	Initial Level	2345.67	mm			
#VAR	Main.PI100	Main.PI200	Main.FI100	Main.FI200	Main.PUMP1	Main.TI100	
#LABEL	Vessel Pressure	Outlet Pressure	Inlet Flow	Outlet Flow	Inlet pump	Vessel Temp	
#UNITS	KPa	KPa	m3/min	m3/min		DegC	
#TYPE	REAL	REAL	REAL	REAL	BOOL	REAL	
#ON_LABEL					RUN		
#OFF_LABEL					STOP		
071220 13:00:01	123.45	123.456	34.5	12.34	RUN	***	
071220 13:00:02	1234.56	12.3456	45.6	***	RUN	123.45	
⋮	⋮	⋮	⋮	⋮	⋮	⋮	
071220 14:00:00	12.34	1234.56	23.4	***	STOP	123.45	
#MINIMUM	12.34	12.3456	23.4	12.34	23	23.45	
#MAXIMUM	1234.56	1234.56	45.6	12.34	37	432.1	
#AVERAGE	567.4	567.8	35.6	12.34		234.5	
#TOTAL			128160	44424	4		

Start time to collect data
Data collection time
Data (up to 40 items)
Header information (file attributes)
Header information (parameters)
Header information (labels)
Collected data
Footer information (closed logging data)
F06E.ai

Figure File Example of Hourly Logging


Hourly logging
Simple daily report
Simple monthly report
Close the hourly logging, compile the collected data, and record the results in a simple daily report
Close and compile the simple daily reports and record the results in a simple monthly report
F07E.ai

#VAR			FI100
#LABEL			Flow
#UNITS			in
#TYPE	REAL	REAL	REAL
071220 13:00:01	123.45	123.456	34.5
071220 13:00:02	1234.56	12.3456	45.6
⋮	⋮	⋮	⋮
071220 13:00:30	1234.56	12.3456	45.6
⋮	⋮	⋮	⋮
071220 14:00:00	12.34	1234.56	23.4
#MINIMUM	12.34	12.3456	23.4
#MAXIMUM	1234.56	1234.56	45.6
#AVERAGE	567.4	567.8	35.6
#TOTAL			128160

#VAR			FI100
#LABEL			Flow
#UNITS			in
#TYPE	REAL	REAL	REAL
071220 01:00:00	123.45	123.456	128000
071220 02:00:00	1234.56	12.3456	128160
⋮	⋮	⋮	⋮
071220 14:00:00	12.34	1234.56	128160
⋮	⋮	⋮	⋮
071221 00:00:00	12.34	1234.56	129200
#MINIMUM	12.34	12.3456	128000
#MAXIMUM	1234.56	1234.56	129200
#AVERAGE	567.4	567.8	128370
#TOTAL			3080880

#VAR			FI100
#LABEL			Flow
#UNITS			in
#TYPE	REAL	REAL	REAL
071202 00:00:00	123.45	123.456	3093880
071203 00:00:00	1234.56	12.3456	3080000
⋮	⋮	⋮	⋮
071221 00:00:00	12.34	1234.56	3080880
⋮	⋮	⋮	⋮
080101 00:00:00	12.34	1234.56	3080880
#MINIMUM	12.34	12.3456	3080000
#MAXIMUM	1234.56	1234.56	3093880
#AVERAGE	567.4	567.8	3085003
#TOTAL			95635093

Figure Example of Generating Simple Daily and Monthly Report

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Batch Logging

This function collects data in a specified collection period and saves it in the file while the batch start/stop switch (*1) is true.

The periodic data collection options are either high speed (1- to 60-second period) or low speed (1- to 60-minute period).

A simple report is not created.

Note: Whenever the batch start/stop switch is true, a new file is created.

*1: Batch start/stop switch
This is a Boolean type variable of control application to specify the period to collect data. At the timing when the batch start/stop switch is changed from false to true (when starting data collection) or oppositely changed from true to false (when stopping data collection), data collection will also be executed.
The interval between True and False of Batch start/stop switch must be one minute or longer.

