Fe *e-Front runners*

Integrated Controllers MICREX-SX Series
Programmable Controllers

SPH

PROGRAMMABLE CONTROLLER

SPH

Realizes High-Speed Advanced Machine Control

I/O control with a program capacity of up to 256K steps and up to 655,36 points enables suitable system configuration ranging from small through to large scale. 1ms program scan and I/O refresh are possible. Function and performance distribution are possible in multi-CPU system configuration with up to 8 CPUs.

Open Network Oriented

Both the hardware and software conform to the IEC 61131 international standard for programmable controllers.
Compatible with Ethernet, LonWorks, DeviceNet, PROFIBUS-DP, AS-i, and other diverse open networks.

Realizes Integrated Programming Support

Provides an environment in which each support tool can be launched by simply clicking on a device in a network structure diagram or system configuration diagram on a PC.
Allows setup of parameters of inverter and servo via SPH and enables remote data monitor operation, thereby eliminating troublesome wiring changes.

Integrated control, information, and communication

With the aid of an upgraded data processing function, mass memory storage, and a built-in Ethernet function, the SPH is capable of monitoring the operation of production systems and devices and recording operation history and errors in addition to conventional FA control, enabling you to use the controller for wider applications of IT-based remote monitoring, maintenance support, and preventive maintenance.
CPU and power supply redundancy can also be achieved in response to the growing demand for higher reliability.

Realization of high speed / the machine control to be heightened

An opening point

Realization of the general programming support

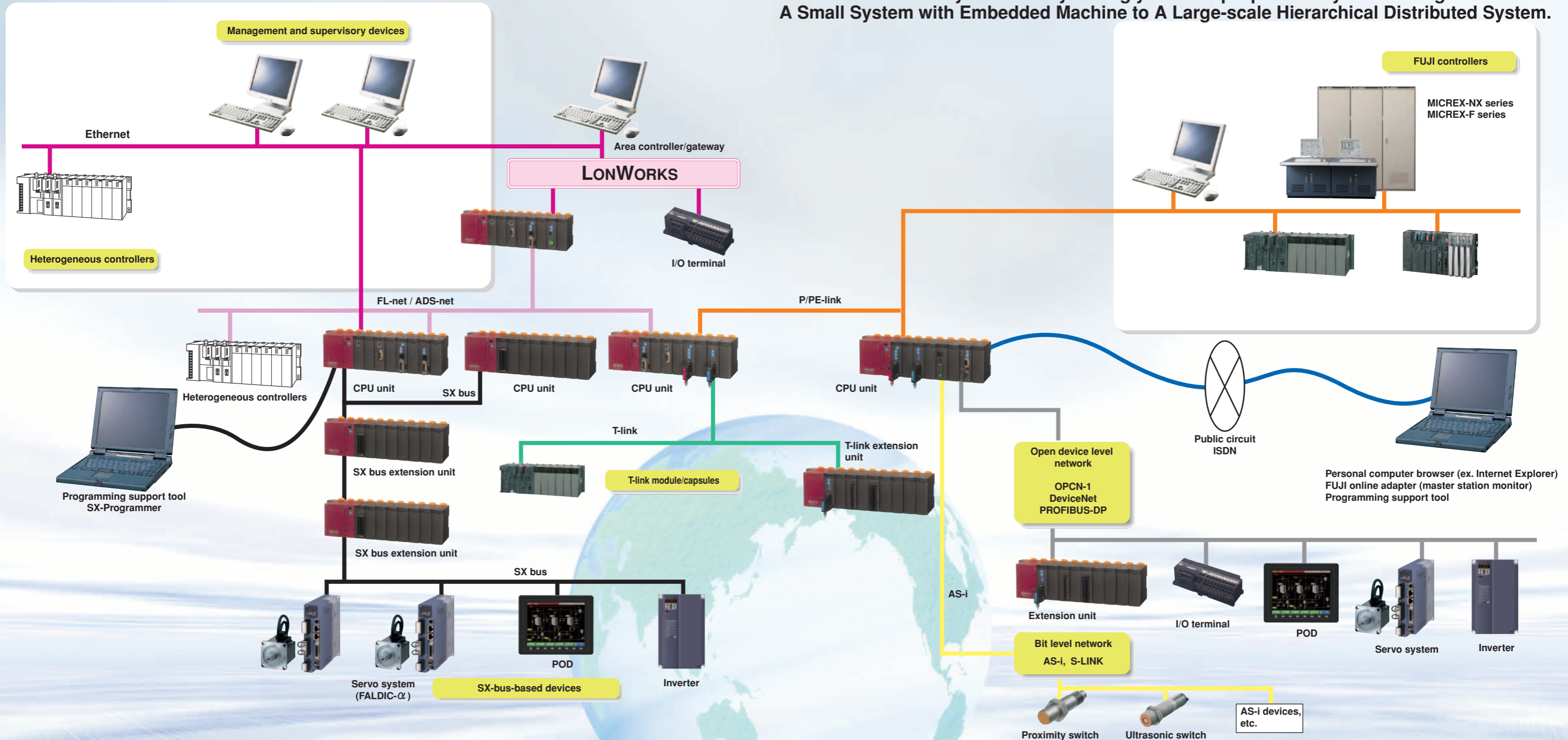SPH2000 which plans control and fusion of information / the communication

INDEX

SX Bus Diverse Network Systems Enabling Seamless Access

High-Speed Processing and Distributed Placement of SX Bus Enable Seamless Connection of Operation Display Units and Servo Inverter.
Network System Variety Strongly Backs Up Optimum System Configuration from A Small System with Embedded Machine to A Large-scale Hierarchical Distributed System.

Management and supervisory devices

FUJI controllers

MICREX-NX series
MICREX-F series

Ethernet

Area controller/gateway

LonWorks

Heterogeneous controllers

I/O terminal

FL-net / ADS-net

P/PE-link

Heterogeneous controllers

CPU unit   SX bus   CPU unit   CPU unit   CPU unit

T-link

T-link extension unit

SX bus extension unit

Public circuit ISDN

Open device level network

OPCN-1
DeviceNet
PROFIBUS-DP

T-link module/capsules

Personal computer browser (ex. Internet Explorer)
FUJI online adapter (master station monitor)
Programming support tool

Programming support tool
SX-Programmer

SX bus extension unit

SX bus

AS-i

Extension unit   I/O terminal   POD

Servo system   Inverter

Bit level network

AS-i, S-LINK

Servo system
(FALDIC-α)

SX-bus-based devices

Inverter

POD

Proximity switch   Ultrasonic switch

AS-i devices, etc.

LonWorks

Internationally noticeable open network for building management. System configuration as a device with distributed autonomous functions is enabled by the control functions incorporated in site devices. Replacement, update, addition, and removal of site devices can easily be performed.

FL-net (OPCN-2)

Open network at the FA application-type controller level established by the Manufacturing Science and Technology Center and the Japan FA Open Systems Promotion Group. Allows inter-connection with PC, CNC, and robots beyond the frame of a single manufacturer.
The communication physical layer employs Ethernet.

PROFIBUS-DP

Device level open network established by the EN 50170 European standard, which best suits time-critical applications between an automation system and distributed devices (remote I/Os, inverters, etc.)

OPCN-1

Device-level open network established by Japan Electrical Manufacturers Association. Allows connection with PC and robots using the same signal line beyond the frame of a single manufacturer, very effective in open system improvement and optimization.

DeviceNet

Open device-level network which facilitates inter-connection of control equipment such as PCs, personal computers, sensors, and actuators. Wiring cost reduction by minimizing wiring, and multi-vendor equipment connection simplify an economical system configuration.

AS-i

Bit level network enacted to IEC62026 and EN50295. AS-i is suitable for distributing intelligent input device such as proximity switch, optoelectronic switch, push button and ultrasonic sensor.

Ultra High-Speed 1ms Controller
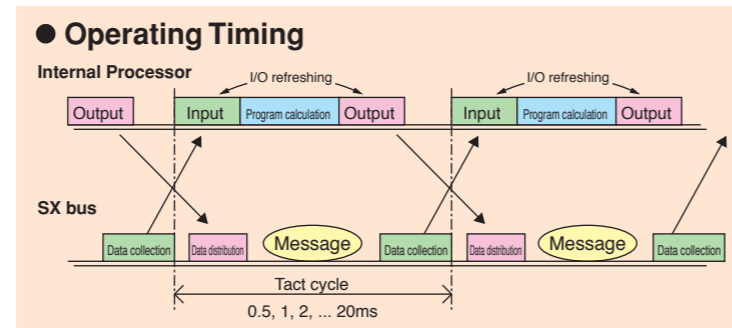
1ms scan
- Program scan time of 1ms is implemented by increased instruction processing speed.
- Real number operation and high-precision positioning control have been put to practical use by dramatically improved floating-point operation speed.

	SPH3000	SPH300	SPH2000	SPH200
Basic instruction LD	9ns	20ns	30ns	70ns
MOV	8ns	40ns	40ns	140ns
Floating-point operation instruction	88ns	80ns	270ns～	56000ns～

* For details on each instruction word's processing speed and tact cycle, see the User's Manual (FEH200).

1ms I/O refreshing
- 1024-point input/output is refreshed in 1ms
- Tact control assures a fixed I/O refresh interval. The I/O refresh cycle can be set to 1ms, 2ms, or up to 10ms, which is suitable for processing requiring strict tact time.
- The cycle time can be set from a minimum of 0.5ms for the SPH300 and a minimum of 1ms for the SPH2000/SPH3000, in increments of 0.5ms steps.

● **Operating Timing**

Internal Processor

I/O refreshing

| Output | Input | Program calculation | Output | | Input | Program calculation | Output |

SX bus

| Data collection | Data distribution | Message | Data collection | Data distribution | Message | Data collection |

Tact cycle
0.5, 1, 2, ... 20ms

Controller Conforms to International Standard

Conforms to IEC 61131 international standard
- Both the hardware and software conform to the IEC 61131 international standard for programmable controllers.
- The programming language conforms to the IEC 61131-3 international standard.

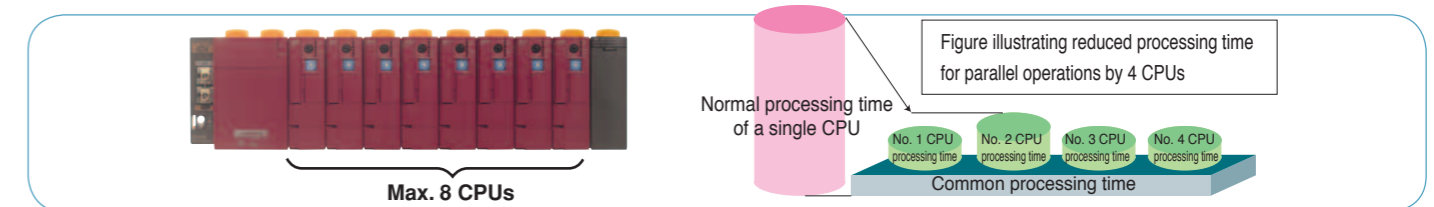### Conforming to international standard
- Conforms to the CE marking, UL standards and RoHS directive (conforming one after another) as well as IEC standard.
- Conforms to the LR shipping standard (England).

IEC CE RoHS LR JIS UL NK
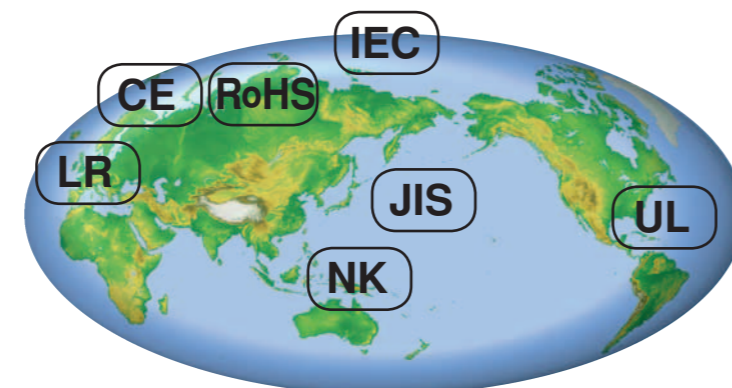
Multi-CPU System Applicable to Up to 8 CPUs

Parallel processing with up to 8 CPUs (SPH300/SPH2000/SPH3000)
Alleviates the load for each CPU allowing high speed processing of a large application program.
For example, the load can be distributed for advanced processing and sequence control processing with additional CPUs. I/O refresh control is performed automatically even if parallel processing by multiple CPUs is performed.

Figure illustrating reduced processing time for parallel operations by 4 CPUs

Normal processing time of a single CPU

No. 1 CPU processing time | No. 2 CPU processing time | No. 3 CPU processing time | No. 4 CPU processing time

Common processing time

Max. 8 CPUs

Redundant System Assuring System Safety and Reliability

1-to-1 warm-standby feature (SPH300/SPH2000)
This redundancy configuration enables continued operation without system downtime if a CPU fails.
(Control may temporarily stop due to fault detection and CPU changeover.)
- The same program is stored in CPUs for the active and backup systems, allowing constant data value equalization.

Active system — Backup system

Warm standby redundancy configuration with up to 4 CPU sets is possible.
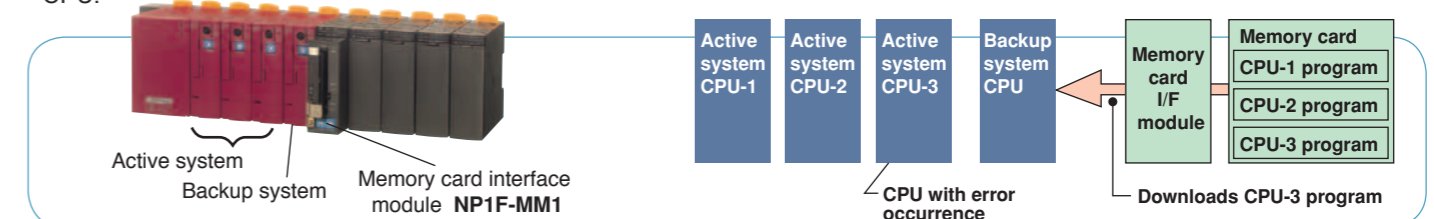
N-to-1 backup feature (SPH300)
This redundancy configuration enables reduction of the number of CPUs to one, though, when a CPU fails, data retained in the active system and that in the standby system are not equalized.
- Data retained by the active system is not taken over. The backup system CPU performs initial start.

Active system — Backup system SX bus Active system — Backup system

- Programs can be intensively controlled by a memory card.
  Programs for N units of systems can be stored on a memory card, which is installed in the memory card interface module for centralized control of the programs. The same processing programs as on the down CPU are downloaded to the backup system CPU.

Active system
Backup system
Memory card interface module **NP1F-MM1**

Active system CPU-1 | Active system CPU-2 | Active system CPU-3 | Backup system CPU

Memory card I/F module

Memory card
CPU-1 program
CPU-2 program
CPU-3 program

CPU with error occurrence

Downloads CPU-3 program

Note 1: The model that supports SPH2000 is NP1PM-256H.
Note 2: For the redundancy configuration buildup with the DC power supply, contact our sales section.

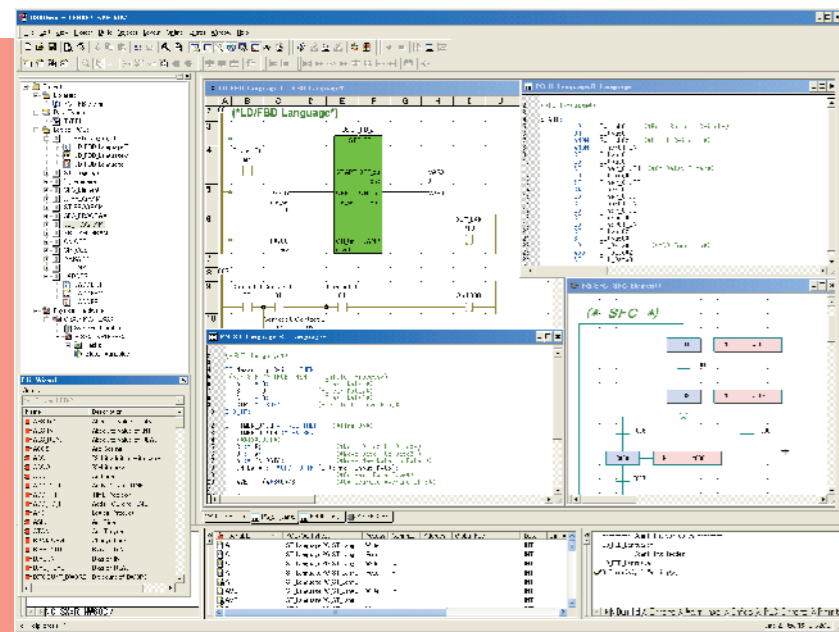**Improves Programming Development Efficiency**

Two Types of Programming Support Tools in Accordance with Development Style

These are Windows-compatible programming support tools conforming to the IEC 61131-3 International Standard.
With the language architecture conforming to the standards, programs understandable by anyone in the world can be created.

SX-Programmer

Expert (D300win)
Development Efficiency Oriented Support Tools

Usage

Improvement of software development efficiency
Programming in units of POU or worksheets allows the use of the structured design method by which a program is created by dividing it by functionality or process. This method enables multiple designers to divide the program design among them so that substantial reduction in the program creation time can be achieved.

Programming of the same techniques as those of microcomputers and personal computers
The ST language is similar to the C language so that programs can be created using the same techniques as those of microcomputers and personal computers for complex calculations that are hard to implement using the Ladder language. Programs and circuits that are frequently used can easily be reused by making them FB (function blocks).

Features

Accommodates a mixture of code written in two or more programming languages.
· The Expert (D300win) completely supports five types of program representations specified by the standards.
· It allows the programmer to code the combination of representations best suited for the control target.

Supported representations
IL (Instruction List)
LD (Ladder Diagram)
FBD (Function Block Diagram)
ST (Structured Text)
SFC (Sequential Function Chart)

Excellent documentation function
· The documentation preparation function of the Expert (D300win) has been substantially improved. Not only can it print drawing numbers, dates, page, and drawing borders, but also company logos and comments.

Simulation function
· The simulation function allows the user to conduct test runs of programs using the Expert (D300win) built-in PLC function in place of a real machine.

Programmable Operation Display (POD) cooperation function
· The Expert (D300win) has implemented function module support and POD cooperation support functions as common support tools.
· The function module support can be operated with the programming supporting tool connecting CPU module.

Standard
Operability Oriented Support Tools
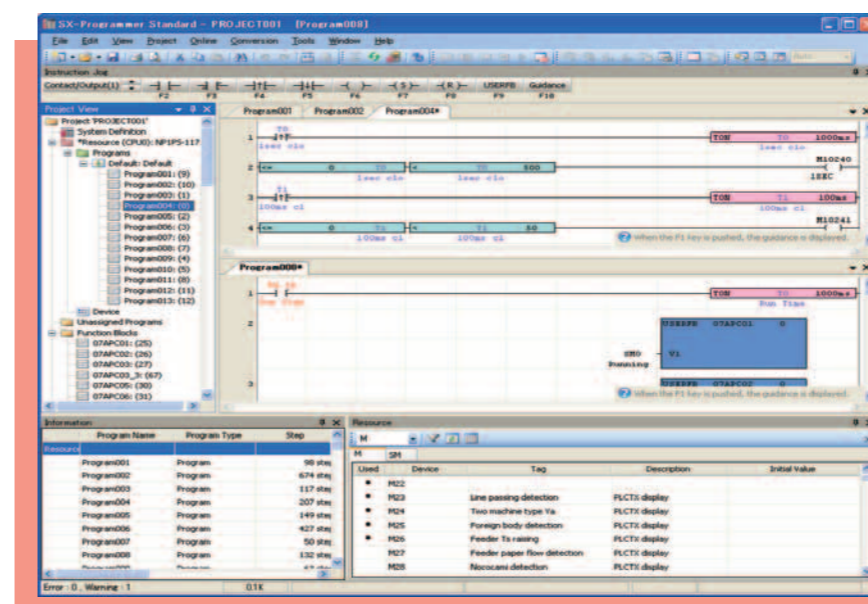
Usage

Ladder operation for on-site maintenance personnel
Supports the full keyboard operations useful for on-site maintenance personnel.
Editing and download can be performed immediately after activation.

