

3 – 3 CPU module

3 – 3 – 1 Performance/function specification list

(1) XCS-3000

Item	Specifications	
Type	CSH1PU1A-00FHY	
Control system	Stored program Default task (cyclic scan), periodic task, event task	
I/O connection system	E-SX bus (between CPU-E-SX bus IF), SX bus (between E-SX bus IF-IO modules)	
I/O control timing	Synchronized with E-SX bus tact <ul style="list-style-type: none"> I/O via network adaptor According to the control cycle of the network card I/O on E-SX bus IF Synchronized with SX bus tact (set by system definition) 	
Programming language	Compliant to IEC61131-3 IL language, ST language, LD language, FBD language, SFC factor	
Command execution time	Sequence command : 0.006 μ s to N Addition/subtraction command : 0.005 μ s Multiplication command : 0.015 μ s Subtraction command : 0.074 μ s Timer command : 0.23 μ s Counter command : 0.24 μ s	
Program memory capacity	512KStep	
Maximum program capacity within 1 POU	16KStep	
Memory	I/O memory (I/O)	SX bus : Single; 512 words Duplex system : System DO only (digital output module) E-SX bus : 4096 words T-LINK IO, IPU-II (via NA) : 2,048 words in total Directly connected IPU-II : 4,096 words
	Standard memory (M)	2368Kwords (max.)
	Retain memory (RM)	2368Kwords (max.)
	Instance memory for user FB (FM)	2368Kwords (max.)
	Instance memory for system FB (SFM)	2368Kwords (max.)
	Memory shared by multi CPUs	0 word
System memory (SM)	Base unit : 512 words Application unit : 512 words For network adaptor : 512 words SM region of set-type IF module : 512 words \times 32	
Temporary region	32KW (per each task)	
Temporary region per 1 POU	16KW	
Number of sequence data-type factors	16-bit data: 32768, 32-bit data: 16384	
Task	Default task: 1	Executed in synchronization with task execution time/ending time of E-SX bus tact cycle
	Periodic interruption	} Up to 4 in total Periodic cycle addressable range: 0.5 to 32000 ms (Shall be integral multiple of designated tact cycle.)
	Event interruption	
Program instance (number of POU's/resource)	256 (The maximum number of registration in one task is 128.)	
Number of user function blocks	1024	
Number of user functions	512	