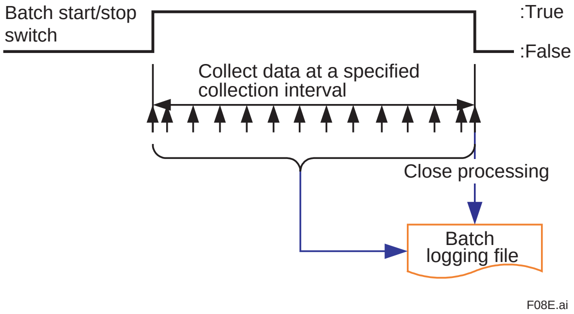

Figure Operation Example of Batch Logging

Snapshot Logging

This function collects data and saves it in a file at the timing when a data collection trigger becomes True.

There are two types, Continuous and Trigger, in accordance with the logging closing method.

- Snapshot Logging (Continuous)
  This function performs the closing processing at a specified time and creates a logging file. A simple report (daily report, monthly report, or yearly report) can also be created.

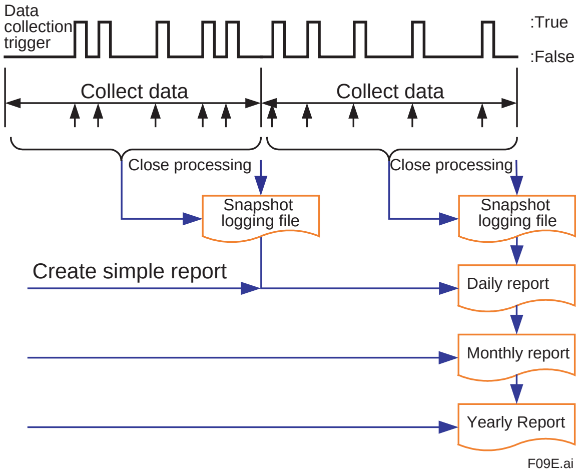

Figure Example of Snapshot Logging (Continuous)

- Snapshot Logging (Trigger)
  This function generates a file when the first data collection trigger becomes True, and then ends the logging and saves the data in the file when a closing trigger becomes True. A simple report cannot be created.
  Note: After the closing processing is performed, the next data collection trigger creates a new file and starts logging.

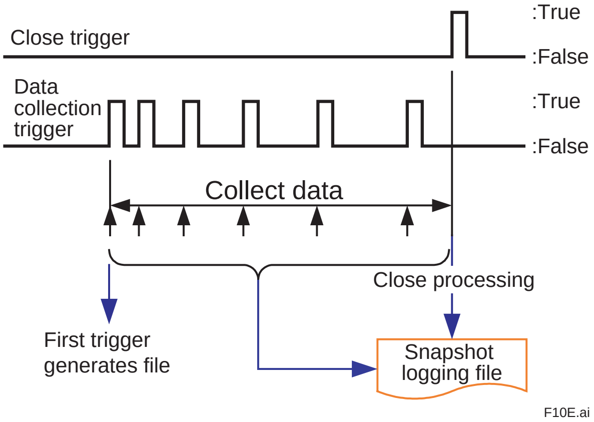

Figure Operation Example of Snapshot Logging (Trigger)

Note: Both the “data collection trigger” and “closing trigger” are Boolean type variables of control application.

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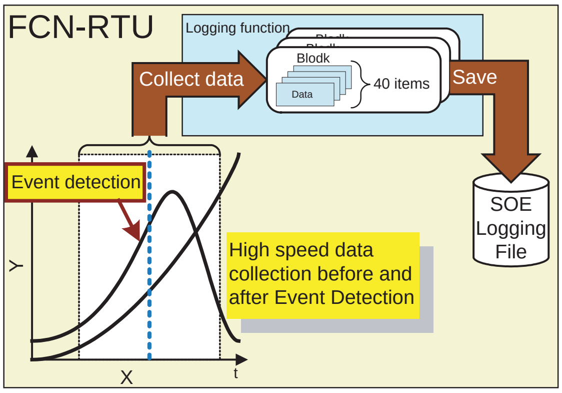
- SOE (Sequence of Events) Logging

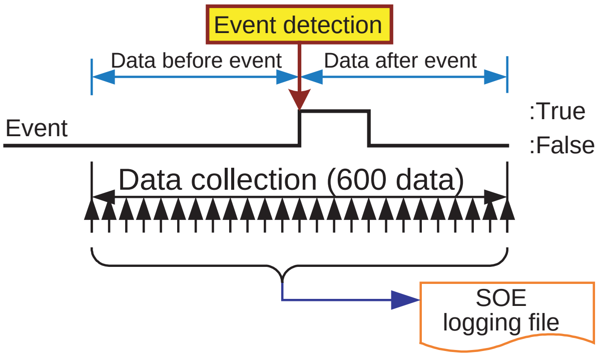
SOE (Sequence of Events) logging collects data at high speed before and after the detection of event such as failure and saves data in a file.