Utilization of programming resources
Program and comment resources of the models MICREX-F series and FLEX-PC series of Fuji Electric can be reused by Copy&Paste. Screens, operability, and programming can be handled with a sense of the personal computer loader with which you are already familiar.

Features

Multi-language support
· The SPH supports not only ladder diagrams but also ST and FBD.
· You can select the proper programming language for the control you desire to perform.

Intuitive screen operation
· Thanks to guidance display and a command word candidate narrowing-down function based on a keyword search, you can input data without referring to the manual.
· You can select the proper input mode according to the situation from functions such as mouse wheel + click input, keyword search input, and Intellisense function input.

Simulation function
· Provided with built-in Standard, the SPH is capable of testing the operation of programs without using an actual system.

Resume function
· When the SPH starts to run, it automatically displays the position last edited or monitored.
· In online mode, the SPH displays the position last monitored and starts monitoring.
· In offline mode, the SPH displays the position last monitored and enters Edit mode.

Device editor and collation function
· Device information is displayed on a single screen, for example, in the form of a list of the operating states of devices, enabling you to save time in memory management.
· You can display details of different points on programs and edit by referring to collation results.

SX Bus Meets Diverse Demands for System Extension

Basic SX Bus Configuration

Ultra Fast SX Bus Preserves Distributed Installation and Expandability Up To 254-module Direct Bus Connection.

SX bus implements distributed installation of equipment.
The total length of the SX bus is 25m. Up to 25 extension base boards, PODs, and other SX-bus-based devices can be connected within 25m. (Up to 25.6km for optical transmission)

Free topology is implemented by T branches.
Use of T branches allows detailed, distributed installation of the SX bus. Expansion units and diverse equipment arranged in tree structure can be connected in the optimum way.

SX bus implements connecting maximum 254 modules.
The number of modules that can be connected to the SX bus is a maximum 254 units. CPU modules, the communication modules, the positioning modules, the function modules, and the standard I/O modules can be connected up to 254.

Classification of System Configuration

Limit of modules connected in single configuration

Module Type	Max. Connected Units
Power module	Not limited in the number of power modules to be connected.
CPU module	8 units (1 unit for the SPH200)
Processor link module	Total 8 units of FL-net modules, P/PE-link modules and LE-net/LE-net loop2 modules. (A total 2 units of SPH200.)
Type A module	8 units (remote I/O master module)
Type B module	A total of 16 units including the SX bus communication unit of POD.
Type C module	238 units including Type A and B connected modules (excluding processor link modules and AS-i master module)

Note: For details informastions, refer to the each manuals.

* Each remote I/O master module has, in addition to the normal mode, the following two modes:

Extension mode: Function to extend the total number of input/output words of devices that can be connected to one master module unit from a maximum of 128 words (2048 points) to a maximum of 512 words (8192 points) (extended to a maximum of 510 words for the PROFIBUS-DP master). However, the total number of input/output words for one CPU unit is a maximum of 512 words, which is equal to a total of the number of input/output words of the SX bus and that of the remote I/O master module.

I/O extension mode: Function to extend, in addition to the extension mode, the total number of input/output words of devices that can be connected to one CPU unit from a maximum of 512 words (8192 points) to a maximum of 4096 words (65536 points). This mode is used when the total number of input/output words exceeds 512 words by connecting multiple remote I/O master modules to one CPU unit (Note that, by using this function, the input/output response time becomes longer in proportion to the number of mounted remote I/O master modules).

Module classification

Type A	Type B		Type C
• OPCN-1 master module (**NP1L-JP1**) • OPCN-1 slave module (**NP1L-JS1**) • DeviceNet master module (**NP1L-DN1**) • DeviceNet slave module (**NP1L-DS1**) • PROFIBUS-DP master module (**NP1L-PD1**) • PROFIBUS-DP slave module (**NP1L-PS1**) • T-link master module (**NP1L-TL1**) • T-link slave module (**NP1L-TS1**) • Remote terminal master/slave module (**NP1L-RM1**)	• Web module (**NP1L-WE1**) • Ethernet module (**NP1L-ET1**) • FL-net module (**NP1L-FL3**) • P-link module (**NP1L-PL1**) • PE-link module (**NP1L-PE1**)	• LE-net module (**NP1L-LE1**) • LE-net loop2 module (**NP1L-LL2**) • General-purpose communication module (**NP1L-RS1/RS2/RS3/RS4/RS5**) • Memory card I/F module (**NP1L-MM1**)	• All modules other than those of Type A and B * The AS-i master module is also included in category C.

No. of connectable base boards/units

Unit for supplying SX bus transmission power	Unit for receiving SX bus transmission power
• Base board (power ON) • SX bus optical converter (external 24V connected) • SX bus electrical repeater (external 24V connected)	• I/O terminal • SX bus optical converter (external 24V not connected) • MONITOUCH series (POD) • PCI-bus-based high performance CPU board (built in personal computer) • AC servo FALDIC-α/ALPHA5 series • Base board (power OFF) equivalent to 3 units above

* Up to 10 units for receiving SX bus transmission power can be continuously connected to each of the IN and OUT connectors of the unit for supplying SX bus transmission power.

Other connection notes

• Be sure to install the power supply module and at least one module other than the power supply module to the left of each base board.
• Up to 25 base boards including the T branch unit can be connected.
• Basically, base boards (power supply) in one configuration should be turned ON at one time. However, if it is necessary to turn OFF some base boards (power supply) for application convenience, up to 3 continuous base boards can be turned OFF in one configuration.

KD03-041A

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■ **General specifications**

Item		Specification	
Physical environmental condition	Operating ambient temperature	0 to 55˚C	IEC 61131-2
	Storage temperature	-25 to +70˚C	
	Relative humidity	20 to 95%RH no condensation	
	Pollution degree	2 (Free from conductive dust)	
	Corrosion immunity	Free from corrosive gases. Not stained with organic solvents	
	Operating altitude	2000m or less above sea level (Transport condition: 70kPa or more)	
Mechanical service condition	Vibration	Half amplitude: 0.15mm, Constant acceleration: 19.6m/s^2 two hours for each of three axes, total six hours.	
	Shock	Acceleration peak: 147m/s^2 three times for each of three axes	
Electrical service condition	Electrostatic discharge	Contact discharge: ± 4kV Aerial discharge: ± 8kV	IEC 61000-4-2
	Radiated, radio-frequency, electromagnetic field	80 to 1000MHz (10V/m) 1.4〜2.0GHz (3V/m) 2.0〜2.7GHz (1V/m)	IEC 61000-4-3
	EFT/B (Electrical fast transient/burst)	Power supply line and I/O signal line (AC unshielded line): ±2 kV Communication line and I/O signal line (DC, AC shielded line): ±1 kV	IEC 61000-4-4
	Lightning impulse surge	AC power supply: Common mode ±2 kV, normal mode: ±1 kV DC power supply: Common mode ±0.5 kV, normal mode: ±0.5 kV	IEC 61000-4-5
	Conducted radio frequency	150kHz to 80MHz, 10V	IEC 61000-4-6
	Power frequency magnetic field	50Hz, 30A/m	IEC 61000-4-8
	Square wave	± 1.5kV rise time 1ns, pulse width 1μs 50Hz	
Construction		Open Type device	
Cooling		Self-cooling	

Power Supply Module: NP1S- □□

■ Features
• Redundant power supply module (**NP1S-22/NP1S-42**)
Redundancy of the power supply has been realized by supplying the power from multiple (up to 3) power supply modules. Redundant power supply units allow you to improve system reliability.
• Small capacity power supply module (**NP1S-81/NP1S-91**)
The use of the 100V AC or 200V AC small capacity power supply module (single slot) on the 3-slot and 6-slot basis allows effective use of one slot.

NP1S-22/NP1S-42   **NP1S-91**
KD03-057A

■ Power supply specifications

Item	Specification			
Type	**NP1S-22**＊	**NP1S-42**	**NP1S-81**＊	**NP1S-91**＊
Rated input voltage	100 to 120V AC / 200 to 240V AC	24V DC	200 to 240V AC	100 to 120V AC
Voltage tolerance	85 to 132V AC / 170 to 264V AC	19.2 to 30V DC	170 to 264V AC	85 to 132V AC
Rated frequency	50/60Hz	—	50/60Hz	
Dropout tolerance	1 cycle or less (Rated voltage, rated load)	10ms or less (Rated voltage, rated load)	1 cycle or less (Rated voltage, rated load)	
AC waveform distortion factor	5% or less	—	5% or less	
Ripple factor tolerance	—	Three-phase full-wave rectification can be used 5% or less	—	
Leakage current	0.25mA or less			
Inrush current	22.5Ao-p or less (Ta=25℃ notrepeated)	150Ao-p or less 2ms or less	22.5Ao-p or less (Ta=25℃ not repeated)	
Power consumption	110VA or less	45W or less	50VA or less	40VA or less
Rated output voltage	24V DC (22.8 to 26.4V DC)			
Output current	0 to 1.46A		0 to 0.625A	
Isolation method	Transducer			
Dielectric strength	2300Vrms AC, 1 second, between power input terminals and ground	510Vrms AC, 1 second, between power input terminals and ground	2300Vrms AC, 1 second, between power input terminals and ground	1400Vrms AC, 1 second, between power input terminals and ground
Insulation resistance	10MΩ or more (500V DC megger)			
No. of occupied slots	2 slots		1 slots (specialized for the 3-slot and 6-slot basis)	
Alarm output	Relay NC contact output (Monitoring of output voltage: 24V DC, 0.3A or less)		None	
Multiple power supply	Compatible (Up to 3 units mountable on the base board.)		None	
Mass	Approx. 360g		Approx. 180g	

＊）Note that UL-certified models are different as shown below (the products are the same).

Standard model	UL-certified model
NP1S-22	**NP1S-22 A**
NP1S-81	**NP1S-81 A**
NP1S-91	**NP1S-91 A**

Programmable Controllers
MICREX-SX series SPH
CPU Module

Programmable Controllers
MICREX-SX series SPH
CPU Module

CPU Module: NP1P □ - □□

■ Features

• Ultra high-speed processing
The CPU module carries out ultra high-speed processing as bellow;
The SPH3000 processes basic instructions in 9ns,
the SPH300 processes basic instructions in 20ns,
the SPH200 processes basic instructions in 70ns,
and the SPH2000 processes basic instructions in 30ns.
• Multi-CPU configuration (SPH300/SPH2000/SPH3000)
Up to 8 CPUs can be configured, effective for high-speed control by load distribution.

• Redundancy (SPH300/SPH2000)
1-to-1 hot standby feature and N-to-1 backup feature improves the system safety and reliability.
(The SPH2000 will soon support the redundancy)
• IEC 61131-3
Complete compliance with the IEC 61131-3 international standard languages enables programming understood worldwide.

• Compatible with USB and user ROM
The SPH300/SPH2000/SPH3000 of the USB and user ROM versions with separate formats are offered (**NP1PS-32R/74R/117R/245R, NP1PM-48R/48E/256E, NP1PU-048E/256E**).
• Large-capacity battery (optionally available)
SPH300 (74K/117K/245K steps) can extend the memory backup time to 3.5 years (25˚C) by adding the large-capacity battery as an option.

SPH200   SPH300   SPH300EX   SPH2000

■ Performance specifications

Type		SPH200		SPH300					SPH300	SPH300EX	SPH2000				SPH3000		Type	
Type		NP1PH-08	NP1PH-16	NP1PS-32	NP1PS-32R	NP1PS-74R	NP1PS-117R		NP1PS-245R	NP1PS-74D	NP1PM-48R	NP1PM-48E	NP1PM-256E	NP1PM-256H	NP1PU-048E	NP1PU-256E		Type	
Control system		Stored program, Cyclic scanning system (default task), periodic task, event task							Stored program, Cyclic scanning system (default task), periodic task, event task								Control system	
Input / Output connection method		Direct connection I/O (SX bus), remote I/O (DeviceNet, OPCN-1, and other remote I/O links)							Direct connection I/O (SX bus), remote I/O (DeviceNet, OPCN-1, and other remote I/O links)								Input / Output connection method	
I/O control system		SX bus: Tact synchronization refresh. Remote I/O link: Refresh at 10-ms fixed intervals (not synchronized with scan)							SX bus: Tact synchronization refresh. Remote I/O link: Refresh at 10-ms fixed intervals (not synchronized with scan)								I/O control system	
CPU		16-bit OS processor, 16-bit execution processor		32-bit OS processor, 32-bit execution processor					32-bit OS processor, 32-bit execution processor		32-bit OS processor						CPU	
Programming language		IL language (Instruction List), ST language (Structured Text), LD language (Ladder Diagram) FBD language (Function Block Diagram), SFC elements (Sequential Function Chart) To IEC 61131-3							IL language (Instruction List), ST language (Structured Text), LD language (Ladder Diagram) FBD language (Function Block Diagram), SFC elements (Sequential Function Chart) To IEC 61131-3								Programming language	
Instruction execution speed	Sequence instruction	70ns or more/instruction		20ns or more/instruction					20ns or more/instruction		30ns or more/instruction				9ns or more/instruction		Sequence instruction	Instruction execution speed
	Applied instruction	140ns or more/instruction		40ns or more/instruction					40ns or more/instruction		40ns or more/instruction				8ns or more/instruction		Applied instruction	
Program memory capacity		8192 steps	16384 steps	32768 steps		75776 steps	119808 steps		250880 steps	75776 steps x 2	49152 steps		262144 steps		49152 steps	262144 steps	Program memory capacity	
Program steps in a POU		4096 steps		8192 steps					8192 steps		16384 steps						Program steps in a POU	
Memory * 1	I/O memory (I/Q)	512 words (Max. 8192 points)		512 words (Max. 8192 points)					512 words (Max. 8192 points)	512 words x 2 (Max. 8192 points x 2)	512 words (Max. 8192 points)						I/O memory (I/Q)	Memory * 1
	General memory (M)	4096 words	8192 words	8192 words		32768 words	131072 words		262144 words	32768 words x 2	65536 words		1703936 words		98034 words	1703936 words	General memory (M)	
	Retain memory (M)	2048 words	4096 words	4096 words		16384 words	32768 words		130048 words	8192 words x 2	8192 words		262144 words		40960 words	237568 words	Retain memory (M)	
	Instance memory for User FB (M)	2048 words	4096 words	4096 words		16384 words	32768 words		66560 words	16384 words x 2	8192 words		65536 words		40960 words	73728 words	Instance memory for User FB (M)	
		4096 words	8192 words	16384 words		65536 words			65536 words	65536 words x 2	16384 words		65536 words		81920 words			
Instance memory for system FB (M)	Timer	128 points	256 points	512 points		2048 points			2048 points	2048 points x 2	512 points		2048 points		2560 points		Timer	Instance memory for system FB (M)
	Integrating timer	32 points	64 points	128 points		512 points			512 points	512 points x 2	128 points		512 points		640 points		Integrating timer	
	Counter	64 points	128 points	256 points		1024 points			1024 points	1024 points x 2	256 points		1024 points		1280 points		Counter	
	Edge detection	256 points	512 points	1024 points		4096 points			4096 points	4096 points x 2	1024 points		4096 points		5120 points		Edge detection	
	Others	2048 words	4096 words	8192 words		32768 words			32768 words	32768 words x 2	8192 words		32768 words		40960words		Others	
	System memory (M)	512 words		512 words					512 words	512 words x 2	512 words						System memory (M)	
Temporary area		4096 words		8192 words					8192 words	8192 words x 2	32768 words/Task, 4096 words/POU						Temporary area	
Available basic data type * 2		BOOL, INT, DINT, UINT, UDINT, REAL, TIME, DATE, TOD, DT, STRING, WORD, DWORD							BOOL, INT, DINT, UINT, UDINT, REAL, TIME, DATE, TOD, DT, STRING, WORD, DWORD								Available basic data type * 2	
No. of tasks		Default tasks (Cyclic scanning): 1, Periodic tasks: 4, Event tasks: 4 (Total of 4 tasks when Periodic task is used)							Default tasks (Cyclic scanning): 1, Periodic tasks: 4, Event tasks: 4 (Total of 4 tasks when Periodic task is used)								No. of tasks	
No. of POUs in program		2000 (including POUs in the library)							2000 (including POUs in the library)								No. of POUs in program	
Interface * 3	User ROM card (CF/SD)	ROM for SPH200	ROM for SPH200	–	○ CF CARD	○ CF CARD	○ CF CARD		○ CF CARD	○ CF CARD	○ CF CARD	○ CF CARD	○	○ CF CARD	○ SD CARD	○ SD CARD	User ROM card (CF/SD)	Interface * 3
	USB * 4	–	–	–	○	○	○		○	○	○	○	○	○	○	○	USB * 4	
	Ethernet * 5	–	–	–	–	–	–		–	–	–	○	○	○ * 6	○	○	Ethernet * 5	
Diagnostic function		Self-diagnosis (memory check, ROM sum check), System configuration supervising, Module fault monitoring							Self-diagnosis (memory check, ROM sum check), System configuration supervising, Module fault monitoring								Diagnostic function	
Security function		Set limits to download/upload of the projects, reference, and clear etc,. by the password.							Set limits to download/upload of the projects, reference, and clear etc,. by the password.								Security function	
Calendar		Up to 31 Dec. 2069 23:59:59 27sec/month (when active)		Up to 31 Dec. 2069 23:59:59 27sec/month (when active) When multi-CPU system is used, time is synchronized.					Up to 31 Dec. 2069 23:59:59 27sec/month (when active). When multi-CPU system is used, time is synchronized.								Calendar	
Battery backup * 7		Backup range: Application programs, system definitions, ZIP files, data memory, calendar IC memory Battery used: Lithium primary battery Backup time (at 25˚C): 5 years Replacement time (at 25˚C): Within 5 minutes		Backup range: Data memory, calendar IC memory Battery used: Lithium primary battery Backup time (at 25˚C) **NP1PS-32/32R**: 5 years, **NP1PS-74R/117R**: Approx. 1.3 years Replacement time (at 25˚C): within 5 minutes					Backup range: Data memory, calendar IC memory Battery used: Lithium primary battery Backup time (at 25˚C) **NP1PS-245R**: Approx. 0.7 years, **NP1PS-74D**: Approx. 0.65 years, **NP1PM-48R/48E/256E/256H**: 5 years **NP1PU-048E/256E**: 5 years Replacement time (at 25˚C): within 5 minutes								Battery backup * 7	
Memory backup by flash ROM (contained in CPU module)		Application programs, system definitions, and ZIP files can be saved in the user ROM card.		Application programs, system definitions, and ZIP files can be saved in the flash memory built in the CPU.					Application programs, system definitions, and ZIP files can be saved in the flash memory built in the CPU.								Memory backup by flash ROM (contained in CPU module)	
Memory backup by user ROM card (optional)		Application programs, system definitions, and ZIP files can be saved in the user ROM card.		Application programs, system definitions, zip files, compressed projects and User's data can be saved in user ROM card (compact flash card).					Application programs, system definitions, zip files, compressed projects and User's data can be saved in user ROM card (compact flash card).								Memory backup by user ROM card (optional)	
Internal current consumption		24V DC 85mA or less		24V DC 200mA or less					24V DC 200mA or less								Internal current consumption	
Mass		Approx. 170g		Approx. 200g (**NP1PS-32/NP1PS-74**) Approx. 220g (**NP1PS-32R/NP1PS-74R**)			Approx. 220g		Approx. 220g	Approx. 410g	Approx. 200g				Approx. 220g		Mass	

Note: * 1 The area sizes of general memory, retain memory, the instance memory for user FBs, and the instance memory for system FBs can freely be increased or decreased. Default values are shown in the above table.
   * 2 This depends on each instruction.
   * 3 O: Standard equipment, –: No equipment
   * 4 Specification of USB
      Applicable standard of USB: USB1.1
      USB connector: USB-B type (**NP1PS-32R/74R/117R/245R**), USB-miniB type (**NP1PM-48R/48E/256E/256H,NP1PU-048E/256E**).