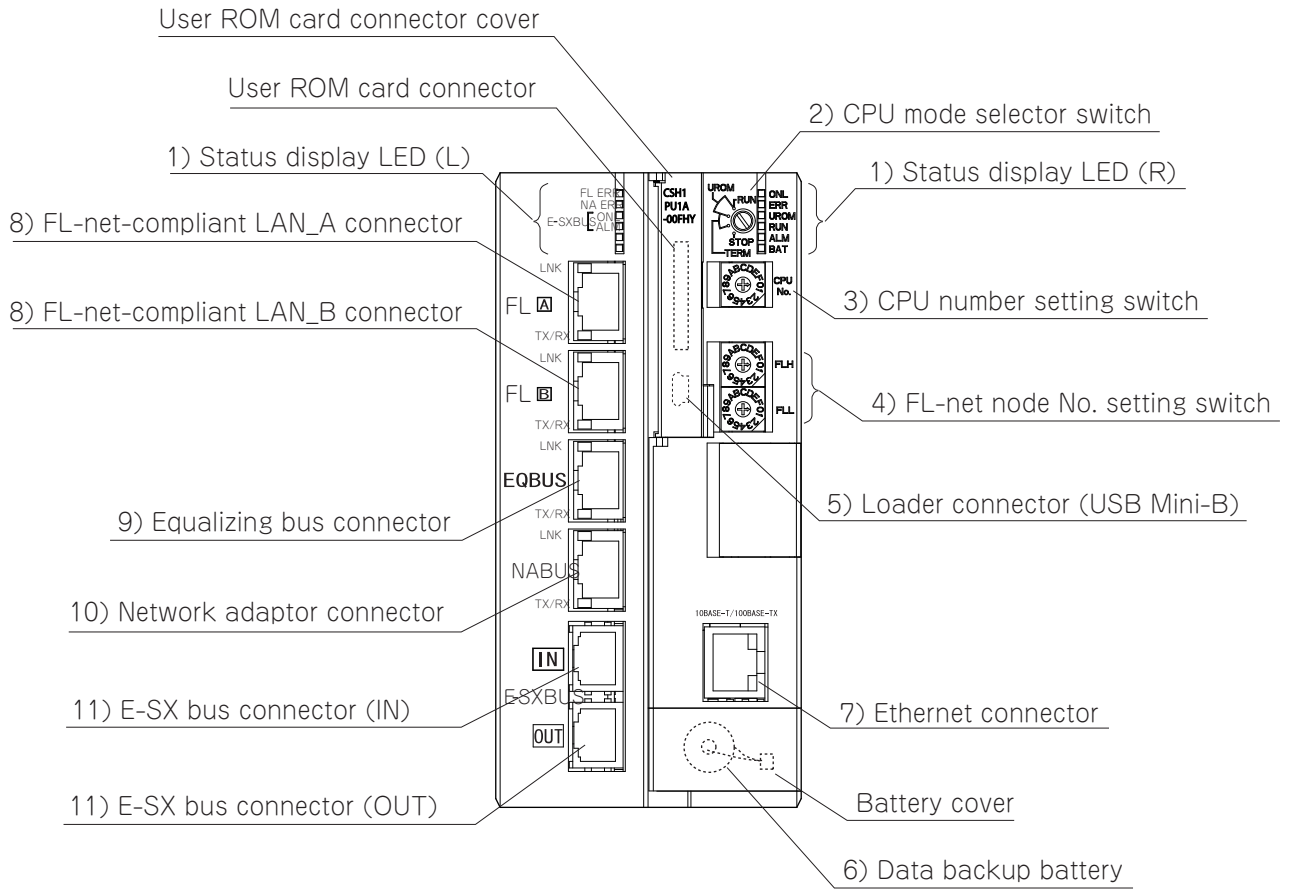
Item		Specifications
User function/function block nesting		127 nesting
FB instance information size		512KW
User function from user function block/number of calls of function block		131072
FB instance region of one user function block		16384 words at the max.
Number of IL function nesting		512 at the max. *Data stack capacity = 512 double words
Tact cycle setting range		SX bus: 1 ms to 10 ms E-SX bus: 0.5 ms to 10 ms (0.5 to 3 ms: in steps of 0.125 ms, 3.25 to 10 ms: in steps of 0.25 ms) SX bus controlled by centralized interface: 1.0 ms to 10 ms (in steps of 0.5 ms)
Diagnosis		Self diagnosis (memory check, ROM checksum, CPU basic computation check) System configuration monitoring, module failure monitoring
Preservation of confidentiality		Restricting project downloading, uploading, cross-check, clearing, etc. by password
Calendar	Time range	1970/1/1 0:00:00 ~ 2069/12/31 23:59:59
	Accuracy	5 ± 23ppm (Temperature: 25°C) * – 1.56 to 2.42 sec./day
	Time setting	Time setting from loader is possible. Time setting from applications by SNTF client FB is possible.
User ROM function		Type: NP8PSD-002 (SD card, 2G bytes) Application program, system definition, ZIP files, compressed project, and user data can be stored.
Memory backup	Backup range	Retain memory, user FB retain attribute memory, calendar IC memory, RAS information
	Battery used	Primary lithium battery, Type: NP8P-BT
	Backup time	5 years (Temperature: 25°C)
	Backup time after detection of battery voltage drop	1 week (Temperature: 25°C)
	Battery replacement time	Within 5 minutes (Temperature: 25°C)
Internal current consumption		24 V DC 770 mA or lower
Mass		Approximately 600 g (including user ROM card and battery)

(2) XCS-3000R

Model		CSH1PU1A-00FHR
Model		CSH1PU1A-00FHR
Execution control method:		Stored program Default task (Cyclic scan), fixed cycle task, event task
Input/output connection method		T-link or Ethernet (EPAP)
Input/output control timing		This timing complies with the control cycle of T-link, which is the I/O module of network adaptor, or Ethernet (EPAP) [I/O: IPU-II].
Programming language		Language of FPROCES-C that is the engineering tool of ACS-2000: Ladder diagram, FB diagram and SFC
Program	Program capacity	Equivalent to 524,288 steps (including the system program)
	Maximum program capacity in 1 POU	16,384 steps