A simple report is not created.



F18E.ai

Figure SOE Logging Function



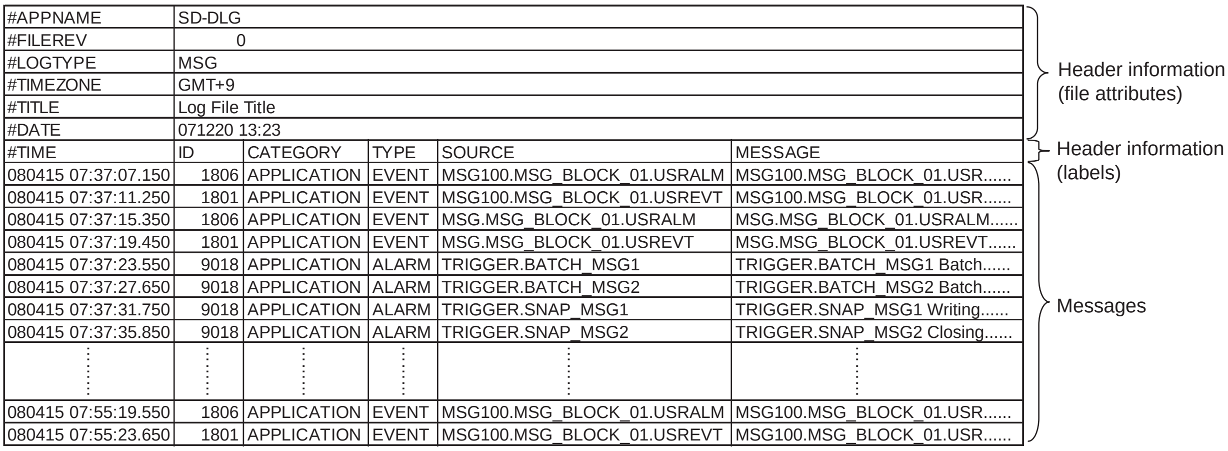
F19E.ai

Figure Operation Example of SOE Logging

- Message Logging

This function saves FCN/FCJ messages in a continuous (one-minute) period in the file.

The messages can also be filtered by the message number.



#APPNAME	SD-DLG				
#FILEREV	0				
#LOGTYPE	MSG				
#TIMEZONE	GMT+9				
#TITLE	Log File Title				
#DATE	071220 13:23				
#TIME	ID	CATEGORY	TYPE	SOURCE	MESSAGE
080415 07:37:07.150	1806	APPLICATION	EVENT	MSG100.MSG_BLOCK_01.USRALM	MSG100.MSG_BLOCK_01.USR......
080415 07:37:11.250	1801	APPLICATION	EVENT	MSG100.MSG_BLOCK_01.USREVT	MSG100.MSG_BLOCK_01.USR......
080415 07:37:15.350	1806	APPLICATION	EVENT	MSG.MSG_BLOCK_01.USRALM	MSG.MSG_BLOCK_01.USRALM......
080415 07:37:19.450	1801	APPLICATION	EVENT	MSG.MSG_BLOCK_01.USREVT	MSG.MSG_BLOCK_01.USREVT......
080415 07:37:23.550	9018	APPLICATION	ALARM	TRIGGER.BATCH_MSG1	TRIGGER.BATCH_MSG1 Batch......
080415 07:37:27.650	9018	APPLICATION	ALARM	TRIGGER.BATCH_MSG2	TRIGGER.BATCH_MSG2 Batch......
080415 07:37:31.750	9018	APPLICATION	ALARM	TRIGGER.SNAP_MSG1	TRIGGER.SNAP_MSG1 Writing......
080415 07:37:35.850	9018	APPLICATION	ALARM	TRIGGER.SNAP_MSG2	TRIGGER.SNAP_MSG2 Closing......
⋮	⋮	⋮	⋮	⋮	⋮
080415 07:55:19.550	1806	APPLICATION	EVENT	MSG100.MSG_BLOCK_01.USRALM	MSG100.MSG_BLOCK_01.USR......
080415 07:55:23.650	1801	APPLICATION	EVENT	MSG100.MSG_BLOCK_01.USREVT	MSG100.MSG_BLOCK_01.USR......