* 5 The Ethernet interface is 10Base-T/100Base-TX.
* 6 Ethernet interface is for equalization only during redundancy, so it is not available for general-purpose communications.
* 7 Backup time (25˚C) when a large-capacity battery (optionally available) is used:
   NP1PS-74R: approx. 3.5 years, **NP1PS-117R**: approx. 3.5 years, **NP1PS-245R**: approx. 2 years, **NP1PS-74D**: approx. 1.75 years.
   (No large-capacity battery can be mounted on **NP1PH-08/16**, **NP1PS-32/32R**, and **NP1PM-48R/48E**, **NP1PM-256E/256H,NP1PU-048E/256E**.)
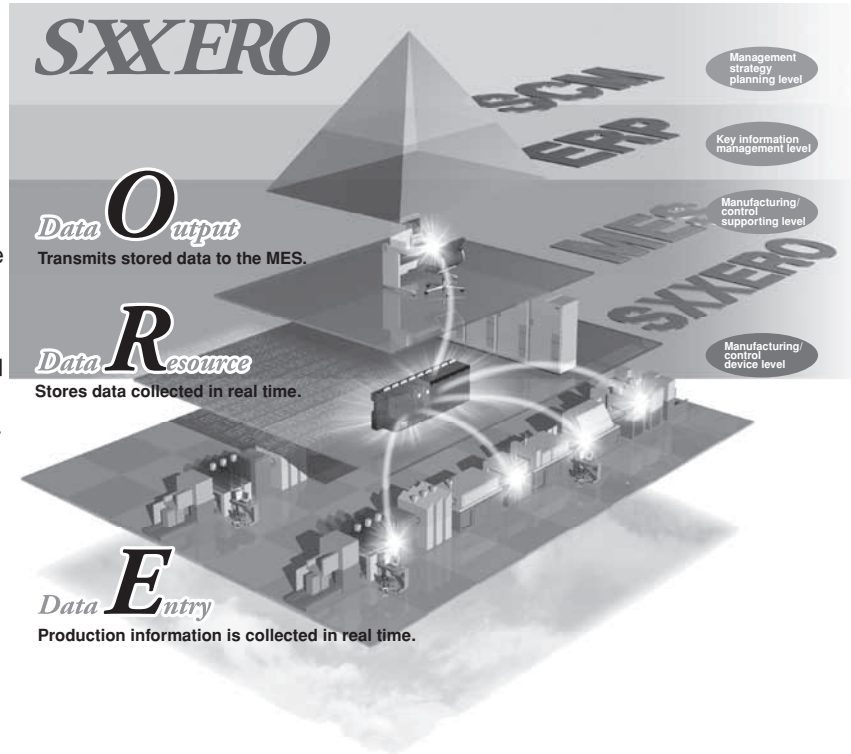
Programmable Controllers
MICREX-SX series SPH
CPU Module

SPH2000
■ Features
- CPU with Built-in Ethernet Capability
  Compared with conventional types, the SPH2000 enables host communications more economically, enabling use as an intelligent Ethernet module.
- FTP server and client function
  Data files (e.g., production control and operation history files) can be easily uploaded and downloaded between host devices and the CPU with built-in Ethernet capability.
- SNTP client function
  Allows you to correct the time by retrieving current time from NTP server.
- Provided with a CompactFlash slot as standard equipment
  CompactFlash (CF) memory with a storage capacity up to 2GB can be used as an auxiliary memory device for storing programs and data.
- Easy data exchange in CSV format
  Dedicated function block (FB) ready for long filenames lets you easily read/write files in CSV format.
- The largest data memory capacity in this class
  The 48K-step types hold up to 96K words, giving them the highest capacity in this class, and 256K-step types hold up to 2M words, which greatly exceeds the memory capacity of conventional PLCs.
- USB interface as standard equipment
  A USB-miniB connector for PC connection is included as standard equipment.
- Double-precision floating point calculation function
  Functions (FCT) especially for double-precision floating point calculations afford highly precise calculations.


SXXERO

Data **O** *utput*
Transmits stored data to the MES.

Data **R** *esource*
Stores data collected in real time.

Data **E** *ntry*
Production information is collected in real time.

Management strategy planning level

Key information management level

Manufacturing/control supporting level

Manufacturing/control device level
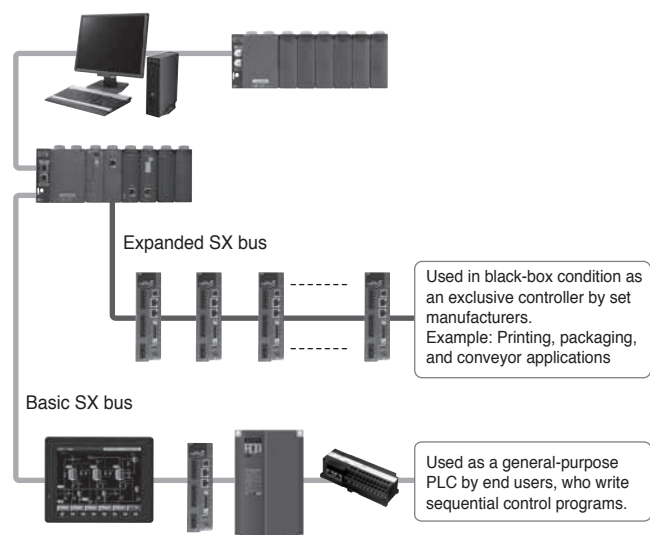
SPH300EX
■ Features
- Features dual control CPUs as standard equipment
  The basic CPU for ordinary sequential processing is used together with an expanded CPU for high-speed processing, to disperse the work load.
- Application to multi-axis servo systems
  The CPU and expanded CPU operate asynchronously, allowing the expanded CPU to provide high-speed control of inverters and servomotors.
  Controls up to 63 axes at the fastest I/O refresh rate of 0.5ms.

■ Overview of the CPU operation
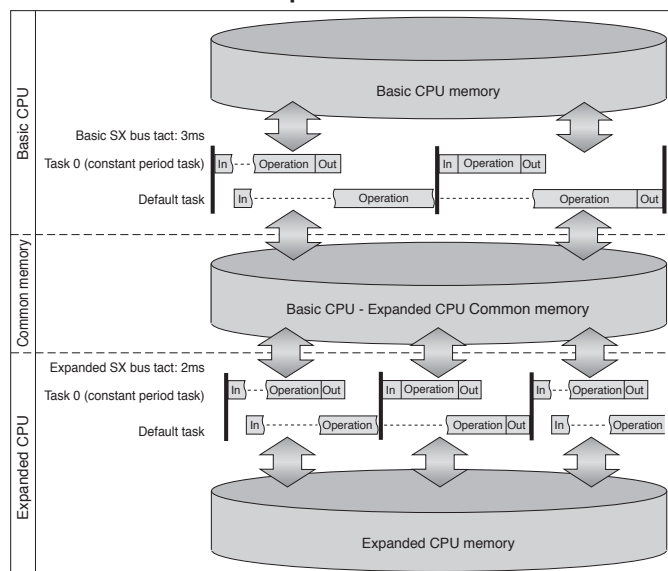
The basic CPU and expansion CPU operate asynchronously in each SX bus cycle.

■ Example of system configuration

Expanded SX bus

Used in black-box condition as an exclusive controller by set manufacturers.
Example: Printing, packaging, and conveyor applications

Basic SX bus

Used as a general-purpose PLC by end users, who write sequential control programs.

SPH2000 Redundant System
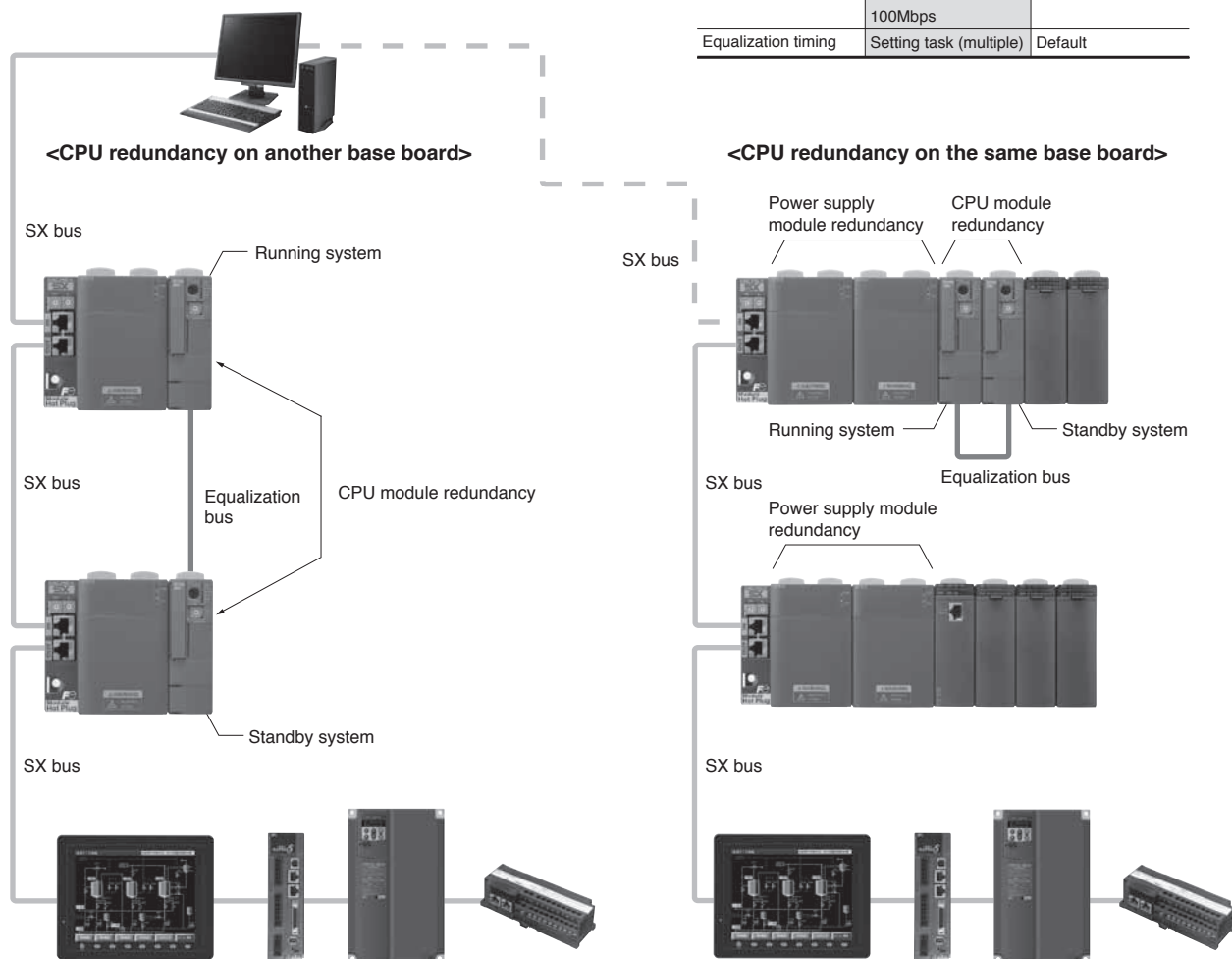
Models to be used: NP1PM-256H

■ Features

- Mass equalization data
  Up to 320K words of data can be equalized.
- High-speed transmission through dedicated equalization bus
  100Mbps dedicated equalization bus transmits the equalization data.
  Also, as a connection cable, a commercially available LAN cable (shielded category 5, cross connect cable) is used.
- Module exchangeable during running CPU
  Failed CPU module can be exchanged without stopping the system by using hot pluggable base board.

- Redundant multi-CPU system enabled
  Up to 4 multi-CPUs can be used for redundancy in multi-CPU (distributed processing) systems.
- Easy equalization setting
  Equalization area can be set up on a per-FB instance basis in addition to on a per-variable basis.
- System configuration with standard modules enabled
  Standard modules allow you to construct systems such as power supplies, base boards and I/O modules.

Comparing SPH redundancy performance

	SPH2000 NP1PM-256H	SPH300 NP1PS-□□
Maximum equalization capacity	320K words	8K words
Equalization performance	20ms/8K words 250ms/320K words	200ms/8K words
Equalization bus	Ethernet (for only) 100Mbps	SX bus
Equalization timing	Setting task (multiple)	Default

■ System configuration example

\<CPU redundancy on another base board\>

SX bus

Running system

SX bus

Equalization bus

CPU module redundancy

SX bus

Standby system

SX bus

\<CPU redundancy on the same base board\>

SX bus

Power supply module redundancy

CPU module redundancy

Running system

Standby system

Equalization bus

SX bus

Power supply module redundancy

SX bus

\<Operation overview\>

- CPU module redundancy
  SPH2000 supports "1:1 redundancy" which allows you to equalize the data and continue operation without stopping the system. Data equalization rate is up to 320k words/250ms (equalization bus transmission rate: 100Mbps) using dedicated "equalization bus".
- Power supply module redundancy
  When two power supply modules are mounted on the same base board, the power supply modules run in parallel, and each module supplies 50% of electric power. When an error occurs in one of power supply modules, the normally running power supply module supplies 100% of electric power.
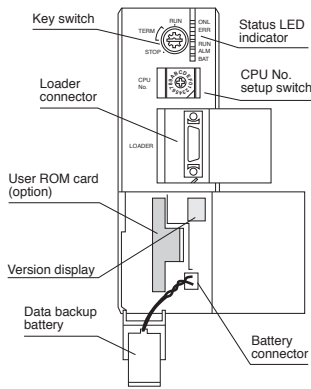
■ Outer view

• SPH200 (**NP1PH-08/NP1PH-16**)
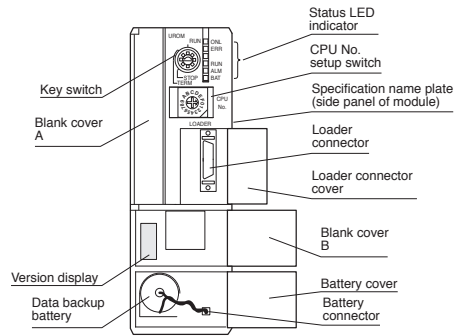
Key switch
Status LED indicator
Loader connector
CPU No. setup switch
User ROM card (option)
Version display
Data backup battery
Battery connector

• SPH300 (**NP1PS-32**)

Status LED indicator
CPU No. setup switch
Specification name plate (side panel of module)
Loader connector
Loader connector cover
Key switch
Blank cover A
Version display
Data backup battery
Blank cover B
Battery cover
Battery connector

• SPH300 (**NP1PS-32R/NP1PS-74R/NP1PS-117R/NP1PS-245R**)

User ROM card (option)
User ROM card connector
User ROM card eject button
Version display
Data backup battery
Battery connector
Key switch
Status LED indicator
CPU No. setup switch
Specification name plate (side panel of module)
Loader connector
Loader connector cover
USB connector (loader connector)
USB connector cover
Battery cover

• SPH300EX (**NP1PS-74D**)

Status indication LED of the basic CPU
Key switch
User ROM card (optional)
User ROM card connector cover
User ROM card ejection switch
Version display
Data backup battery
Status indication LED of the expanded CPU
CPU No. selection key switch
Expansion SX bus
Specification name plate (side panel of module)
Loader connector
Loader connector cover
USB-B connector (Loader connector)
USB connector cover
Battery cover
Battery connector

• SPH2000 (**NP1PM-48R/NP1PM-48E/NP1PM-256E/NP1PM-256H**)

User ROM card (option)
(CF memory)
User ROM card eject button
Ethernet port (NP1PM-48E/256E/256H)
Key switch
Status LED indicator
CPU No. setup switch
Specification name plate (side panel of module)
Loader connector
Loader connector cover
Ethernet status LED indicator
Connector cover
Battery cover

• SPH3000 (NP1PU-048E/NP1PU-256E)

User ROM card (option)
(SD memory)
User ROM card connector
USB-miniB connector
Version display
Data backup battery
Battery connector
Key switch
Status LED indicator
CPU No. setup switch
Specification name plate (side panel of module)
Loader connector
Loader connector cover
Ethernet port
Ethernet status LED indicator
Connector cover
Battery cover

• Mounting of the battery box (optional)

Up mounting

Battery box

Low mounting

Battery box

Note: 1) Note that, if the battery box is up-mounted, the loader cannot be connected.
2) No battery box can be mounted on SPH200 (NP1PH-08/NP1PH-16), SPH300 (NP1PS-32/ NP1PS-32R), SPH2000 (NP1PM-48R/NP1PM-48E/ NP1PM-256E/NP1PM-256H), and SPH3000 (NP1PU-048E/ NP1PU-256E).
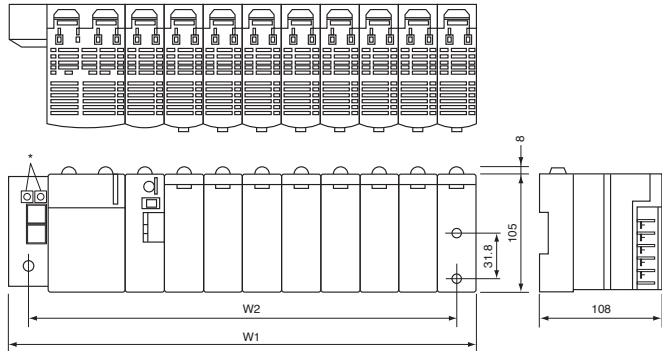
Base Board: NP1B □ - □□

Name	Type	No. of slots	Maximum no. of modules	Internal current consumption	Mass	Remarks
Standard base board	**NP1BS-03**	3 slots	2 (Not contain the power supply)	35mA or less	Approx. 250g	SX bus 3 slots, processor bus 2 slots
	NP1BS-06	6 slots	5 (Not contain the power supply)	45mA or less	Approx. 420g	SX bus 6 slots, processor bus 4 slots
	NP1BS-08	8 slots	6 (Not contain the power supply)	50mA or less	Approx. 540g	SX bus 8 slots, processor bus 3 slots
	NP1BS-11	11 slots	9 (not contain the power supply)	60mA or less	Approx. 720g	SX bus 11 slots, processor bus 3 slots
	NP1BS-13	13 slots	11 (Not contain the power supply)	70mA or less	Approx. 840g	SX bus 13 slots, processor bus 3 slots
High-performance base board	**NP1BP-13**	13 slots	11 (Not contain the power supply)	70mA or less	Approx. 840g	SX bus 13 slots, processor bus 10 slots
Station number setting switch incorporated standard base board	**NP1BS-08S**	8 slots	6 (Not contain the power supply)	60mA or less	Approx. 550g	SX bus 8 slots, processor bus 3 slots
	NP1BS-11S	11 slots	9 (not contain the power supply)	70mA or less	Approx. 730g	SX bus 11 slots, processor bus 3 slots
	NP1BS-13S	13 slots	11 (Not contain the power supply)	80mA or less	Approx. 850g	SX bus 13 slots, processor bus 3 slots
Station number setting switch incorporated high-performance base board	**NP1BP-13S**	13 slots	11 (Not contain the power supply)	80mA or less	Approx. 850g	SX bus 13 slots, processor bus 10 slots
Station number setting switch incorporated hot plugging standard base board	**NP1BS-08D**	8 slots	6 (Not contain the power supply)	70mA or less	Approx. 550g	SX bus 8 slots, processor bus 3 slots
	NP1BS-11D	11 slots	9 (not contain the power supply)	80mA or less	Approx. 730g	SX bus 11 slots, processor bus 3 slots
	NP1BS-13D	13 slots	11 (Not contain the power supply)	80mA or less	Approx. 850g	SX bus 13 slots, processor bus 3 slots
Station number setting switch incorporated hot plugging high-performance base board	**NP1BP-13D**	13 slots	11 (Not contain the power supply)	80mA or less	Approx. 850g	SX bus 13 slots, processor bus 10 slots

Note: Mount a power supply module, plus not less than one module, onto the base board.
Make sure to always mount power supply module at the left side of the base board.
High-performance base board is used when configuring the system, such as multi-CPUs and redundancy, which use a processor bus heavily.
Modules which use the processor bus are as follows:
 • CPU module   • FL-net module
 • P/PE link module   • LE-net relevant module

■ Dimensions, mm

No. of slots	W1	W2
3	133	115
6	238	220
8	308	290
11	413	395
13	483	465

Note) When the connector is mounted, depth is max. 195.3 mm.
The bracket is already mounted on the base board.