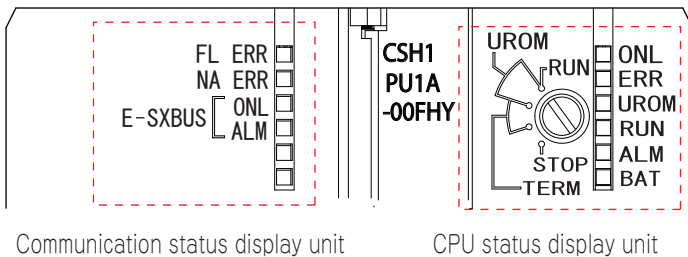
Model		CSH1PU1A-00FHR	
Data	Input/output memory (I/O)	640 words (WB) + 2,560 words (AB) However, since no additional connection I/O can be used, the I/O refresh can be performed for 512 words (WB) + 2,048 words (AB). Others can be used as memory.	
	Timer	1,024 points	
	Counter	256 points	
	Differential	1,024 points	
	Memory	Auxiliary relay: 8,192 points (512 words) Keep relay: 1,024 points (64 words) Analog arithmetic memory: 512 words Single-precision integer (SI): 10,000 points Double-precision integer (DI): 10,000 points Floating decimal point (FP): 5,000 points User file: 90,112 words SFC initial step: 256 points (16 words) SFC step: 16,000 points (1,000 words) SFC transition: 16,000 points (1,000 words) SFC action: 16,000 points (1,000 words) Measurement and control functions: Same as ACS See the Edition of ACS Migrator (TN5A2110) for other details.	
	System memory (Collective RAS information)	512 (basic unit) + 512 (application unit) + 512 (network adaptor) + 512*32 (E-SX bus centralized interface SM area)	
Temporary area		32,768 words (per task)	
Temporary area for 1 POU		16,384 words	
Number of tasks		4 pieces (Task environment setting) + 1 piece (Default)	3 pieces of fixed cycle are already reserved for the system.
Type of task environment setting		Fixed cycle interruption	Usable only in PG88 and PG89
Task starting factor		Fixed cycle interruption	Usable only in PG88 and PG89
		Level P	—
Function module		Total 2048 (0-2047). 0-383, 480-487 for user However, a part is used for system processing (same as ACS).	
Nesting of user function (Nested hierarchy)		127	
Setting range of task cycle		10ms	
Backup of memory	Backup range	Application program, calendar IC memory, RAS information	
	Battery used	Primary lithium battery (Model: NP8P-BT)	
	Backup time	5 years (Temperature: 25°C)	
	Backup time after detecting drop of battery voltage	1 week (Temperature: 25°C)	
	Time for replacing battery	Within 5 minutes (Temperature: 25°C)	
Internal consumption current		24 V DC, 770 mA or less	
Mass		Approx. 600 g (including battery)	

3 – 3 – 2 Names and functions



1) Status display LED (L), (R)

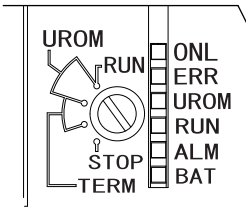
Displays the status of this CPU and various communication units supported by the CPU.



Symbol	Color display	Lighting-up conditions
ONL	Green	Blinks : CPU is preparing for connecting to SX bus. ON : Normally connected.
ERR	Red	CPU error
RUN	Green	In operation
ALM	Red	System error detected (including own CPU error)
UROM	Green	User ROM card recognized
BAT	orange	Power supply voltage error detected (voltage drop or battery displacement)
NA ERR	Red	Network adaptor or Direct IPU-II error detected
FL ERR	Red	FL-net or FL-net-compliant LAN communication error detected
E-SXBUS ONL	Green	E-SX bus normally connected
E-SXBUS ALM	Red	E-SX bus error

2) CPU mode selector switch

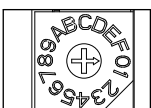
The switch is settable to the following four positions: RUN, UROM TERM, TERM, and STOP. CPU operations at each switch position are described below:



Key position	CPU operation
<div style="border: 1px solid black; padding: 2px; display: inline-block;">UROM RUN</div> 	<ul style="list-style-type: none"> • The CPU starts operating and recognizes user ROM. • When user ROM is mounted to the CPU, the operation project of the flash memory within the CPU and the operation project within user ROM are checked against each other.
<div style="border: 1px solid black; padding: 2px; display: inline-block;">UROM TERM</div> 	<ul style="list-style-type: none"> • Operates based on the operation project of the flash memory within the CPU in accordance with the details of “designation of operation at the time of power ON” in system definition (run/previous state/stop). • Recognizes user ROM. • Downloading of project from the loader to the CPU and user ROM, and uploading of compressed project from the user ROM are allowed.
<div style="border: 1px solid black; padding: 2px; display: inline-block;">TERM</div> 	<ul style="list-style-type: none"> • Operates based on the operation project of the flash memory within the CPU in accordance with the details of “designation of operation at the time of power ON” in system definition (run/previous state/stop). • User ROM cannot be recognized. • Downloading of project from the loader to CPU is allowed.
<div style="border: 1px solid black; padding: 2px; display: inline-block;">STOP</div> 	<ul style="list-style-type: none"> • The CPU remains stopped. Operation does not start.