Header information (file attributes)

Header information (labels)

Messages

F11E.ai

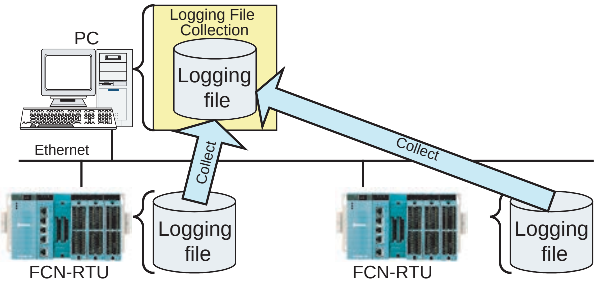
Figure Example of Message Logging File

● LOGGING FILE COLLECTION FUNCTION

Logging files on FCN-RTU are periodically collected on PC using logging file collection function. Collection can also be performed manually whenever necessary.

The following methods are prepared for the logging file collection function. Select one of them for the intended purpose.

- Logging File Collector
  It runs in the task tray while PC is logged on.
- Logging File Collection Service
  It runs as a PC service even if PC is not logged on.



F13E.ai

Figure Logging File Collection Function

● LOGGING FILE VIEW FUNCTION

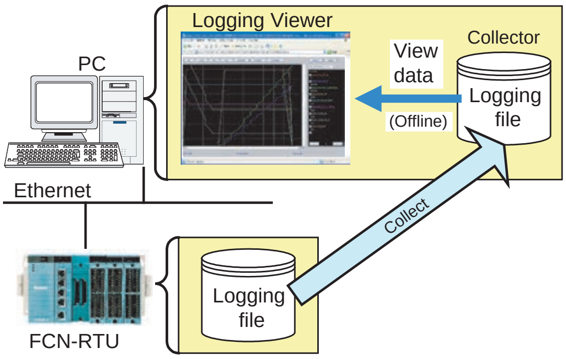
Logging File View Function

Logging files collected on the PC can be simply viewed using Logging Viewer (offline view).

Trend View and Table Format View are available in Logging Viewer.

Message View Function

FCN/FCJ message logs that were collected can also be viewed in Logging Viewer in the same manner as viewing data.

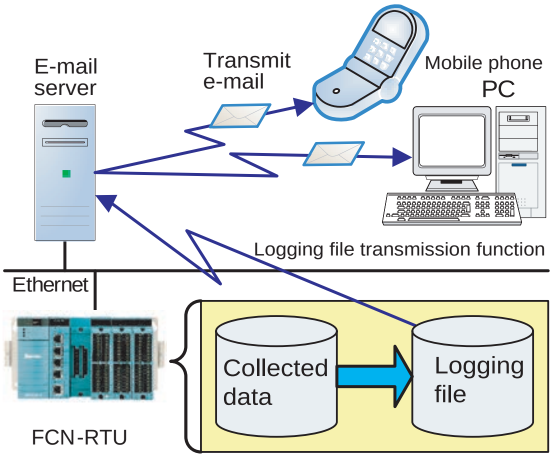


F12E.ai

Figure Viewing Logging File by Logging Viewer

● LOGGING FILE TRANSMISSION (E-mail) FUNCTION (*1)

This function allows for transmitting logging files as attachments by e-mail.



F14E.ai

*1: Not supported by FCN-RTU (NFCP050) style S1.