* Station number setting switch:
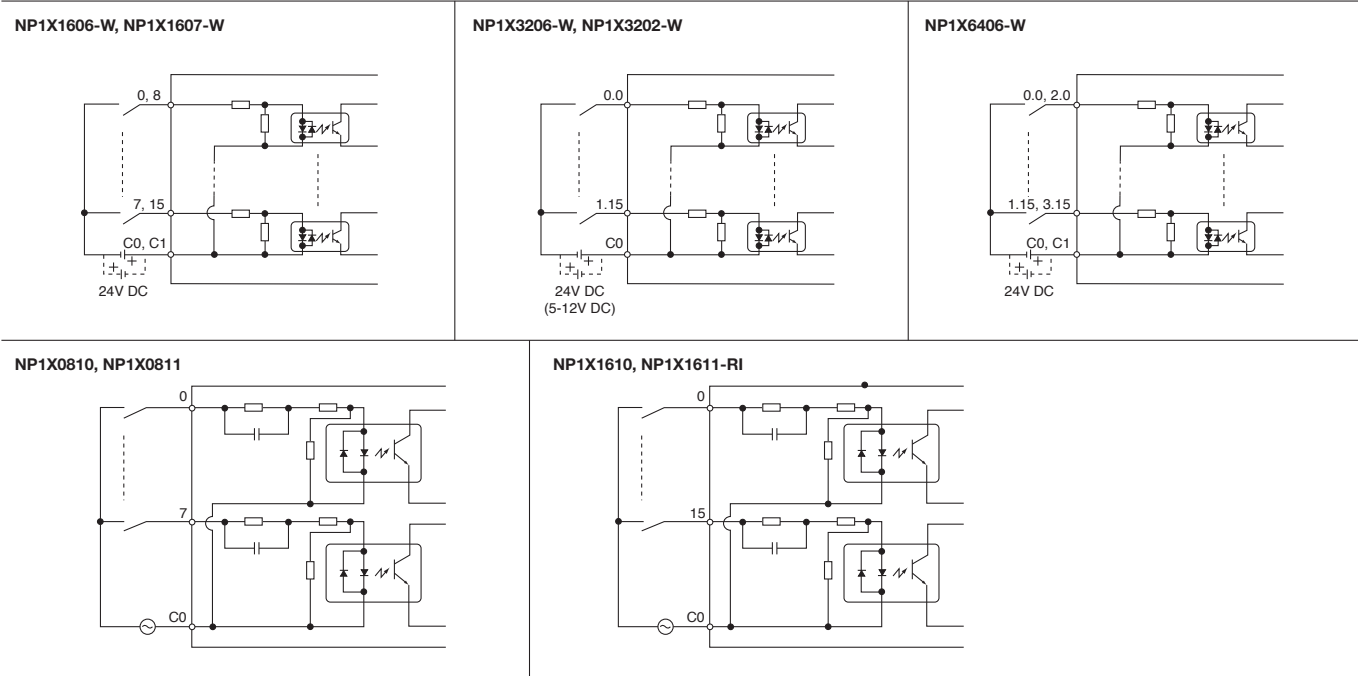Incorporated the station number setting switch incorporated base board.

Digital Input Module: NP1X □

■ Performance specifications

Type	Input	No. of input points	Rated voltage	Rated current	Operating voltage OFF to ON	Operating voltage ON to OFF	Input delay time OFF to ON	Input delay time ON to OFF	Isolation method	Status indication	No. of points /common	External wire connection	Internal current consumption (24V DC)	Mass
NP1X1606-W	DC input, sink/ source	16	24V DC	7mA	15 to 30V	0 to 5V	1 to 100ms Variable by parameter setting		Photocoupler	LED indication	8 (x 2)	Terminal block	35mA or less	Approx. 150g
NP1X1607-W			48V DC	5mA	34 to 60V	0 to 10V							35mA or less	Approx. 150g
NP1X3206-W		32	24V DC	4mA	15 to 30V	0 to 5V					32 (x 1)	Connector	50mA or less	Approx. 130g
NP1X3202-W			5 to 12V DC	3 to 9mA	3.5 to 13.2V	0 to 1V							50mA or less	Approx. 130g
NP1X6406-W		64	24V DC	4mA	15 to 30V	0 to 5V					32 (x 2)		85mA or less	Approx. 180g
NP1X0810	AC input	8	100 to 120V AC	10mA	80 to 132V	0 to 20V	Approx. 10ms	Approx. 10ms			8 (x 1)	Terminal block	35mA or less	Approx. 130g
NP1X1610		16									16 (x 1)		40mA or less	Approx. 170g
NP1X0811		8	200 to 240V AC		160 to 264V	0 to 40V					8 (x 1)		35mA or less	Approx. 130g
NP1X1611-RI		16		7mA				Approx.30ms			16 (x 1)		40mA or less	Approx. 180g

■ Internal circuit diagram

NP1X1606-W, NP1X1607-W

NP1X3206-W, NP1X3202-W

NP1X6406-W

NP1X0810, NP1X0811

NP1X1610, NP1X1611-RI

Digital Output Module: NP1Y □

■ Performance specifications

Type	Output	No. of output points	Rated voltage	Max. load current Per point	Max. load current Common	Response time OFF to ON	Response time ON to OFF	Isolation method	Status indication	No. of points / common	Surge protection	External wire connection	Internal current consumption (24V DC)	Mass
NP1Y08T0902	Transistor output sink	8	12 to 24V DC	2.4A	8A	1ms or less	1ms or less	Photocoupler	LED indication	8 (x 1)	Varistor	Terminal block	20mA or less	Approx. 150g
NP1Y16T09P6		16		0.6A	4A					8 (x 2)			42mA or less	Approx. 160g
NP1Y16T10P2			48V DC	0.2A	1.6A								42mA or less	Approx. 160g
NP1Y32T09P1		32	12 to 24V DC	0.12A	3.2A					32 (x 1)	Zener diode	Connector	45mA or less	Approx. 130g
NP1Y64T09P1		64								32 (x 2)			90mA or less	Approx. 180g
NP1Y08U0902	Transistor output source	8		2.4A	8A					8 (x 1)	Varistor	Terminal block	20mA or less	Approx. 150g
NP1Y16U09P6		16		0.6A	4A					8 (x 2)			30mA or less	Approx. 160g
NP1Y32U09P1		32		0.12A	3.2A					32 (x 1)	Zener diode	Connector	45mA or less	Approx. 140g
NP1Y64U09P1		64								32 (x 2)			90mA or less	Approx. 180g
NP1Y08S	SSR output	8	100 to 240V AC	2.2A	2.2A	10ms or less	10ms or less			All points are independent	CR absorber and varistor	Terminal block	80mA or less	Approx. 200g
NP1Y08R-04	Relay output	8	110V DC/ 240V AC	30V DC/ 264V AC: 2.2A 110V DC: 0.2A	30V DC/ 264V AC: 4A 110V DC: 0.8A	Approx. 10ms	Approx. 10ms	Relay		4 (x 2)	Varistor		80mA or less	Approx. 150g
NP1Y16R-08		16			30V DC/ 264V AC: 8A 110V DC: 1.6A					8 (x 2)			176mA or less	Approx. 190g
NP1Y08R-00		8			-					All points are independent			100mA or less	Approx. 170g

■ Internal circuit diagram

NP1Y08T0902

NP1Y16T09P6, NP1Y16T10P2

NP1Y32T09P1

NP1Y64T09P1

NP1Y08U0902

NP1Y16U09P6

NP1Y32U09P1

NP1Y64U09P1

NP1Y08S

NP1Y08R-04

NP1Y16R-08

NP1Y08R-00
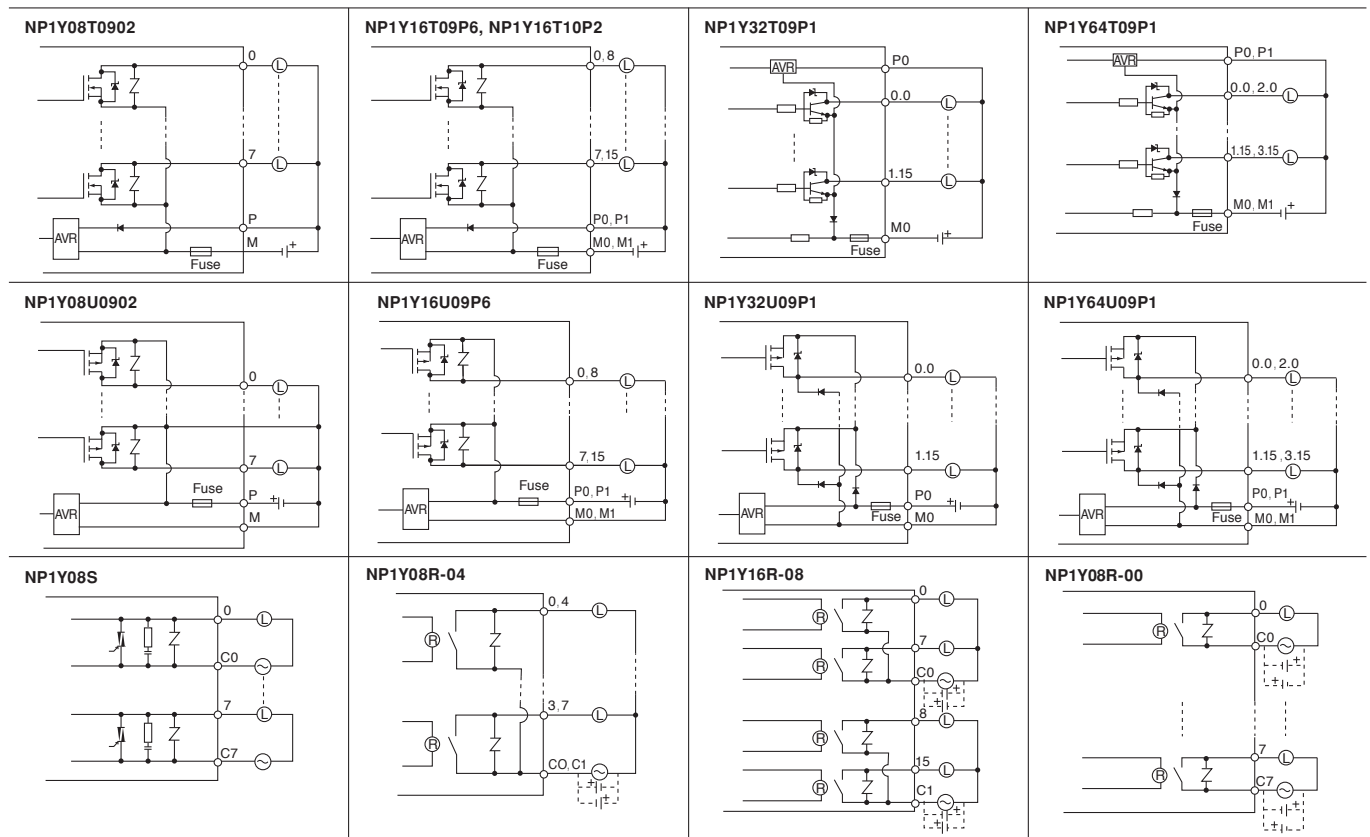
MICREX-SX series SPH
Standard I/O Module

Digital Input/Output Module: NP1W □

■ Performance specifications

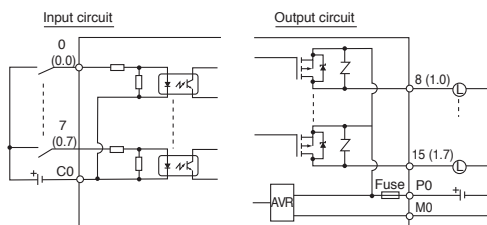| Type	Input					Output			Max. load current		No.of points/	Common					
	Input	No. of input points	Rated voltage	Rated current	No. of points / common	Output	No. of output points	Rated voltage	Per point	Common	common	Isolation method	Status indication	External wire connection	Internal current consumption (24V DC)	Mass
NP1W1606T	DC input, source	8	24V DC	7mA	8 (x 1)	Transistor output, sink	8	12 to 24V DC	0.6A	4A	8 (x 1)	Photocoupler	LED indication	Terminal block	35mA or less	Approx. 150g
NP1W3206T		16		4mA	16 (x 1)		16		0.12A	1.6A	16 (x 1)			Connector	50mA or less	Approx. 140g
NP1W1606U	DC input, sink	8		7mA	8 (x 1)	Transistor output, source	8		0.6A	4A	8 (x 1)			Terminal block	35mA or less	Approx. 150g
NP1W3206U		16		4mA	16(x 1)		16		0.12A	1.6A	16 (x 1)			Connector	50mA or less	Approx. 140g
NP1W6406T	DC bidirectional input	32		4mA	32(x 1)	Transistor output, sink	32		0.12A	3.2A	32 (x 1)			Connector	90mA or less	Approx. 180g
NP1W6406U	DC bidirectional input	32		4mA	32(x 1)	Transistor output, source	32		0.12A	3.2A	32 (x 1)			Connector	90mA or less	Approx. 180g

■ Internal circuit diagram

NP1W1606T
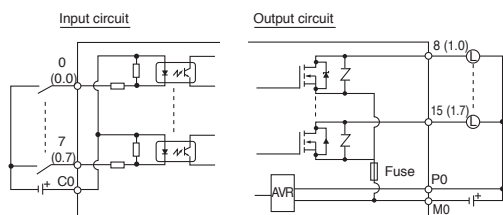
NP1W1606U
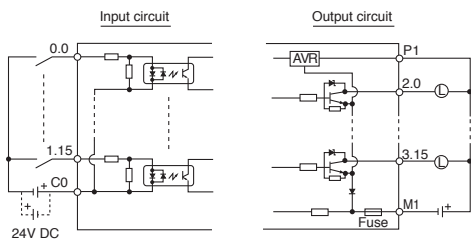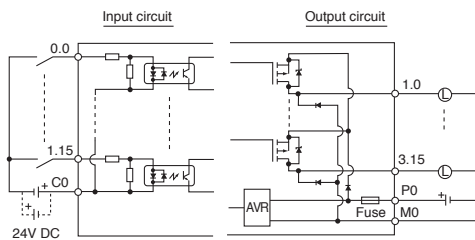

NP1W3206T
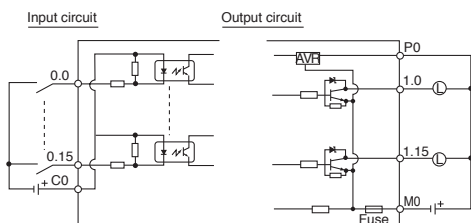
NP1W3206U
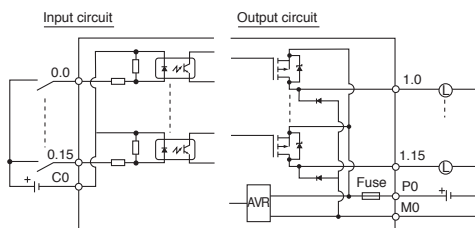
NP1W6406T

NP1W6406U

## High-speed Digital Input Module: NP1X3206-A

- Digital input module with pulse catch input
- Pulse catch input of minimum 20µs or normal input
- Pulse counter input function of maximum 20kHz, 4 ch. (2-phase)

■ Specifications

Type	Input	No. of input points	Rated voltage	Rated current	Operating voltage		Input delay time		Isolation method	Status indication	No. of points /common	External wire connection	Internal current consumption (24V DC)	Mass
					OFF to ON	ON to OFF	OFF to ON	ON to OFF						
NP1X3206-A	24V DC, source	32	24V DC	4mA	15 to 30V	0 to 5V	0.1 to 100ms Variable by parameter setting		Photocoupler	LED indication	32 (x 1)	Connector	50mA or less	Approx. 130g

■ Internal circuit diagram

NP1X3206-A
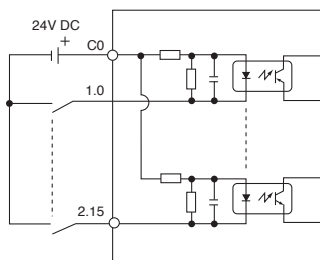
Pulse Train Output Built-in Digital Output Module: NP1Y32T09P1-A

- Module with transistor output and pulse train output built-in
- Pulse train output (20kHz) can be selected up to maximum 4 ch. x 2-phases

■ Specifications

Type	Ouput	No. of output points	Rated voltage	Max. load current		Respose time		Isolation method	Status indication	No. of points /common	Surge protection	External wire connection	Internal current consumption (24V DC)	Mass
				Per point	Commom	OFF to ON	ON to OFF							
NP1Y32T09P1-A	Transistor output, sink	32	12 to 24V DC	0.12A	3.2A	port 1 to 8: 20µs or less, port 9 to 32: 1ms or less		Photocoupler	LED indication	32 (x 1)	Zener diode	Connector	50mA or less	Approx. 200g

■ Built-in pulse train output specifications

Item	Specification
No. of pulse train output channels	Max. 4 ch. x 2 phases (only when pulse train output mode is selected)
Max. output frequency	20kHz
Pulse output mode	(1) Forward pulse, reverse pulse (2) Pulse train + Sign
Output pulse counting method	Built-in 16-bit up-down counter
Operation mode	Start, stop, and clear operations, Ring operation
No. of general-purpose output points	Frequency/rotation direction/output mode settings 32 points (min. 24 points in pulse train output mode)

### ■ Internal circuit diagram

NP1Y32T09P1-A
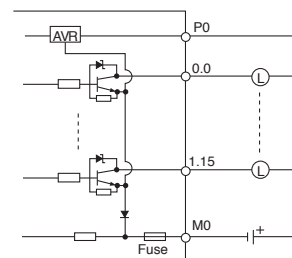
Analog Input Module: NP1AX □

### ■ Performance specifications

Type	Input	No. of channels	Signal range	Digital output value	Digital resolution	Total accuracy	Converting speed	Occupied word (Input + Output)	Insulation between channels	External wire connection	Internal current consumption (24V DC)	Mass
NP1AX04-MR	Multi-range input	4 ch	DC-5 to +5V DC0 to 20mA DC4 to 20mA DC-20 to +20mA	-500 to +500 or 0 to 1000	10 bits	±0.5% or less (25˚C) ±1.0% or less (0 to 55˚C)	4ms / 4 ch	8 words + 2 words	Non-insulation	Terminal block	120mA or less	Approx. 200g
NP1AXH4-MR			DC0 to 5V DC0 to 10V DC1 to 5V DC-10 to +10V	-8000 to +8000 or 0 to 16000	14 bits	±0.1% or less (25˚C) ±1.0% or less (0 to 50˚C)	1ms / 4 ch					
NP1AX08V-MR		8 ch	DC0 to 5V DC0 to 10V DC1 to 5V DC-5 to +5V DC-10 to +10V	-500 to +500 or 0 to 1000	10 bits	±0.5% or less (18 to 28˚C) ±1.0% or less (0 to 50˚C)	5ms / 8 ch	16 words + 2 words				
NP1AX08I-MR			DC0 to 20mA DC4 to 20mA DC-20 to +20mA									
NP1AXH8V-MR			DC0 to 5V DC0 to 10V DC1 to 5V DC-10 to +10V	0 to 16000	14 bits	±0.1% or less (18 to 28˚C) ±0.2% or less (0 to 55˚C) ±0.3% (0 to 55˚C, 1-5V Range)	2.5ms or less / 8 ch	8 words + 4 words			200mA or less	Approx. 240g
				-8000 to +8000								
NP1AXH8I-MR			DC0 to 20mA DC4 to 20mA DC-20 to +20mA	0 to 16000		±0.1% or less (18 to 28˚C) ±0.4% or less (0 to 55˚C)						
NP1AXH8VG-MR			DC0 to 5V DC0 to 10V DC1 to 5V DC-10 to +10V	-32000 to +32000 or 0 to 32000	16 bits	±0.05% or less (18 to 28˚C) *1 ±0.239% or less (10 to 55˚C)	30ms or less / 8 ch		Insulation		150mA or less	Approx. 280g
NP1AXH8IG-MR			DC0 to 20mA DC4 to 20mA DC-20 to +20mA									

*1) Take 40 minutes or more for warm-up (no need to warm-up for ± 0.2%)

■ Characteristic diagram

Characteristic pattern 1		Characteristic pattern 2	
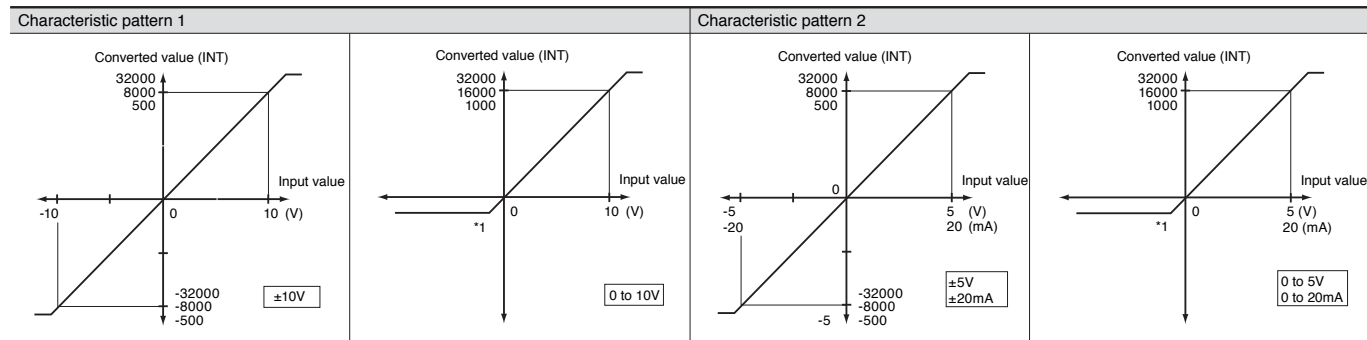
Characteristic pattern 3
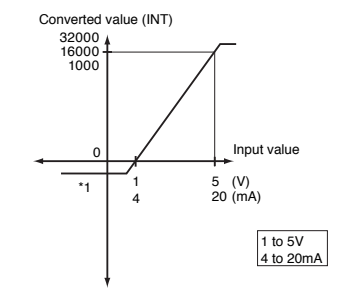
*1) For NP1AX04-MR and NP1AXH4-MR, the lower limit value (digital value) is "0".