3) CPU No. setting switch

CPU No. can be set using this switch. Be sure to set the switch to “0”

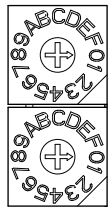


CPU No.

Note: Do not change the setting during operation.

4) FL-net node No. setting switch

Set the FL-net station No. of the FL-net-compliant LAN embedded in the CPU module using this switch.



Upper side

Lower side

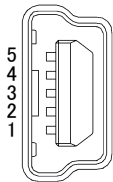
Setting range: 01 to FE (1 to 254)

5) Loader connector (mini-B type)

Connect Expert loader here.

Since the USB cable is in accordance with the standard of external peripheral devices of personal computers, make sure that the following is ensured, taking noise immunity of the connected PC into consideration.

- Separate the USB cable from the power cable.



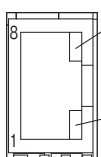
Pin No.	Signal name	I/O	Function
1	VCC	-	Cable power
2	- Data	I/O	Reception -
3	+ Data	I/O	Reception +
4	NC	-	No connection
5	GND	-	Cable ground

6) Data backup battery

This battery is for backing up data retained in the CPU module (such as retain memory, calendar, and RAS) on occurrence of power interruption.

7) Ethernet connector

10BASE-T/100BASE-TX



Data send/receive status LED (yellow): TX/RX

Displays data send/receive status. ON: Occurrence of send/receive packet

Link status LED (green): LNK

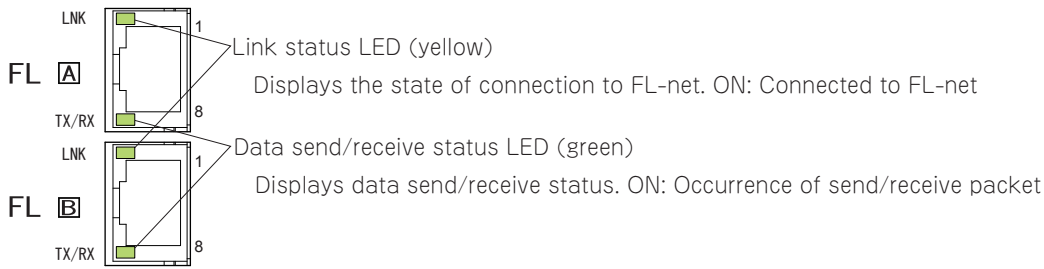
Displays the state of connection to the Ethernet. ON: Connected to the Ethernet

Pin No.	Signal name	I/O	Function
1	TXD+	-	+ send data
2	TXD-	I/O	- send data
3	RXD+	I/O	+ receive data
4	NC1	-	NC *1
5	NC1		NC *1
6	RXD-		- receive data
7	NC2		NC *1
8	NC2		NC *1

*1: Connected to GND by way of C, R as a measure for noise reduction.

8) FL-net-compliant LAN connectors A/B

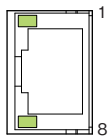
The connectors are for FL-net-compliant LAN. Connector A is for line 0 (operated system) and connector B is for line 1 (standby system)



Pin No.	Signal name
1	TP0+
2	TP0-
3	TP1+
4	TP2+
5	TP2-
6	TP1-
7	TP3+
8	TP3-

9) Equalizing bus connector

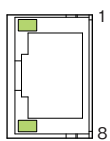
Connect the cable for equalizing data in the duplex system to this connector.



Pin No.	Signal name
1	TP0+
2	TP0-
3	TP1+
4	TP2+
5	TP2-
6	TP1-
7	TP3+
8	TP3-

10) Network adaptor connector

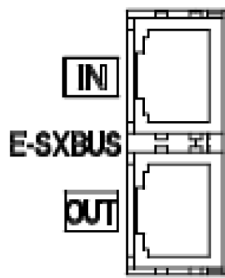
Connect the network adaptor or Direct IPU-II function to this connector to perform data communication.



Pin No.	Signal name
1	TP0+
2	TP0-
3	TP1+
4	TP2+
5	TP2-
6	TP1-
7	TP3+
8	TP3-

11) E-SX bus connector (IN) (OUT)

Connect centralized I/F module to these connectors to perform data communication.



Pin No.	Signal name
1	TX+
2	TX-
3	RX+
4	GND
5	24V
6	RX-
7	GND
8	24V