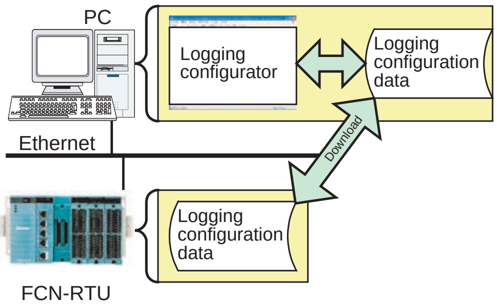
Figure Logging File Transmission (E-mail) Function

Note: • An e-mail server is required on the intranet to transmit e-mail.
• The logging files that can be transmitted are simple reports (daily report, monthly report, and yearly report).

● LOGGING CONFIGURATION FUNCTION

A Logging Configurator allows for configuring how to collect data.

This tool runs in offline mode that allows for downloading the configuration information to the FCN/FCJ after it is changed on the PC.



F16E.ai

Figure Logging Configurator (Offline)

Note: When using the logging configurator the tool is required to be installed in the PC.

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● DATA LOGGING FUNCTION SPECIFICATIONS

Table Data Logging Function Specifications

Item	Specifications	
	Data Logging / SOELogging	Message Logging
Data to be collected	FCN/FCJ control application variables	FCN/FCJ message
Number of items	40 items/block	-
Number of blocks	16 blocks (*11) (*12)	2 blocks
Logging block start/stop trigger	BOOL-type control application variable (*1) (*9)	
Amount of data to be saved	30,000 items/min. (*13)	
File format	CSV form (*4)	
Total logging file size	Limited by the free space on the FCN/FCJ system card (500 MB max) or flash memory on FCN-RTU (80 MB max) (*10)	
Logging block size	Specify the maximum data size on logging block basis. The specified values must be such that the sum of all logging block sizes does not exceed the total logging file size. (*5)(*6)	
Number of files	400 files per logging (*7)	

Note: When there is possibility of power interruption in the electric supply to FCN-RTU, please connect an uninterruptible power supply system (UPS). For more information, refer to the STARDOM UPS Guide (FCN/FCJ) (TI 4P02Q45-01E)

*1: Logging for a logging block can be started or stopped from a control application by specifying a variable as a block start/ stop trigger. If no trigger is specified, the logging block is always activated (in RUN status).

*2: This represents the total number of blocks for the data logging function and SOE logging function.

*3: Collecting this amount of data is equivalent to increase in CPU load by 25 % to 30 %.
CPU load is increased when e-mails are sent, simple reports are created and messages are logged.

*4: When closing processing is performed, the logging file is compressed into Zip format, normally to between 10% and 50% of the original file size.

*5: The oldest file is removed when collected data for a logging block exceeds the specified logging block size, even if the number of files accumulated in a logging block does not exceed 400.

*6: In case of hourly logging (for up to 40 data items and in a collection period of 1 second), the maximum size of one file is approximately 1.7 MB. The file is compressed to the one-third compared to the size of the original file in Zip format, except for a logging file for which data is currently being collected.
When a 100 MB area is allocated, approximately 170 files (for one week) can be logged.

*7: Files are deleted from the oldest when the number of files accumulated in a logging block exceeds 400, even if collected data for a logging block does not exceeds the specified logging block size.

*8: This represents the total number of blocks for the high-speed data collection, namely hourly logging(high-speed), batch logging(high-speed) and SOE logging.

*9: The interval between True and False of start/stop trigger of logging block must be one minute or longer.

*10: 16 MB max in case of FCN-RTU (NFCP050) style S1

*11: Maximum of the total number of blocks for high-speed data collection, low-speed data collection, and SOE logging is 16.
Maximum of the total number of blocks for high-speed data collection and SOE logging is 5.

*12: FCN-RTU (NFCP050) style S1 can be used only with low-speed data collection function. High-speed data collection and SOE logging function are not supported.

*13: 8,000 items/min. in case of FCN-RTU (NFCP050) style S1

Table Detailed Specifications of Hourly and Daily Logging Functions

Item	Hourly logging		Daily logging
	High speed collection	Low speed collection	
Periodic collection	1, 2, 5, 10, 15, 30, 60 second(s)	1, 2, 5, 15, 30, 60 minute(s)	
Data to be collected	POU for logging data (*1)	FCN/FCJ control application variables (*2)	
Closing timing	Fixed period		
Closing processing period	1 hour		1 day
Closing time	Specify in minutes		Specify in hours
Items to be generated at closing time	Select from “None,” “Minimum, maximum, average,” “Minimum, maximum, average, total.”		
Simple report (*3)	Select from “None,” “Daily report,” “Daily and monthly report,” “Daily, monthly, and yearly report.”		Select from “None,” “Monthly report,” “Monthly and yearly report.”