■ Input value and converted value

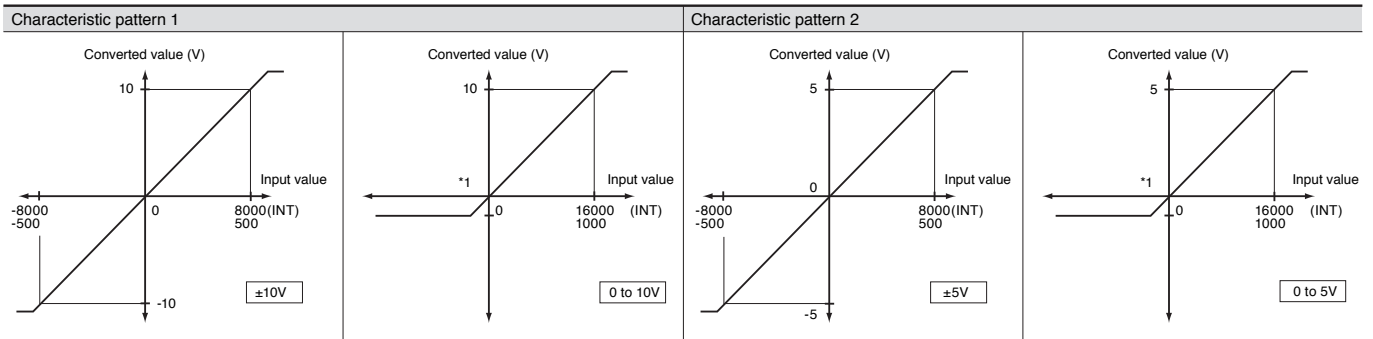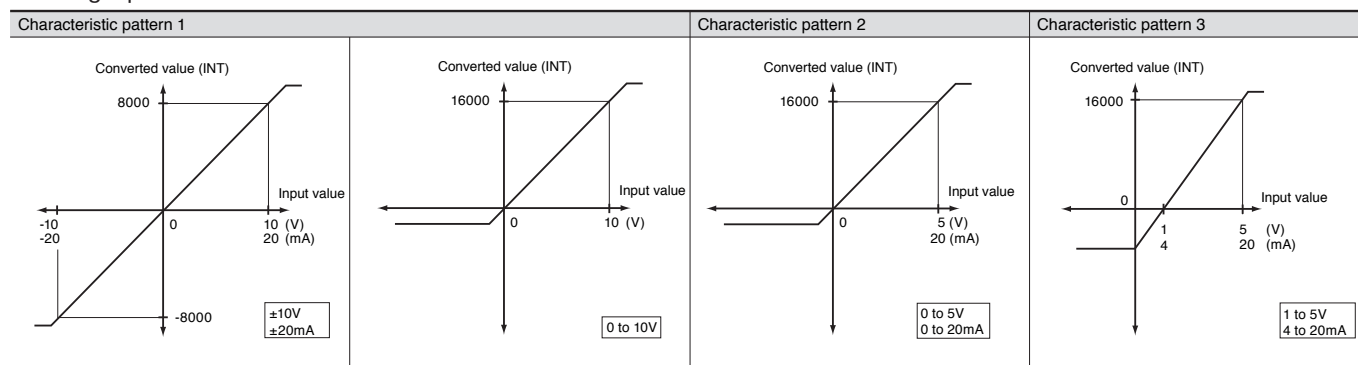| Range of input	Characteristic pattern 1			Characteristic pattern 2			Characteristic pattern 3		
	Resolution			Resolution			Resolution		
	10 bits	14 bits	16 bits	10 bits	14 bits	16 bits	10 bits	14 bits	16 bits
-5 to +5V				±500	±8000				
0 to 5V				1000	16000	32000			
1 to 5V							1000	16000	32000
0 to 10V	1000	16000	32000						
-10 to +10V	±500	±8000	±32000						
0 to 20mA				1000	16000	32000			
4 to 20mA							1000	16000	32000
-20 to +20mA				±500	±8000	±32000			

Analog Output Module: NP1AY
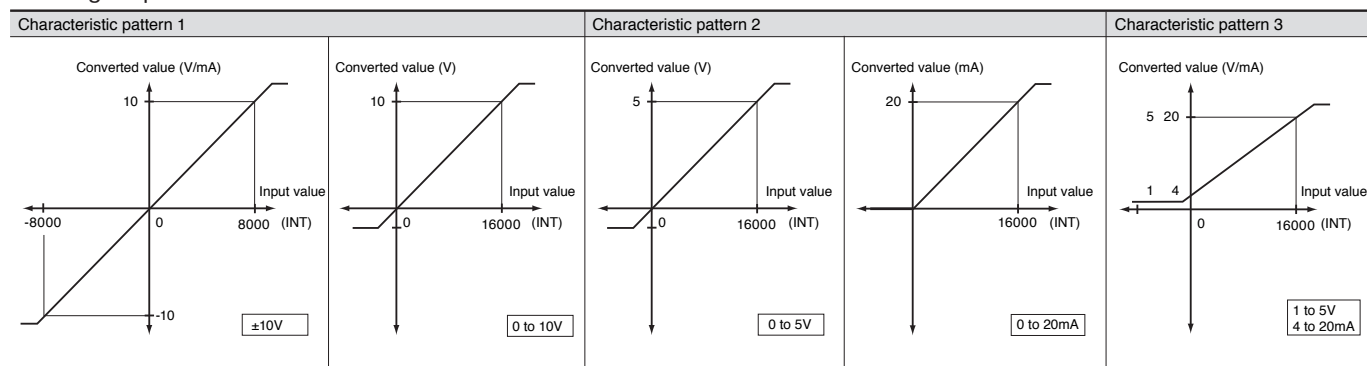
■ Performance specifications

Type	Input	No. of channels	Signal range	Digital output value	Digital resolution	Total accuracy	Converting speed	Occupied word (Input + Output)	Insulation between channels	External wire connection	Internal current consumption (24V DC)	Mass
NP1AY02-MR	Multi-range output	2 ch	DC-5 to +5V DC0 to 20mA DC4 to 20mA	-500 to +500 or 0 to 1000	10 bits	±0.5% or less (25˚C) ±1.0% or less (0 to 55˚C)	2ms / 2 ch	2 words + 4 words	Non-insulation	Terminal block	120mA or less	Approx. 200g
NP1AYH2-MR			DC0 to 5V DC0 to 10V DC1 to 5V DC-10 to +10V	-8000 to +8000 or 0 to 16000	14 bits	±0.1% or less (25˚C) ±1.0% or less (0 to 50˚C)	1ms/ 2 ch					Approx. 200g
NP1AYH4V-MR		4 ch	DC0 to 5V DC0 to 10V DC1 to 5V DC-10 to +10V	-8000 to +8000 or 0 to 16000		±0.1% or less (18 to 28˚C) ±0.2% or less (0 to 55˚C) ±0.3% (0 to 55˚C, 1 to 5V Range)	1ms/ 4 ch	4 words + 4 words			200mA or less	Approx. 240g
NP1AYH4I-MR			DC0 to 20mA DC4 to 20mA	0 to 16000		±0.1% or less (18 to 28˚C) ±0.4% or less (0 to 55˚C)						
NP1AYH4VG-MR			DC0 to 5V DC0 to 10V DC1 to 5V DC-10 to +10V	-16000 to +16000 or 0 to 16000		±0.1% or less (18 to 28˚C) *1 ±0.289% or less (0 to 55˚C)	0.6ms/ 4 ch		Insulation			Approx. 300g
NP1AYH4IG-MR			DC0 to 20mA DC4 to 20mA	0 to 16000		±0.1% or less (18 to 28˚C) *1 ±0.289% or less (0 to 55˚C)					250mA or less	
NP1AYH8V-MR		8 ch	DC0 to 5V DC0 to 10V DC1 to 5V DC-10 to +10V	-8000 to +8000 or 0 to 16000		±0.1% or less (18 to 28˚C) ±0.2% or less (0 to 55˚C) ±0.3% (0 to 55˚C, 1 to 5V range)	2ms/ 8 ch	4 words + 8 words	Non-insulation		240mA or less	Approx. 240g
NP1AYH8I-MR			DC0 to 20mA DC4 to 20mA	0 to 16000		±0.1% or less (18 to 28˚C) ±0.4% or less (0 to 55˚C)					300mA or less	

*1) Take 30 minutes or more for warm-up (no need to warm-up for ± 0.2%)

■ Characteristic diagram

Characteristic pattern 1		Characteristic pattern 2	

Characteristic pattern 2	Characteristic pattern 3
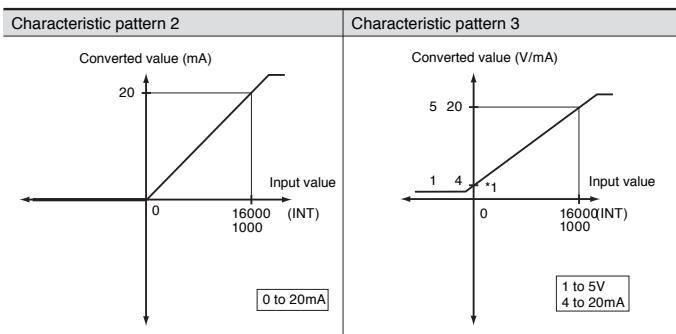
*1) For NP1AY02-MR and NP1AYH2-MR, the lower limit value (digital value) is "0".

■ Input value and converted value

Range of input	Characteristic pattern 1			Characteristic pattern 2			Characteristic pattern 3		
	Resolution			Resolution			Resolution		
	10 bits	14 bits	15 bits	10 bits	14 bits	15 bits	10 bits	14 bits	15 bits
-5 to +5V				±500	±8000				
0 to 5V				1000	16000	16000			
1 to 5V							1000	16000	16000
0 to 10V	1000	16000	16000						
-10 to +10V	±500	±8000	±16000						
0 to 20mA				1000	16000	16000			
4 to 20mA							1000	16000	16000

Analog Input /Output Module: NP1AWH6-MR

■ Performance specifications

Type	Input	No. of channels	Signal range	Digital input output value	Digital resolution	Total accuracy	Converting speed	Occupied word (input + output)	Insulation between channels	External wire connection	Internal current consumption (24V DC)	Mass
NP1AWH6-MR	Multi-range input/output	4 ch	Voltage input: 0 to 5V DC 0 to 10V DC 1 to 5V DC -10 to +10V DC Current input: 0 to 20mA DC 4 to 20mA DC -20 to +20mA DC	-8000 to +8000 or 0 to 16000	14 bits	± 0.1% or less (at 18 to 28˚C) ± 0.2% or less (at 0 to 55˚C) ± 0.3% or less (at 0 to 55˚C, 0 to 20mA/4 to 20mA range)	1ms/4 ch	4 words + 4 words	Non-insulation	Terminal block	200mA or less	Approx. 240g
		2 ch	Voltage output: 0 to 5V DC 0 to 10V DC 1 to 5V DC -10 to +10V DC Current output: 0 to 20mA DC 4 to 20mA DC					0.5ms/2 ch					

■ Characteristic diagram
• Analog input

Characteristic pattern 1 — ±10V ±20mA

Characteristic pattern 2 — 0 to 10V

Characteristic pattern 3 — 0 to 5V / 0 to 20mA · 1 to 5V / 4 to 20mA

• Analog output

Characteristic pattern 1 — ±10V

Characteristic pattern 2 — 0 to 10V · 0 to 5V

Characteristic pattern 3 — 0 to 20mA · 1 to 5V / 4 to 20mA

■ Input/output value and converted value
• Analog input

Range of input	Characteristic pattern 1	Characteristic pattern 2	Characteristic pattern 3
0 to 5V		16000	
1 to 5V			16000
0 to 10V	16000		
-10 to 10V	±8000		
0 to 20mA		16000	
4 to 20mA			16000
-20 to 20mA	±8000		

• Analog output

Range of output	Characteristic pattern 1	Characteristic pattern 2	Characteristic pattern 3
0 to 5V		16000	
1 to 5V			16000
0 to 10V	16000		
-10 to 10V	±8000		
0 to 20mA		16000	
4 to 20mA			16000

Resistance Bulb Input Module: NP1AX □□ -PT

- IEC Standards conformed sensors (platinum resistance thermometer bulb) can be connected. Batch setting is possible for all channels.
- Error detection (the detection of sensor wire breakage or short-circuit) is possible.
- Temperature scale is selectable between Celsius and Fahrenheit.
- The NP1AXH6G-PT provides high accuracy and high resolution, thereby enabling fine-grained measurements.

■ Specifications

Item	Specification	
Types	**NP1AXH4-PT**	NP1AXH6G-PT
Measurement accuracy * 2	±0.3% (ambient temperature 18 to 28˚C) * 1	±0.05 to ±0.07% (ambient temperature 18 to 28˚C)
	±0.7% (ambient temperature 0 to 55˚C)	±0.239% (ambient temperature 0 to 55˚C)
Allowable input wiring resistance	10Ω or less	20Ω or less
	500ms/4 ch	45ms/6 ch
Sampling interval Input filtering time	Hardware (time constant): 50ms	Hardware (time constant): 30ms
	Software filter: 1s (variable from 1 to 100s by program)	Software filter: 1 to 100s, Moving average over: 4 times, 8 times, 16 times, 32 times.
		(Configurable per 1s unit. Default value: Moving average over 32 times)
No. of input channels	4 ch (insulation between channels)	6 ch (insulation between channels)
No. of occupied I/O points	Input 8 words, output 8 words	Input 8 words, output 4 words
Internal current consumption	150mA or less	150mA or less
External connection	Removable terminal block M3, 20 poles	Removable terminal block M3, 20 poles
Mass	Approx. 240g	Approx. 300g

*1 In the range from 0.0 to 100.0 °C, and from -20.0 to 80.0 °C, full scale ±0.4% ±1 Digit (ambient temperature: 18 to 28°C), ±0.8% ±1 Digit (ambient temperature: 0 to 55°C).
*2 For more information, refer to the User's manual: FEH208.

■ Type of resistance thermometer element and Resolutions
• NP1AXH4-PT

Type of resistance thermometer element	Celsius (˚C) Measuring temperature range	Fahrenheit (˚F) Measuring temperature range	Resolution of data
PT	0 to 200	32 to 392	1
	-20 to 80	-4 to 176	
	0 to 100	32 to 212	
	0 to 400	32 to 752	
	-200 to 200	-328 to 392	
	-200 to 600	-328 to 1112	
	0.0 to 200.0	32.0 to 392.0	0.1
	-20.0 to 80.0	-4.0 to 176.0	
	0.0 to 100.0	32.0 to 212.0	
	0.0 to 400.0	32.0 to 752.0	
	-200.0 to 200.0	-328.0 to 392.0	
	-200.0 to 400.0	-328.0 to 1112.0	
JPt	0 to 200	32 to 392	1
	-20 to 80	-4 to 176	
	0 to 100	32 to 212	
	0 to 400	32 to 752	
	-200 to 200	-328 to 392	
	-200 to 500	328 to 932	
	0.0 to 200.0	32.0 to 392.0	0.1
	-20.0 to 80.0	-4.0 to 176.0	
	0.0 to 100.0	32.0 to 212.0	
	0.0 to 400.0	32.0 to 752.0	
	-200.0 to 200.0	-328.0 to 392.0	
	-200.0 to 500.0	-328.0 to 932.0	

Note: The measuring range of temperature is ± 5% of the input range span.

• NP1AXH6G-PT

Type of resistance thermometer element	Celsius (˚C) Measuring temperature range	Fahrenheit (˚F) Measuring temperature range	Resolution of data
PT	0 to 200	32 to 392	1
	-20 to 80	-4 to 176	
	0 to 100	32 to 212	
	0 to 400	32 to 752	
	-200 to 200	-328 to 392	
	-200 to 600	-328 to 1112	
	-200 to 850	-328 to 1562	
	0.0 to 200.0	32.0 to 392.0	0.1
	-20.0 to 80.0	-4.0 to 176.0	
	0.0 to 100.0	32.0 to 212.0	
	0.0 to 400.0	32.0 to 752.0	
	-200.0 to 200.0	-328.0 to 392.0	
	-200.0 to 600.0	-328.0 to 1112.0	
	-200.0 to 850.0	-328.0 to 1562.0	
	-20.00 to 80.00	-4.00 to 176.00	0.01
JPt	0 to 200	32 to 392	1
	-20 to 80	-4 to 176	
	0 to 100	32 to 212	
	0 to 400	32 to 752	
	-200 to 200	-328 to 392	
	-200 to 500	-328 to 932	
	0.0 to 200.0	32.0 to 392.0	0.1
	-20.0 to 80.0	-4.0 to 176.0	
	0.0 to 100.0	32.0 to 212.0	
	0.0 to 400.0	32.0 to 752.0	
	-200.0 to 200.0	-328.0 to 392.0	
	-200.0 to 500.0	-328.0 to 932.0	

■ Characteristic diagram
• NP1AXH4-PT
In case of PT0.0 to 400.0°C

(In 0.1˚C units) (In 1˚C units) Conversion value

4200 (420)
4000 (400)

Temperature input value (˚C)

-20
-200 (-20)
400 420
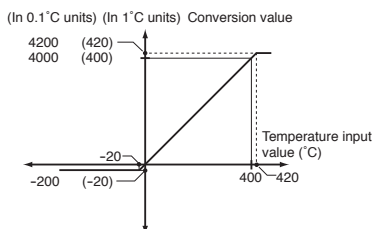
• NP1AXH6G-PT
In case of PT0.0 to 400.0°C

(In 0.1˚C units) (In 1˚C units) Conversion value

4400 (440)
4000 (400)

Temperature input value (˚C)

-40
-400 (-40)
400 440
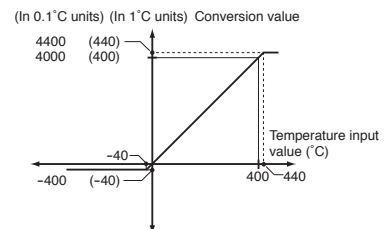
MICREX-SX series SPH
Standard I/O Module

Thermo-couple Input Module: NP1AXH □□ -TC

- The following thermocouples that conform to IEC, ASTN and DIN Standards can be connected. Batch setting is possible for all channels.
  IEC: R, K, J, S, B, E, T, N   ASTM: W5Re, W26Re, PLII
  DIN: U, L
- Error detection (the detection of sensor wire breakage or short-circuit) is possible.
- Temperature scale is selectable between Celsius and Fahrenheit.
- The NP1AXH8G-TC provides high accuracy and high resolution, thereby enabling fine-grained measurements.