*1: The data types that can be connected to the POU for logging data are CData_REAL, REAL, CData_INT, INT, and BOOL.

*2: FCN/FCJ control application variables with an OPC check.
The data types of variables that can be collected are CData_REAL, CData_INT, REAL, LREAL, INT, SINT, UNIT, USINT, DINT, UDINT, BOOL, and STRING.

*3: Simple reports can be transmitted by e-mail.
(E-mail function is not supported by FCN-RTU (NFCP050) style S1.)

Table Detailed Specifications of Batch Logging Function

Item	Batch logging	
	High speed collection	Low speed collection
Periodic collection	1, 2, 5, 10, 15, 30, 60 second(s)	1, 2, 5, 10, 15, 30, 60 minute(s)
Data to be collected	POU for logging (*1)	FCN/FCJ control application variables (*2)
Closing processing	When data collection is finished	
Items to be generated at closing time	Select from “None,” “Minimum, maximum, average,” “Minimum, maximum, average, total”	
Simple report	Unavailable	

*1: The data types that can be connected to the POU for logging data are CData_REAL, REAL, CData_INT, INT, and BOOL.

*2: FCN/FCJ control application variables with an OPC check.
The data types of variables that can be collected are CData_REAL, CData_INT, REAL, LREAL, INT, SINT, UNIT, USINT, DINT, UDINT, BOOL, and STRING.

Table Detailed Specifications of Snapshot Logging Function

Item	Snapshot logging		
	Continuous collection		Trigger
Periodic collection	More than 1 minute for the data collection trigger (*3) interval		
Data to be collected	FCN/FCJ control application variables (*1)		
Close timing	Fixed period		Closing trigger (*3) (*4)
Closing processing period	1 hour	1 day	-
Closing time	Specify in minutes	Specify in hours	-
Simple report (*2)	Select from “None,” “Daily report,” “Daily and monthly report,” and “Daily, monthly, and yearly report.”	Select from “None,” “Monthly report,” and “Monthly and yearly report.”	Unavailable
Closing processing	When data collection is finished		
Items to be generated at closing time	Select from “None,” “Minimum, maximum, average,” and “Minimum, maximum, average, total.”		

*1: FCN/FCJ control application variables with an OPC check.
The data types of variables that can be collected are CData_REAL, CData_INT, REAL, LREAL, INT, SINT, UNIT, USINT, DINT, UDINT, BOOL, and STRING.

*2: Simple report can be transmitted by e-mail.
(E-mail function is not supported by FCN-RTU (NFCP050) style S1.)

*3: Trigger is a Boolean type variable of control application.

*4: The interval between the closing triggers of logging block must be one minute or longer.

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● SOE LOGGING FUNCTION SPECIFICATIONS

Table SOE Logging Function Specifications

Item	SOE Logging (*3)
Periodic collection	100 milli seconds or longer (*1)
Data to be collected	POU for SOE logging (*2)
Number of sample	600
Number of pretrigger sample	0 to 599
Closing processing	When data collection is finished
Items to be generated at closing time	Unavailable
Simple report	Unavailable

*1: Periodic collection depends on the scan period of the task.

*2: The data types that can be connected to the POU for SOE logging are REAL, INT, and BOOL.

*3: Not supported by FCN-RTU (NFCP050) style S1.

● MESSAGE LOGGING

Table Message Logging

Item	Message logging
Periodic collection	1 minute
Data to be collected	FCN/FCJ message
Number of blocks	2 blocks (*1)
Filter	ID of messages to be collected can be specified on a block basis
Closing processing period	1 day
Closing time	0 A.M.
File format	CSV format (*2)
Logging file size	1 file: Less than 1 MB (by default) Total: 1 to 500 MB (*3)

*1: Total number of blocks for the message logging function.

*2: When the file closing processing is performed, the logging file is compressed in ZIP format. This logging file is compressed to 10% to 50% compared to the size of the original file.

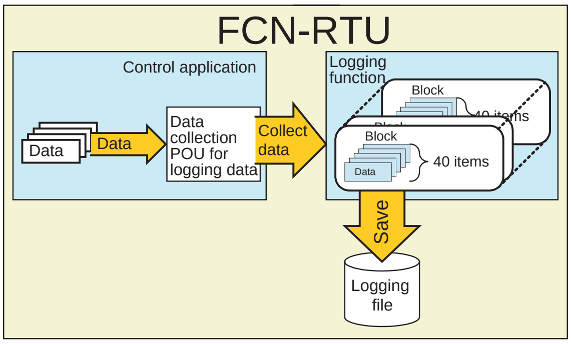
*3: Specify the maximum size on a collection block basis. When the collected data is larger than the specified size, the oldest file is deleted.

● TIME STAMP

Time stamp in data logging file, SOE file logging and message logging file is recorded based on FCN-RTU clock and time zone of FCN-RTU setting. Daylight saving time is not applied.

● POUs FOR LOGGING

A POU for logging data is used to collect data at high speed.



F17E.ai

Figure POU for Logging

POUs for High-speed Logging

There are high-speed synchronous POU and high-speed data collection POU (data types: REAL, INT, BOOL, CData_REAL, CData_INT).

POUs for SOE Logging

There are SOE trigger POU and SOE data collection POU (data types: REAL, INT, BOOL).

● LOGGING VIEWER

Table Logging Viewer Function Specifications

Item	Specifications
Tool	Start the tool on a PC
View method	Trend, table format (*1)
Number of data items to be viewed	Table format view: up to 40 items Trend view: up to 10 items

*1: Message logging file can be viewed only in table format.

● LOGGING FILE COLLECTION FUNCTION SPECIFICATIONS

Table Logging File Collection Function Specifications

Item	Specifications
Applicable device	FCN/FCJ: up to 32 units
File transfer mode	HTTP, FTP passive or FTP active
Periodic collection	Every 1, 2 , 3, 4, 6, 8, 12, and 24 hours (*1)
Applicable file	All logging files
Amount of data to be saved	Depends on the disk space of the PC (*2)

*1: Logging files can also be collected manually whenever necessary.

*2: As for logging file collected in PC, you can select “automatic decompress” or “not automatic decompress.” Prepare a hard disk in which all data files can be saved, or remove unnecessary logging files on a timely basis.

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● LOGGING FILE TRANSMISSION (E-MAIL) FUNCTION SPECIFICATIONS

Table Logging File Transmission (E-mail) Function Specifications

Item	Specifications
E-mail transmission protocol (*1)	SMTP (Specify the server type from the following options) • SMTP (Standard) • AUTH (User login is required) • PBS (POP before SMTP)
E-mail address	5 addresses per group can be specified
E-mail group	32 groups can be registered
E-mail transmission destination	Specify it in the e-mail group
Logging file	Transmit a logging file (*2) as an attached file (*3)

Note: Logging file transmission (e-mail) function is not supported by FCN-RTU (NFCP050) style S1.

*1: For sending e-mails, an e-mail server is needed. Not only e-mail servers in the intranet but also external e-mail servers, such as internet providers can be used.
When external e-mail servers are used, the firewall needs to be configured that e-mails can be sent to external e-mail servers.

*2: The logging files that can be transmitted are described in the table below ”Logging Files for E-mail Transmission”.

*3: A file compressed in Zip format is attached.
File attachement is done by uuencode, so e-mail client needs to support uuencode function.

Table Logging Files for E-mail Transmission

Item		File	E-mail Transmission
Hourly logging		Hourly logging file	-
		Simple report	X
Daily logging		Daily logging file	-
		Simple report	X
Batch logging		Batch logging file	-
Snapshot logging	Continuous	Snapshot logging file	-
		Simple report	X
	Triggered	Snapshot logging file	-
SOE logging		SOE logging file	-
Message logging		Message logging file	-

● PERFORMANCE

The table below describes a rough guide of the CPU load of control application and the collecting capacity of logging function.