■ Specifications

Item	Specification	
Types	**NP1AXH4-TC**	NP1AXH8G-TC
Measurement accuracy * 3	±0.3% (ambient temperature 18 to 28˚C) * 1 ±0.7% (ambient temperature 0 to 55˚C)	±0.05% (ambient temperature 25˚C) * 2
Cold contact compensation accuracy	±1˚C (ambient temperature 18 to 28˚C)	±1˚C (ambient temperature 18 to 28˚C)
	500ms/4 ch	60ms/8 ch
Sampling interval	Hardware (time constant): 50ms,	Hardware (time constant): 30ms
Input filtering time	Software filter: 1s (variable from 1 to 100s by program)	Software filter: 1 to 100s, Moving average over: 4 times, 8 times, 16 times, 32 times. (Configurable per 1s unit. Default value: Moving average over 32 times)
No. of input channels	4 ch (insulation between channels)	8 ch (insulation between channels)
No. of occupied I/O points	Input 8 words, output 8 words	Input 8 words, output 4 words
Internal current consumption	150mA or less	150mA or less
External connection	Removable terminal block M3, 20 poles	Removable terminal block M3, 20 poles
Mass	Approx. 240g	Approx. 300g

*1 In the range from K (0.0 to 400.0 °C, 0.0 to 500.0 °C, and from 0.0 to 800.0 °C), and T (0.0 to 400.0 °C), full scale ±0.4% ±1 Digit (ambient temperature: 18 to 28°C), ±0.8% ±1 Digit (ambient temperature: 0 to 55°C).
*2 The measurement accuracy depends on the sensor, and measurement temperature.
*3 For more information, refer to the User's manual: FEH209.

■ Thermocouple types and resolutions
• NP1AXH4-TC

Thermocouple type	Celsius (˚C) Measuring temperature range	Fahrenheit (˚F) Measuring temperature range	Resolution of data
K	0 to 1300	32 to 2372	1
	0 to 500	32 to 932	
	0 to 800	32 to 1472	
	0.0 to 400.0	32.0 to 752.0	0.1
	0.0 to 500.0	32.0 to 932.0	
	0.0 to 800.0	32.0 to 1472.0	
B	0 to 1800	32 to 3272	1
R	0 to 1700	32 to 3092	1
S	0 to 1700	32 to 3092	1
E	0 to 400	32 to 752	1
	0 to 700	32 to 1292	
	0.0 to 700.0	32.0 to 1292.0	0.1
J	0 to 500	32 to 932	1
	0 to 800	32 to 1472	
	0.0 to 400.0	32.0 to 752.0	0.1
	0.0 to 500.0	32.0 to 932.0	
	0.0 to 800.0	32.0 to 1472.0	
T	0 to 400	32 to 752	1
	0.0 to 400.0	32.0 to 752.0	0.1
N	0 to 1300	32 to 2372	1
U	0 to 400	32 to 752	1
	0 to 600	32 to 1112	
	0.0 to 600.0	32.0 to 1112.0	0.1
L	0 to 400	32 to 752	1
	0 to 900	32 to 1652	
	0.0 to 400.0	32.0 to 752.0	0.1
	0.0 to 900.0	32.0 to 1652.0	
PL II	0 to 1200	32 to 2372	1
W5Re, W26Re	0 to 2300	32 to 4172	1

Note: The measuring range of temperature is ± 5% of the input range span.

• NP1AXH8G-TC

| Thermocouple type	Celsius (˚C) Measuring temperature range	Fahrenheit (˚F) Measuring temperature range	Resolution of data
K	-200 to 1370	-328 to 2498	1
	-200 to 500	-328 to 932	
	-100.0 to 1370.0	-148.0 to 2498.0	0.1
	-100.0 to 500.0	-148.0 to 932.0	
	-100.0 to 230.0	-148.0 to 446.0	
	0.00 to 300.0	-	0.05
B	0 to 1820	32 to 3308	1
R	-50 to 1760	58 to 3200	1
S	-50 to 1760	58 to 3200	1
E	-250 to 1000	-418 to 1832	1
	-120.0 to 1000.0	-184.0 to 1832.0	0.1
	-120.00 to 160.00	-	0.03
J	-200 to 500	-328 to 932	1
	-200 to 800	-328 to 1472	
	-200 to 1100	-328 to 2012	
	-100.0 to 500.0	-148.0 to 932.0	0.1
	-100.0 to 800.0	-148.0 to 1472.0	
	-100.0 to 1100.0	-148.0 to 2012.0	
	-80.00 to 180.00	-	0.04
T	-260 to 400	-436 to 752	1
	-150.0 to 200.0	-238.0 to 392.0	0.1
N	-200 to 1300	-328 to 2372	1
U	-150 to 550	-238 to 1022	1
	0.0 to 550.0	32.0 to 1022.0	0.1
L	-150 to 400	-238 to 752	1
	-150 to 850	-238 to 1562	
	0.0 to 400.0	32.0 to 752.0	0.1
	0.0 to 850.0	32.0 to 1562.0	
PL II	0 to 1300	32 to 2372	1
	0.0 to 1300.0	32.0 to 2372.0	0.1
W5Re, W26Re	0 to 2300	32 to 4172	1

Distributor Module: NP1AXH4DG-MR

- Converts signals (4-20mA) from two-wire transmitters, such as differential pressure flowmeters, water gauges, and temperature communicators, into digital data.
- A transducer is unnecessary as the module is insulated with high pressure-resistance (AC1000V) between channels.
- An external power supply is unnecessary as a power supply for two-wire transmitters is embedded in each channel.
- Provides high precision and high resolution, thereby allowing detailed measurement.
- The square root extraction function allows you to input the data directly as like an industry value, to such as the output from differential pressure flowmeters and other devices that need to extract the square root.

■ Specifications

Item	Specification
Specification	**NP1AXH4DG-MR**
No. of input channels	4 channels
Analog input range	4 to 20mA, 0 to 20mA
Input impedance	250Ω
Maximum permissible input	30mA
Input filter Approx.	200μs or less (hardware: primary delay time constant)
Resolution	16-bit
Digital conversion value	0 to 32000 (Data type: INT)
Reference precision	±0.1% of F.S.R. (Ta = 25°C)
Temperature coefficient	±0.007%/°C
Conversion cycle	30ms/ 4 channels
Warm up time * 1	40 minutes or more
Power supply for transmission machine * 2	1) Output voltage: 24V DC ±15%
	2) Permissible current: 23mA or less
	3) Short-circuit limitation current: Approx. 25mA
	4) Ripple noise: Approx. 250mV (p-p) or less
	5) Abrupt change of load: 4V (0-P) or less (abrupt change condition of load: 0 to 23mA)
Input response time * 3	Conversion cycle + tact cycle (ms)
Occupied words	8 input words + 4 output words (fixed)
Insulation method	Photo-coupler insulation or Transformer insulation (between I/O terminals and FG)
	Transformer insulation (between analog input terminals and channels)
Dielectric strength	1000V AC 1 minute (between I/O terminals and FG) (short circuit current: 10mA)
	1000V AC 1 minute (between analog input terminals and channels) (short circuit current: 10mA)
Insulation resistance	10MΩ or more with 500V DC megger (between I/O terminals and FG)
	10MΩ or more with 500V DC megger (between analog input terminals and channels)
Internal current consumption	390mA or less (When the transmission machine power supply used.)
	170mA or less (When the transmission machine power supply unused.)
Non use output treatment	Opening.
Use cable	Use the twisted pair wire with the shield. (Wiring length: 500m or less)
Mass	Approx. 290g
External connection	Detachable terminal block (M3 x 20 poles)

* 1 Reference precision = 0.22% (no need to warm-up when Ta=25°C)
* 2 It is able to reduction by usable of the transmissions number. For more detail, refer to the User's Manual "FEH432."
     An ambient temperature is 40°C or less. (40 to 50°C: 10 minutes or less).
* 3 For the step response,
     Response time = 30ms x Simple Moving Average + 20ms + Input filter x 8 + Tact period.
     = 56.6ms (When the No Simple Moving Average, Tact period: 5ms)

■ Characteristic diagram
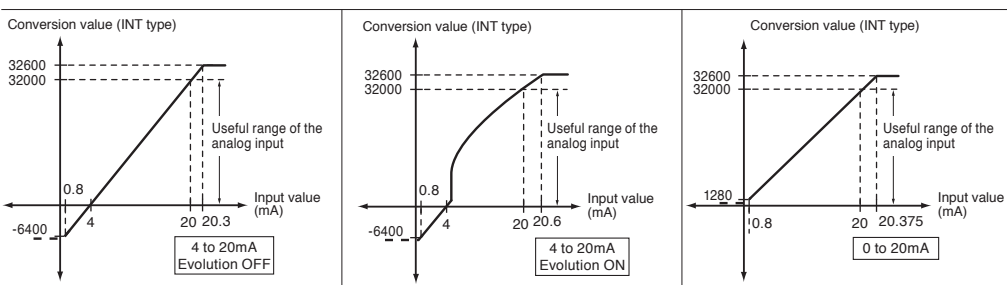
Note: The broken line represents the saturated area. Inputs below 0.8mA may not be measured accurately.

I/O Connection of Connector-type Modules

The following types of modules are connected using connectors and recommended for the I/O connection use.

■ Connector type module list

Item	Type	Specification
Digital input module	**NP1X3206-A**	24V DC, 32 points, 4mA 0ms to 100ms variable, with 20kHz x 4 ch. built-in pulse counter
	NP1X3206-W	24V DC, 32 points, 4mA 1ms to 100ms variable
	NP1X3202-W	5/12V DC, 32 points, 3/9mA 1ms to 100ms variable
	NP1X6406-W	24V DC, 64 points, 4mA 1ms to 100ms variable
Digital output module	**NP1Y32T09P1-A**	Tr. Sink, 24V DC, 32 points, 0.12A/point, 3.2A/common, with 20kHz x 4 ch. built-in pulse train output
	NP1Y32T09P1	Transistor sink, 12 to 24V DC, 32 points, 0.12A/point, 3.2A/common
	NP1Y64T09P1	Transistor sink, 12 to 24V DC, 64 points, 0.12A/point, 3.2A/common
	NP1Y32U09P1	Transistor source, 12 to 24V DC, 32 points, 0.12A/point, 3.2A/common
	NP1Y64U09P1	Transistor source, 12 to 24V DC, 64 points, 0.12A/point, 3.2A/common
Digital input /output module	**NP1W3206T**	24V DC, 16 points, Source input, 12 to 24V DC, Tr sink 16-point output
	NP1W3206U	24V DC, 16 points, Sink input, 12 to 24V DC, Tr source 16-point output
	NP1W6406T	24V DC, 32 points, Bidirectional input, 12 to 24V DC, Tr sink 32-point output
	NP1W6406U	24V DC, 32 points, Bidirectional input, 12 to 24V DC, Tr source 32-point output
High-speed counter module	**NP1F-HC2**	500kHz x 2 ch, 90-degree phase difference 2-phase signal, pulse + directional signal, others
Multi-channel high-speed counter module	**NP1F-HC8**	50kHz x 8 ch, 90-degree phase difference 2-phase signal, pulse + directional signal, others
Pulse train output positionig control module	**NP1F-HP2**	Pulse train command 250kHz x 2 ch.
Pulse train positioning control combined module	**NP1F-MP2**	2-axis pulse train command positioning control combined module output pulse: 250kHz, Feedback pulse: 500kHz
Analog command positioning control combined module	**NP1F-MA2**	2-axis analog command positioning control combined module feedback pulse: 500kHz

Note: Connector model implemented in the module is FCN-365P040-AU (plug) manufactured by Fujitsu Component Ltd.

■ Recommended connectors

Types	Types (Fujitsu Component Ltd.)	
	Jack	Cover
Soldered type *1	FCN-361J040-AU	FCN-360C040-B (B type)
Crimp type	FCN-363J040 (Housing)	FCN-360C040-D (D type: Wide mouthed type)
	FCN-363J-AU (Contact)	FCN-360C040-E (E type: Long screw type)
Wire wrapping type	FCN-362J040-AU	FCN-360C040-J2 (J2 type: Thinly, obliquely type)
Insulation displacement type	FCN-367J040-AU/FW	The cover is not necessary.

*1 As soldered type connectors, Fuji Electric model (NP8V-CN) is provided (Attached cover: FCN-360C040-B).
Note) For more retail, refer to each user's manuals.

■ Recommended relay terminal blocks (Made by Fuji Electric Technica Co., Ltd.)
• Specifications

Types (Product code)	Terminal block	Connector		Performance
	Number of poles	Number of poles	Rating	
LP5W-40H1	40 M3 screw Supported by screws Standard tightening torque: 1.2N·m Compliant cable: Up to 1.25mm^2	40 Implemented connector: FCN-364P040-AU (plug) Fujitsu Component Ltd.	Insulation voltage: 125V (AC, DC) Rated applied current: 1A	Insulation resistance: 100MΩ or more Withstanding voltage: 600V for one minute Allowed ambient temperature: -10 to +50°C Flame resistance: UL94V-0

• Dimensions, mm

Connector
Lever switch for detaching rail
162
120
2-φ4.5
(For mounting holes)
36.8
33 10
36
33 10
35
14
26
40
40
6.35 1.27 7.62
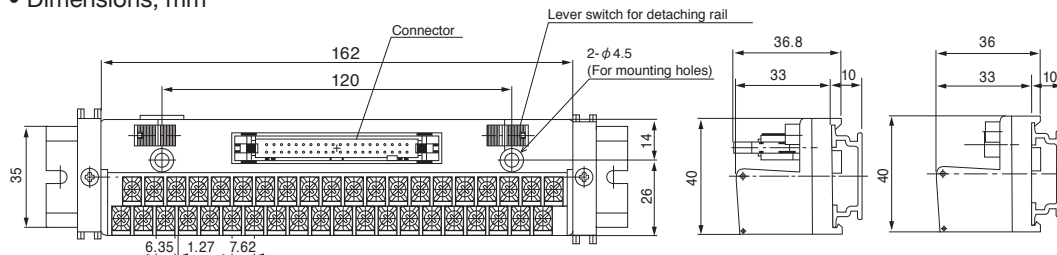
• Applicable connector

Types	Types (Fujitsu Component Ltd.)	
	Jack	Cover
Soldered type *1	FCN-361J040-AU	FCN-360C040-B (B type)
Crimp type	FCN-363J040 (Housing)	FCN-360C040-D (D type: Wide mouthed type)
	FCN-363J-AU (Contact)	FCN-360C040-E (E type: Long screw type)
Wire wrapping type	FCN-362J040-AU	
Insulation displacement type	FCN-367J040-AU/FW	The cover is not necessary.

*1 As soldered type connectors, Fuji Electric model (NP8V-CN) is provided (Attached cover: FCN-360C040-B).

Terminal Relay
(Model by Fuji Electric FA Components & Systems Co., Ltd.)

■ Features
- Minimum width of 110mm has been achieved.
  The external dimension is as compact as 110mm (W) x 52mm (D) x 37mm (H).
- Push-set terminal facilitates tightening screws.
  Push-set terminal is used in the terminal section, eliminating the screw tightening time and preventing screws from being lost.
- LED operation indication facilitates I/O ON/OFF operation check.
  Operation indication LED is arranged in 1:1 correspondence with the relay. This makes the ON/OFF relay operation status clear at a glance.
- Two types of relays available for output and input.
- With surge protection diode provided.

AF96-82

- Terminal cover is installed as standard allowing device No. indication.
- With the built-in relay remover.
- Used for both DIN rail installation and rear-side screw mounting.

■ Performance specifications

Item		Performance
Operating duration		10ms or less
Recovery duration		10ms or less
Vibration resistance	Malfunction	10 to 55Hz, Duplex amplitude 1.0mm
	Durability	10 to 55Hz, Duplex amplitude 1.0mm
		3 times each in X, Y, and Z directions to total 18 times
Impact resistance	Malfunction	100 m/s²
	Durability	200 m/s²
		2 hours each in X, Y, and Z directions to total 6 hours
Operating ambient temperature		-25 to +55˚C (no condensation)
Operating ambient humidity		35 to 85% RH
Terminal screw size		M3
External connection tightening torque		0.5 to 0.7 N·m
Mounting method		Rail mounting (screw mounting also possible)
Applicable round-type crimp-style terminal		R1.25 to 3 (max.6mm wide)
Connection wire		max. ø1.4
LED indication color		Operating indication: Red, Power indication: Green
Coil surge protection element		Diode
Relay removal count		50 times
Insulation resistance (initial)		100 MΩ or more (with 500V DC megger)
Voltage resistance	Between contact coils	For 1 min. at 2000V DC
	Between contacts with same polarity	For 1 min. at 1000V DC
	Between contacts with different polarity	For 1 min. at 2000V DC
Mass		200g

■ Type/Model/Ordering code

Model (Ordering code)	I/O type	No. of points	Rated voltage	Common line handling on Connector side
RS16-☐04	Output	16 points	5V DC [DY]	NPN compatible (+ common)
RS16-☐04P		(1a x 16)	24V DC [DE]	PNP compatible (- common)
RS16E-☐04	Input	16 points		NPN compatible (+ common)

■ Terminal relay cable
• Type, model, and ordering code

Type	Cable Length	Model (ordering code)
Cable with connectors (1:2)	1,000mm	**RS910M2-0104**
For MICREX-SX	2,000mm	**RS910M2-0204**
(for input, output)	3,000mm	**RS910M2-0304**

• Model, and ordering code

Model (ordering code)	I/O type	Compatible PLC
RS910M2-☐☐04 Numeric in ☐☐ indicates a cable length. 01: 1m 02: 2m 03: 3m	Output	MICREX-SX series Tr output module: **NP1Y32☐** *1 **NP1Y64☐**
	Input	MICREX-SX series Input module: **NP1X32☐** **NP1X64☐** **NP1W3206T☐**

*1 **NP1Y32T09P1-A** (with the pulse train output function) is not applicable.

■ Dimensions

Units: mm

Remover
Power indicator lamp (green)
Operation indicator lamp (red)
110
52
M3 x 22
Connector Hirose HIF3CA-20PA-2.54DSA
4.7

50 (for rail height 15)
42.5 (for rail height 7.5)
(39)
37
33
35mm width DIN rail
14.8

Panel hole dimension (for panel mounting)
111 (min. installation pitch)
43.5
2- ø4.2 (M3 to M4 screw hole for screw mounting)
91
4.2
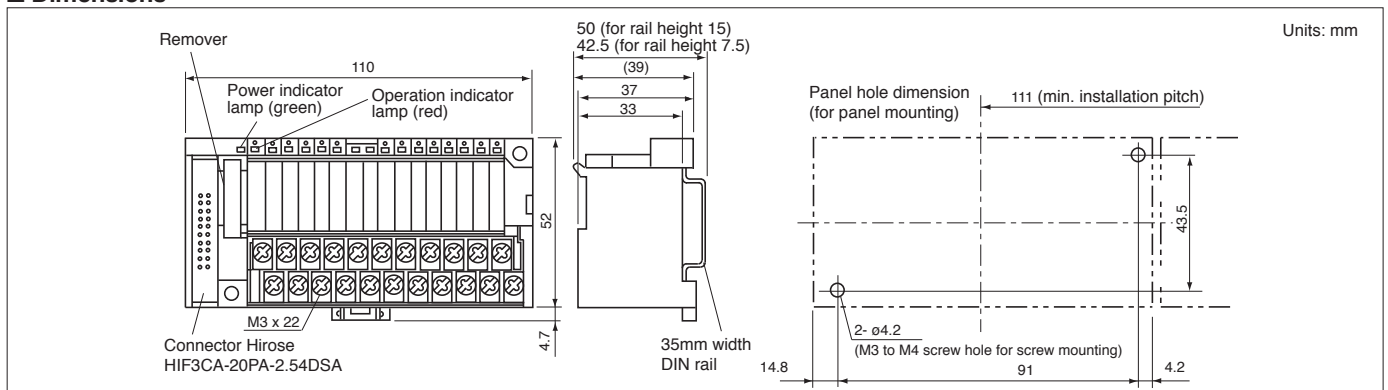
Programmable Controllers
MICREX-SX series SPH
Communication Module

Computer-level Communication Module
Web Module: NP1L-WE2 [English version]

■ Features
Through the Internet and Intranet, this module realizes equipment supervision by Web browser, E-mail sending at failure occurrence, and remote control and remote maintenance (monitoring/program modification) by the programming support tool.

NP1L-WE2
KD02-041A

■ Functional specifications

Item	Specification
Web server functions	Controller data can be monitored and set using a browser (Internet Explorer) on a remote personal computer. Mounts the tabular form data display and trend graph display functions as standard. Initial setup items for the Web modules are all set in the browser screen.
E-main send function	Sends E-mail (contain the attached file) to the specified destination address at occurrence of a set event (failure alarm notification, etc.).
FTP function	Saves trend data and CPU data (binary file) in external FTP server at occurrence of a set event. Saved data can be processed to generate a daily/monthly report or trend graph.
Security function	Limits users and setup operations by user name and password.
Remote loader function	Remote operation of SX support tool (D300win), such as monitoring of SPH sequence, from a personal computer
PPP function	Realizes the above functions through the modem (telephone and PHS circuit connection service) and mobile arc (Dopa network) on the RS-232C interface.
User contents creation function	Incorporates user-created contents in the Web module.
SNTP function	Controller data can be calibrating the date data (calendar) of the CPU module.

■ Performance specifications

Item	Specification
Ethernet interface	10BASE-T/100BASE-TX, RJ45 modular jack x1 Auto negotiation
RS-232C interface (For PPP connection)	115.2kbps max. Dsub 9-pin (male) connector x1 Character format Data length: 7/8 bits Parity: Even/odd parity Stop bits: 1/2 bits Hardware flow control: Provided
No. of units mounted	4 or less recommended (in the same configuration)
Internal current consumption	24V DC, 140mA or less
Mass	Approx. 140g

- The following are recommended the Ethernet devices;
  For industrial Ethernet devices, made by Phoenix contact Co., Ltd.
  (Switching hub, Repeater hub, Category 5 cable, Optical fiber cable etc.)

■

Ethernet Interface Module: NP1L-ET1

■ Features
- Supports the 10BASE-T/100BASE-TX interface.
- Supports three different communication modes.
- Genera-purpose communication mode
  (TCP/IP or UDP/IP protocol communication)
- Fixed buffer communication mode
  (Handshake communication between PC and specific node)
- Loader command communication mode
  (MICREX-SX loader command function)

NP1L-ET1
KD02-040A

■ Performance specifications

Item		Specification
Type		**NP1L-ET1**
Communication function	Application communication mode	General-purpose communication
		Fixed buffer communication
	Loader command automatic reception mode	Automatic transmission communication
Interface		10BASE-T/100BASE-TX
		Automatic selection by the auto negotiation function
Media control		IEEE 802.3/IEEE 802.3u
Transmission rate		10Mbps/100Mbps
Transmission medium		Twist pair cable (UTP)
Protocol		TCP/IP, UDP/IP
Max. number of nodes for simultaneous communication		16 stations (ports)
Max. number of transmit words		1017 words
Max. number of loader connections simultaneously		8 units
No. of units mounted		4 or less recommended (in the same configuration)
Internal current consumption		24V DC, 140mA or less
Mass		Approx. 140g

- The following are recommended the Ethernet devices;
  For industrial Ethernet devices, made by Phoenix contact Co., Ltd.
  (Switching hub, Repeater hub, Category 5 cable, Optical fiber cable etc.)

■ System configuration

Personal computer

Transceiver   Ethernet (10BASE5)

Hub   10BASE-T
       (or 100BASE-TX)

Personal computer

MICREX-SX   POD   MICREX-SX   Heterogeneous controllers

Remote programming monitoring

Programming support tool

Programmable Controllers
MICREX-SX series SPH
Communication Module

Online Adapter: FOA-ALFA2 [Japanese Version]

■ Features
This module allows easy remote maintenance system configuration simply by connecting the online adapter to the loader port without changing any program on the PLC (MICREX-SX SPH) side.

- Bidirectional communication between the master station (personal computer) and slave station (SPH)
- Diverse functions
  - Failure monitor function • Data accumulation function
  - Integrated time monitor function
  - Communication function between the PLCs
- Calendar function (year, month, day, hour, minute, second), Data backup function (data memory, calendar IC memory) are usually available.

■ Specifications
- General specifications

Item		Specification
Physical environment	Operating ambient temperature	0 to ±55˚C (without condensation)
	Storage temperature	-20 to ±70˚C (without condensation)
	Relative humidity	20 to -90%RH (without condensation)
	Contamination	Contamination level 2
	Corrosion resistance	No corrosive gas is present, no organic solvent adhesion
	Operating altitude/air pressure	Altitude of 2000m or less (air pressure of 70kPa or higher during transportation)
Mechanical operating condition	Resistance to vibration	One amplitude: 0.15mm, constant acceleration: 9.8m/s², 2 hours for each direction, 6 hours total
	Resistance to shock	Peak acceleration: 294m/s², 3 times for each direction
Electrical operating condition	Resistance to noise	Noise simulator method, rise time of 1ns, pulse width of 1μs, 1kV
	Resistance to electrostatic discharge	Contact discharge method: ±6kV, air discharge method: ±8kV
	Resistance to radiation electromagnetic field	10V/m (80 to 1000MHz)
Cooling system		Natural cooling
Insulation characteristic	Insulation resistance	10M or more (between connectors and ground) with a 500V DC megger
Power supply method		Supplies 24V DC from PLC or 12V DC from AC adapter.
Current consumption		24V: 60mA or less (SPH) / 288mA or less (SPB) 12V: 120mA or less
Mass		Approx. 320g
Calendar accuracy		±90 seconds/month (25˚C, conduction)
Battery type/operating life		Lithium primary battery 3.6V **NP8P-BT** / 5 years (ambient temperature of 25˚C)

Note: For operating environment, take into consideration the specifications of the communication devices used.
* 1 Use the AC adapter only at the time of initial setup data transmission. Do not use it for connection with SPH.

■ System configuration

Specialized connection cable (option) **NP4H-CB2**

■ Initial setup loader (Model: FOA-LOADER2-CD) <Japanese version>
- Creates initial setup data (each function setup). Sets the failure monitor, data accumulation, integrated time monitor functions and registers AT commands for communication.
- Writes the initial setup data to the online adapter.
- Reads the initial setup data from the online adapter.

FOA-ALFA2
KD02-024B

- Functional specifications

Mode	Contents
Online adapter mode	Execution mode of various monitor functions
Loader mode	Monitors SPH programming monitor.
Remote mode Initial setup mode	Monitors SPH programming monitor from a remote site.
Memory clear mode	Writes setup data necessary for various monitor functions using the initial setup loader.
	Backup memory initialization (clear) mode

■ Outside dimensional drawing
Unit; mm

110
36
ONLINE adapter FOA-ALFA2
90
80
70
90
4-ø5
(2) (118) (6)

Online adapter **FOA-ALFA2**

Communication network

Communication device

Communication device

Performs various monitor functions and communication setup using the initial setup loader (**FOA-LOADER2-CD**).

Performs remote monitor, e-mail sending, and data monitoring using the master station monitoring software (**FOA-CENTER2-CD**).

■ Master station monitoring software (Model: FOA-CENTER2-CD) <Japanese version>
- Slave station monitor function (reception of notification from slave station)
  - Failure monitor function • Data accumulation function
  - Integrated time monitor function
- Access from the master monitor software (personal computer) to slave station.
  - Reads data accumulated in the online adapter.
  - Automatically collects data by time specification (with circuit connection each time).
  - Updates the initial setup data from a remote site. (Remote update function)
  - Uses the personal computer loader software from a remote site.
- Other functions
  - Saves receive data as CSV files.
  - Monitors accumulated data in bar graph form.
  - Upon reception of failure information, automatically transfers the E-mail.

Controller-level Communication Module
FL-net (OPCN-2) Ver. 2.0 (100Mbps adaption)
Module: NP1L-FL3

■ **Features**
- Up to 2 communication modules including P/PE-link can be installed on the base board equipped with CPU. (For SPH200, up to two modules)
- Data exchange between processors
  Cyclic data communication, message communication
- OPCN-2 (FL-net) loader commands supported
- SX system loader functions via network are supported.

NP1L-FL3
KDD05-017

■ **Performance specifications**

Item	Specification
Type	**NP1L-FL3**
Transmission specification	10BASE-T / 100BASE-TX
No. of SX bus connectable modules	Max. 8 / configuration (including P/PE-link)
Max. number of system nodes	254 units (2 units / segment, including HUB)
Transmission line format	Bus configuraiton (multi-drop)
Framing method	Ethernet II
Access control	CSMA/CD
Transmission method (code)	Base band (Manchester coding)
Transmission speed	10Mbps / 100Mbps
Max. segment length	100m: between node and HUB (max. 200m with repeater)
Protocol	FA link protocol, UDP / IP, ICMP, ARP
IP address	Class C
Data exchange method	• Cyclic broadcast transmission method Data size: Max. 8.5 Kwords
	• Message transmission method Data size: Max. 512 words
Host interface	Common memory cyclic refresh method, block data read / write
Internal current consumption	24V DC, 160mA or less
Mass	Approx. 220g

- The following are recommended the Ethernet devices;
  For industrial Ethernet devices, made by Phoenix contact Co., Ltd.
  (Switching hub, Repeater hub, Category 5 cable, Optical fiber cable etc.)

■ **System configuration**

Personal computer

OPCN-2 (FL-net)

MICREX-SX   MICREX-SX   MICREX-SX   Heterogeneous controllers

Remote programming monitoring

Programming support tool
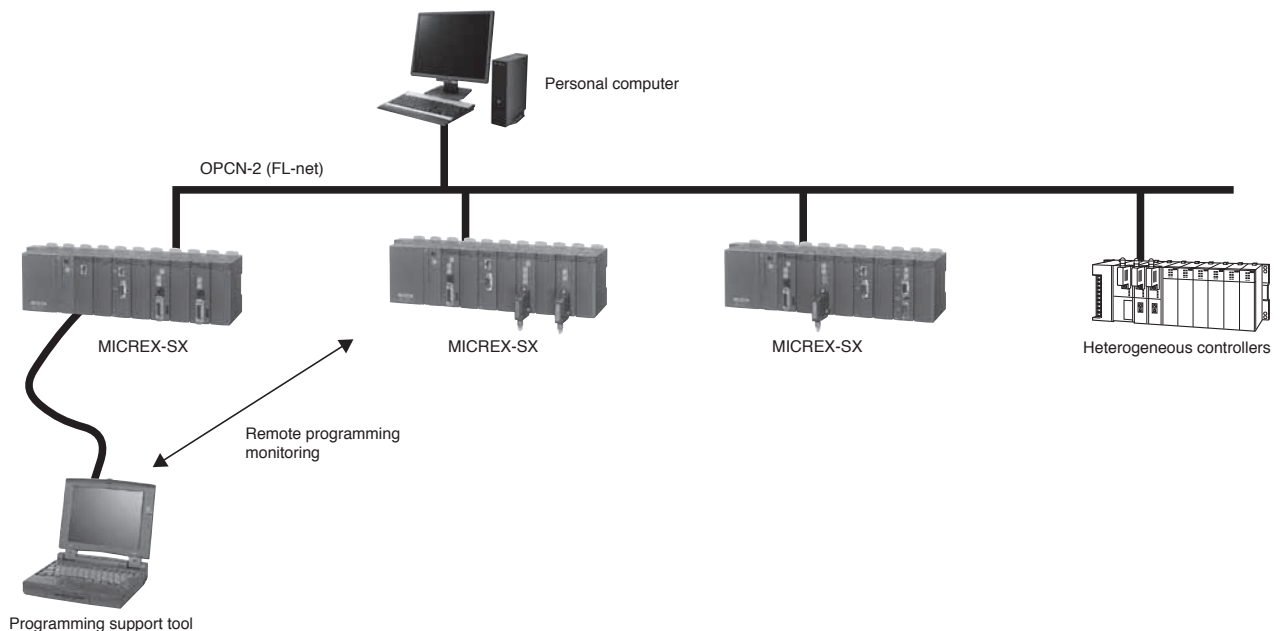
LONWORKS Network Interface Module: NP1L-LW1

■ Features
- Uses the communication extension FB compatible with the LONWORKS network, making it easier to transfer and receive MICREX-SX application data to/from other LONWORKS nodes.
- Max. number of NVs: 300, Number of CPs: Up to 200 intelligent nodes can be configured.
- Up to two units can be mounted in one system (configuration).

NP1L-LW1
AF00-197A

■ Specifications

Item	Specification	Remarks
Applicable standards	LONTALK (EIA-709.1), LONMARK	
Transmission rate	78 Kbit/sec	
Transmission distance	2200m (Bus connection)	
	500m (Free-topology connection)	
No. of node connections	64 units	No. of node connections in the same segment
Transceiver	FTT-10A	
Control LSI	TMPN3120	Application programs operate on SPH.
No. of SX bus mounted	Up to 2 modules / Configuration	Can be used through connection to two LONWORKS networks.
Max. number of NVs	300	Depends on the definition.
Max. number of CPs	200	Depends on the definition.
Total data size of NV+CP	8 Kwords + 128 words	
I/O area size	128 words	Used for NV and CP.
Memory area size	Size x 4 blocks, a total of 8 Kwords or less	Used for NV and CP.
No. of address entries	Fixed to 15	No. of nodes for NVo variable binding
No. of domain table entries	Fixed to 2	
Internal current consumption	24V DC, 140mA or less	
Mass	Approx. 200g	

■ System configuration

Central supervisory system

LON-object for air conditioners

LON-object for illumination control

Other LON-object

LON-object for electrical equipment

Ethernet (TCP / IP) / BACNET

Area controller/gateway

LONWORKS

LONWORKS-based remote I/O

Various Open Networks

Pio

Site devices

* Registration of multiple objects is possible.
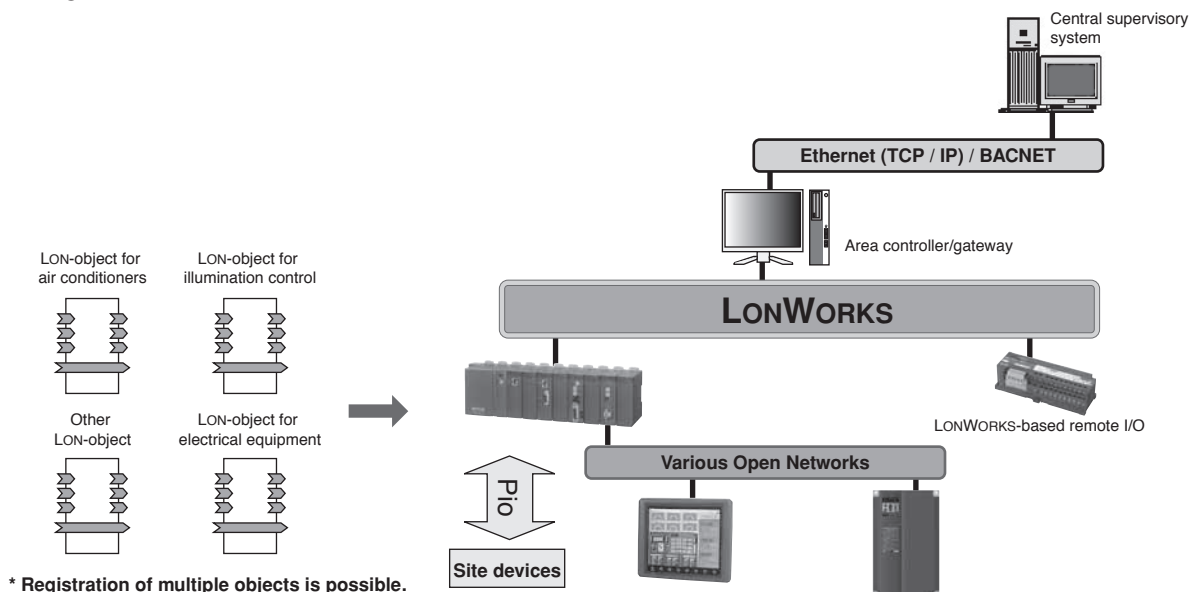
LONWORKS Network Interface Module Support Tool: [Japanese Version]

- To perform communication with the LONWORKS network, it is necessary to define network variables using the specialized tool compatible with the LONWORKS network (neuron C language programming).
- SLDEF makes it possible to define these variables with an ACCESS file without knowledge of the neuron C language.
- The information (SXD files) defined by SLDEF are downloaded from programming support tool Expert (D300win) to the LONWORKS module.
- Since the node object definition specified by LonMark is offered as FB, LONWORKS control can be defined by PLC programming.
- This support tool will be available for download free of charge from our website.

P-link/PE-link Module: NP1L-PL1 (P-link)
NP1L-PE1 (PE-link)

■ Features
- Up to 2 P/PE-link modules can be installed in a single system configuration. (For SPH200, up to two modules)
- N-to-N communications in the token passing method
- Data exchange between processors
  Broadcast communication, message communication
- User program upload/download and processor start/stop are possible from the host computer.
- Remote programming for other processor is possible via the P/PE-link.