Low Power Autonomous Controller FCN-RTU

Table The collecting capacity of logging function for FCN-RTU (Guide)

CPU load of Control AP	Number of logging block			Simple report e-mail transmission
	High speed	Low speed (*2)	SOE	
40%	0	16	0	-
25%	0	16	0	X (*1)
25%	5	11	0	-
10%	5	11	0	X (*1)
25%	3	3	1	-
20%	3	3	1	X (*1)

Note:
- The capacity described in the table above is a rough guide of the performance. In case other functions such as Duolet function or transmission function are running simultaneously on FCN-RTU, the CPU load should be considered to be higher.
- Configure the system secured enough to avoid any overloaded operation.

*1: When all Simple Reports are sent by E-mail.

*2: FCN-RTU (NFCP050) style S1 only supports Low Speed type. (5 blocks for 40 %, 10 blocks for 25 %, 16 blocks for 10 %)

● OPERATING ENVIRONMENT

Low Power Autonomous Controller FCN-RTU

Table Hardware

Hardware	Description
Model (CPU)	NFCP050
Style (CPU)	S1 or later

Table Software

Software	Description
Basic Software	FCN/FCJ Basic Software
Revision	R4.30.01 or later
License	Licenses are bundled with CPU module (Model: NFCP050).

PC for Definition

The tables below show the operating environment for the following tools.

- Logging Viewer
- Logging File Collector
- Logging Configurator

Note: The logging portfolio cannot be used with R4.20 or earlier InfoWell.

Table Hardware

Hardware	Remarks
Personal Computer	PC/AT compatible machine
CPU	1 GHz or higher 64-bit (x64) processor
Memory	2 GB or larger recommended
Hard disk	Free space 32 GB or larger
Network	Ethernet
Media	DVD-ROM

Table Software

Software	Remarks
OS	Windows 10 Enterprise 2019 LTSC(64bit) Windows 10 IoT Enterprise 2019 LTSC(64bit) Windows 10 Enterprise 2016 LTSB(64bit) Windows 10 IoT Enterprise 2016 LTSB(64bit) Windows 10 Pro 20H2 or later(64bit) (*4)
Java Runtime Environment	AdoptOpenJDK Open JDK 8u232 (*1)
.NET Framework	.NET Framework 4.6.2 (*2) (*3)

*1: Java Runtime Environment is bundled with Application Portfolio Software Media.
When it operates on the same PC with a VDS HMI client, version of Java Runtime Environment for both of them have to be the same. Use version of Java for InfoWell same as for VDS.
It cannot be used with Oracle Java Runtime Environment 8.0.

*2: This is required for a PC that uses the logging file collection function, but is not required for a PC for the configuration function and viewing logging files.

*3: .NET Framework is pre-installed in Windows 10.

*4: Some functions of the STARDOM software may possibly be restricted when Windows Update is applied to Windows 10 Pro.
Refer to the following Yokogawa Web site (registration is required) for the support status of STARDOM software for Windows 10 Pro.
“System Requirements” Page in “YOKOGAWA Partner Portal STRADOM” site
https://partner.yokogawa.com/global/member/rtu/os/index.htm

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STYLE OF SOFTWARE SUPPLY

Software Media

The programs and documents for all Application Portfolios excluding PAS Portfolio and Time Synchronization Server Portfolio are supplied as a DVD-ROM. Hence, a DVD-ROM drive is required for installation in the computer you use.

PAS Portfolio is included in the media (DVD-ROM) of FCN/FCJ Software (Model NT203AJ).

MODELS AND SUFFIX CODES

Software Media

		Description
Model	NT203AJ	FCN/FCJ software media
Suffix Codes	-P	Programs (including electronic documents)
	C	DVD-ROM
	1	Always 1
	1	Always 1
	E	English version

		Description
Model	NT205AJ	Application Portfolio software media
Suffix Codes	-P	Programs (including electronic documents)
	C	DVD-ROM
	1	Always 1
	1	Always 1
	E	English version

Application Portfolios

The runtime environment are bundled with CPU module. Refer to Table Application Portfolio. The Application Portfolios cannot be added later on.

ORDERING INFORMATION

Specify the model and suffix codes.

RELATED DOCUMENTS

FCN-RTU Low Power Autonomous Controller Functions	GS 34P02Q02-01E
FCN Autonomous Controller Functions (FCN-500)	GS 34P02Q03-01E
DNP3 Communication Portfolio (FCN-500/FCN-RTU)	GS 34P02P22-02E

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