NP1L-PL1
AF98-133

■ Performance specifications

Item	Specification	
Type	**NP1L-PL1** (P-link)	**NP1L-PE1** (PE-link)
No. of SX bus connetable modules	Max.2 /configuration	
No. of P/PE links	Max. 16	Max. 64
Transmission line format	Bus configuration (multi-drop)	
Transmission line	Coaxial cable	Coaxial cable
	Total length: Max.250m	Total length: Max.500m
Transmission method	Half-duplex, serial transmission	
Data exchange method	N: N (token passing) method, memory refresh method	
Transmission speed	5Mbps	
Data transfer	Broadcast communication, message transmission	
Cable	Coaxial cable /5C-2V (conforming to JIS C 3501)	
Internal current consumption	24V DC, 160mA or less	
Mass	Approx. 235g (module), approx. 40g (P/PE-link connector)	

■ System configuration
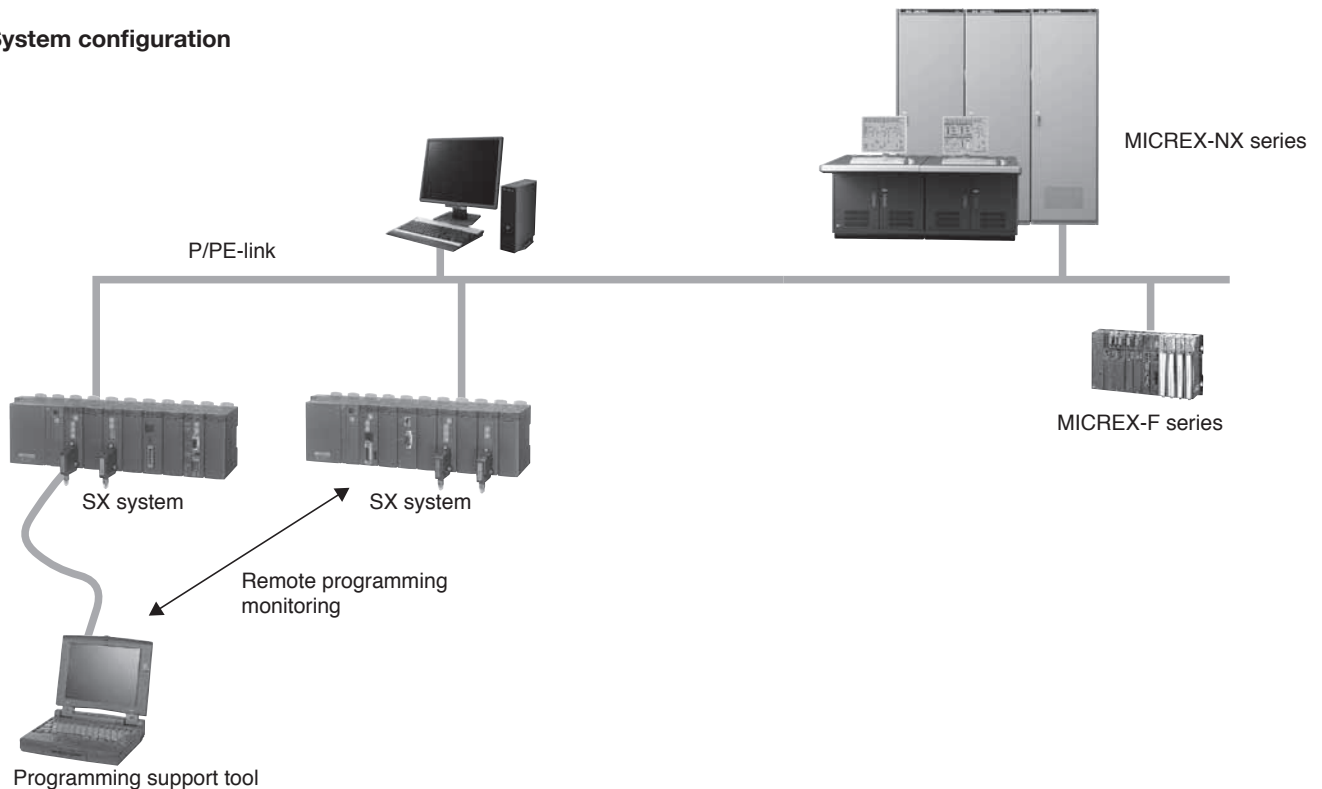
MICREX-NX series

P/PE-link

MICREX-F series

SX system

SX system

Remote programming monitoring

Programming support tool

LE-net Module: NP1L-LE1
LE-net Loop 2 Module: NP1L-LL2

■ Features
- Up to eight LE-net modules mountable on each configuration. (For SPH200, up to two modules)
- LE-net is an original network of Fuji Electric. It is a low-priced link module between processors to conduct communication with other nodes connected to the LE-net.
- Using the LE-net, broadcast communication and message communication can be conducted.
- The LE-net can be connected either as a multi-drop network or a single loop redundant wiring network.
- If the transmission line is broken, a transmission error occurs in a multi-drop network, but in a loop network, data communication between nodes can continue. This enables construction of a highly reliable system at a relatively low cost.
- It is possible for the loop-2 module to make the LE-net modules redundant by using the redundancy maintenance FB (provided free of charge). The single configuration and the redundant configuration can coexist within a loop.

NP1L-LL2
KD04-015

NP1L-LE1
KD04-016

Note: Multi-drop networks, loop-2 networks cannot be connected with each other because each network uses a different transmission protocol. To connect them together, the transmission method must be unified.

■ Performance specifications

Item	LE-net module	Loop 2 module
Type	**NP1L-LE1**	**NP1L-LL2**
Connection node quantity	Up to 64 units	
Node number setting range	0 to 63	
Connection distance/ communication speed	800m/62.5kbps, 500m/125kbps, 250m/250kbps, 100m/500kbps, 40m/1Mbps	Total extension: 500m, Between nodes: 100m 5Mbps
Transmission line	Shielded twisted pair cable (T link cable recommended)	Shielded twisted pair cable, category-5 cross cable
Transmission line format	Multi drop,	Single loop redundant wiring
Transmission method	Semi-duplex, Half-duplex, destination arrival receiving method on both sides	
Communication protocol	N: N time slot data exchange communication (broadcast) 1: 1 message communication	
User data frame size	Time slot frame: up to 96 bytes/node Message frame: up to 122 bytes	Time slot frame: up to 1536 bytes/node Message frame: up to 490 bytes
No. of connectable support units	Up to two units simultaneously, including those connected directly or remotely	
Hardware redundancy	—	O

■ System configuration
- LE-net module

LE-net network
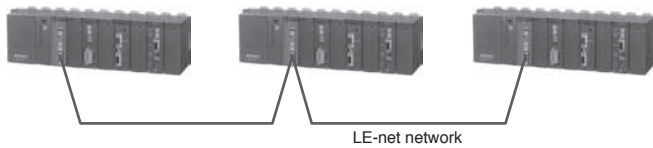
- LE-net loop 2 module

1) Basic system

LE-net loop 2 network
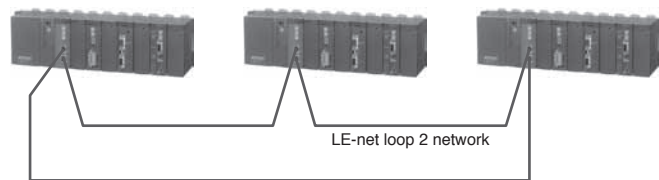
2) Redundant system

LE-net modules within the same baseboard can be made redundant by using the redundancy maintenance FB (provided free of charge). The single configuration and the redundant configuration can coexist within a loop.

Network duplex configuration

The redundant configuration of power supply, CPU, and network.

LE-net loop 2
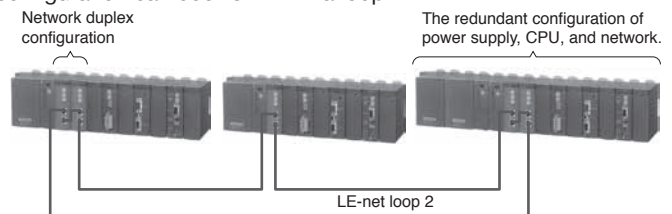
General Purpose Communication Module: NP1L-RS□

■ Features
- Can be combined with an expansion FB (Function Block) for communications with diverse equipment without creating any communication control program.
- Communication port can be used as the loader connection port, which is effective in debugging from the SX bus expansion side installed at a distance.

NP1L-RS1
AF01-93

■ Performance specifications
- Commnication port type by module types

Type	NP1L-RS1	NP1L-RS2	NP1L-RS3	NP1L-RS4	NP1L-RS5
Communication port	RS-232C x 1 channel RS-485 x 1 channel	RS-232C x 1 channel	RS-232C x 2 channels	RS-485 x 1 channel	RS-485 x 2 channels

- Commnication port specifications

Item	Specification		
Port	RS-232C	RS-485	
No. of SX bus connectable modules	Max. 16 /configuration		
Communication method	Semi-duplex / serial communication [1]		
Synchronization method	Start-stop synchronous transmission		
Transmission speed	1200/2400/4800/9600/19200/38400/57600/76800/115200bps (115200bps or less in total of 2-ch.) [2]		
Transmission distance	15m or less	1km or less (transmission speed : 19200bps or less)	
No. of connectable modules	1 : 1 (One external device)	1 : N (Max. 31)	
Connection method	D-sub, 9-pin connector (female)	D-sub, 9-pin connector (male)	Screw terminal block (M3) 20 poles (NP1L-RS5)
Transmission protocol	Depends on the application program (Expansion FB) in the CPU module		
Internal current consumption (24V DC)	NP1L-RS1: 110mA or less, NP1L-RS2: 90mA or less, NP1L-RS3: 110mA or less, NP1L-RS4: 80mA or less, NP1L-RS5: 110mA or less		
Mass	NP1L-RS1: Approx. 170g, NP1L-RS2: Approx. 160g, NP1L-RS3: Approx. 140g, NP1L-RS4: Approx. 160g, NP1L-RS5: Approx. 190g		

[1] : The use of the non-procedure FB allows full-duplex communication on applications.
[2] : For transmission rates 300, 600, 76800, and 115200 bps, use FBs corresponding to the transmission rate.

■ System configuration

MICREX-SX

Communication software is described in the programs as an extended FB and stored in the CPU module.

RS-232C equipment including personal computer and barcode reader

RS-485 equipment
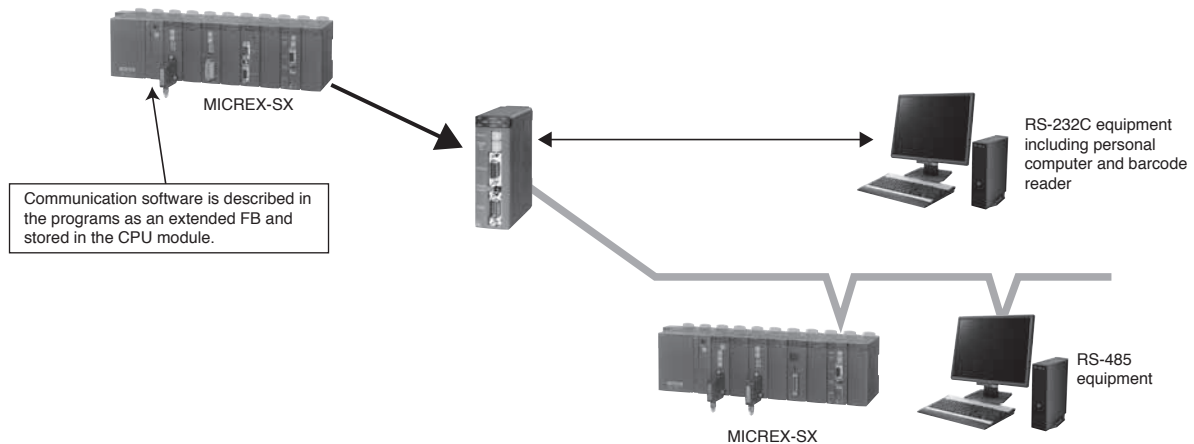
MICREX-SX

■ Support tool network function
Use of general-purpose communication modules enables supporting multiple systems with one unit of personal computer loader or remotely supporting the

MICREX-SX   MICREX-SX   MICREX-SX

Modem

Modem   Programming support tool
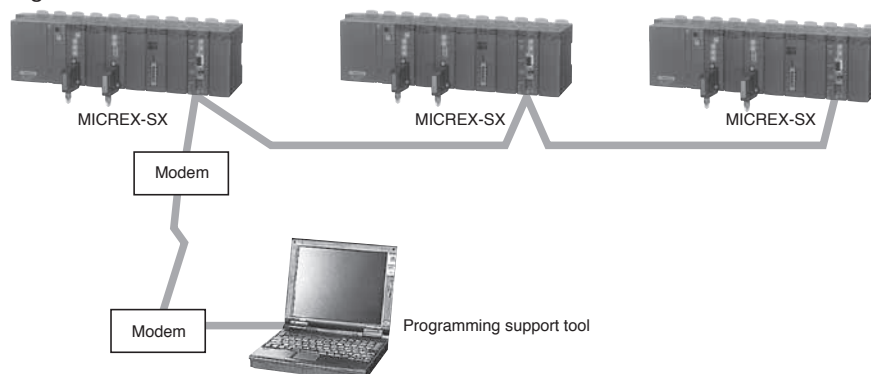
MICREX-SX series SPH
Communication Module

Device-level Communication Module
OPCN-1 Master Module: NP1L-JP1
OPCN-1 Slave Module: NP1L-JS1
OPCN-1 Interface Module: NP1L-RJ1

■ Features
NP1L-JP1
- Up to 8 units can be connected in a single system configuration.
- Up to 31 units of slave equipment can be connected to a single master unit.
- Number of I/O points is maximum 8192 points (512 words). For SPH200, up to 2048 points (128 words)
- Line speed can be changed to 1Mbps, 500kbps, 250kbps, or 125kbps.

NP1L-JS1
- I/O data link through the OPCN-1 is possible between CPUs.
- Number of I/O points is maximum 2048 points (128 words)

NP1L-JP1
AF97-522

NP1L-RJ1
- Slave station configuration, conforming to the OPCN-1 Standard, implements compact, economical, centralized remote I/O as a multi-vendor network.
- Input filtering time of the input module can be set with DIP switch on the front.

■ Communication specifications

Item	Specification		
Type	**NP1L-JP1**	**NP1L-JS1**	**NP1L-RJ1**
Applicable class	TYPE-M51 I		TYPE-S51 I
No. of SX bus connectable modules	Max. 8 /configuration		–
No. of connectable slaves	31/master module	–	
Station No. setting range	00 fixed	01 to 7F	
Transmission line format	Bus configuration (multi-drop)		
Transmission line	Shielded twisted pair cable		
Transmission method	Half-duplex, serial transmission, based on EIA RS-485		
Transmission speed (Max. total length) *1	125kbps (1000m), 250kbps (800m), 500kbps (480m), 1Mbps (240m)		
Encoding method	NRZI (Non Return to Zero Inverted)		
Error check	ECS ($X^{16}+X^{12}+X^5+1$) and retry		
Communication function	• Initial setting service • I/O service • Reset service • JEM-TR192 service (data read/write service)	• Initial setting service • I/O service • Reset service • Simultaneous broadcast service	
No. of I/O points	Normal mode: Max. 2032 points (127 words) Extension mode or I/O Extension mode: Max. 8192 points (512 words)	Max. 2048 points (128 words) /1 slave	
No. of message points	Max. length of single transmission: 250 bytes (data section for the data read/write service)	–	
Internal current consumption	24V DC, 130mA or less		
Mass	Approx. 230g (module), Approx. 40g (OPCN-1 connector)		

*1 The transmission distance applies to T-KPEV-SB 1.25mm² from Furukawa Electric Co. Note that the distance may vary with the cable characteristics.

■ System configuration
● OPCN-1 slave system
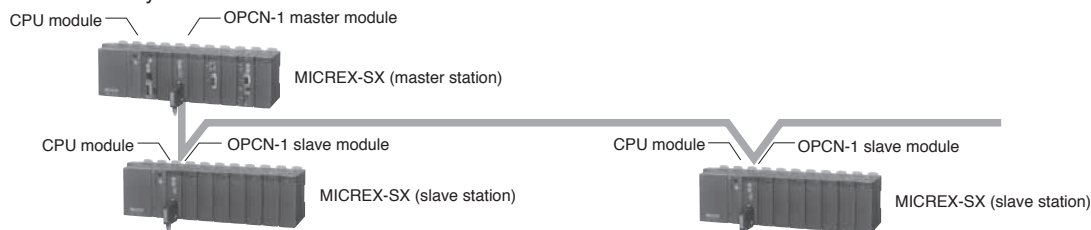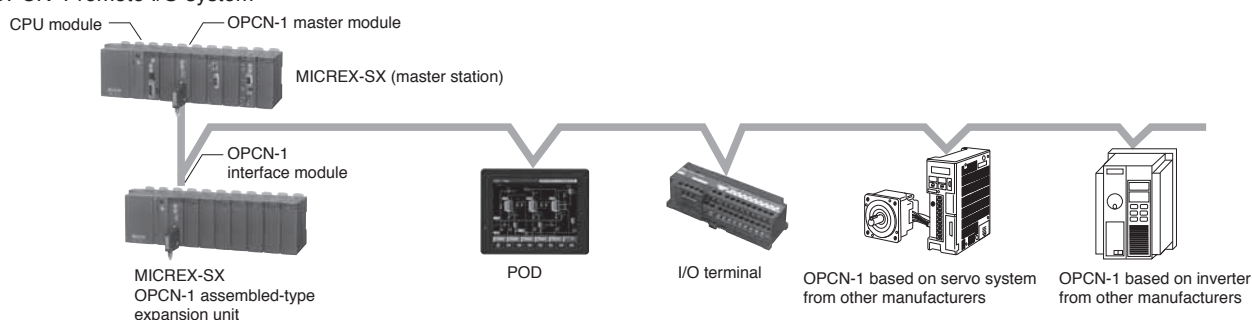
CPU module — OPCN-1 master module
MICREX-SX (master station)

CPU module — OPCN-1 slave module
MICREX-SX (slave station)

CPU module — OPCN-1 slave module
MICREX-SX (slave station)

● OPCN-1 remote I/O system

CPU module — OPCN-1 master module
MICREX-SX (master station)

OPCN-1 interface module

MICREX-SX
OPCN-1 assembled-type expansion unit

POD

I/O terminal

OPCN-1 based on servo system from other manufacturers

OPCN-1 based on inverter from other manufacturers

DeviceNet Master Module: NP1L-DN1
DeviceNet Slave Module: NP1L-DS1
DeviceNet Interface Module: NP1L-RD1

■ **Features**

NP1L-DN1
• Up to 8 units can be connected in a single system configuration.
• Up to 63 units of remote I/O equipment can be connected to a single master unit.
• Number of I/O points is maximum 8192 points (512 words). For SPH200, up to 2048 points (128 words)
• Line speed can be changed to 125kbps (500m), 250kbps (250m), or 500kbps (100m).

NP1L-DS1
• I/O data link through the DeviceNet is possible between CPUs.
• Number of I/O points is maximum 2048 points (128 words)

NP1L-DN1
AF99-340

NP1L-RD1
• Realizes small economic collective remote I/O as a DeviceNet slave station.

■ **Communication specifications**

Item	Specification		
Type	**NP1L-DN1**	**NP1L-DS1**	**NP1L-RD1**
No. of SX bus connectable modules	Max. 8/configuration		–
No. of remote I/O stations	63 units/master module	–	
MAC ID setting range	00 to 63		
Transmission line format	Bus configuration (multi-drop), tree-structure, branch-structure		
Transmission line	Trunk (thick cable), drop (thin cable)		
Transmission method	Half duplex serial communication method		
Data rate (distance)	125kbps (500m), 250kbps (250m), 500kbps (100m)		
Media access control	CSMA/NBA		
Modulation	Base band		
Media linking	DC coupling-type differential Tx/Rx		
Encoding method	Non-zero recovery using the bit stuff function NRZ (Non Return to Zero)		
Error check	FCS (Frame Check Sequence CRC-16)		
Communication function	I/O message · Poll command/response · Bit-Strobe command/response · Change of state/Cyclic ACK not provided · Change of state/Cyclic ACK provided Explicit message (implements the client/server function to set and diagnose the remote I/O stations Low priority communication traffic)	Poll command/response Explicit message	
Vendor ID	319 (Fuji Electric Systems Co,. Ltd.)		
Device type	Communication Adapter (Code: 0x0C)		
No. of I/O points	Normal mode: Max. 2048 points (128 words) Extension mode or I/O Extension mode: Max. 8192 points (512 words)	Max. 2048 points (128 words) /1 slave	
No. of message points	Max. length 492 bytes per transmission (Explicit message)		
Network current consumption	24V DC, 45mA or less (supplied from DeviceNet power supply)		
Internal current consumption	24V DC, 90mA or less		
Mass	Approx. 170g		

■ **System configuration**

●DeviceNet slave system

CPU module — DeviceNet master module
MICREX-SX master station)

CPU module — DeviceNet slave module
MICREX-SX (slave station)

CPU module — DeviceNet slave module
MICREX-SX (slave station)
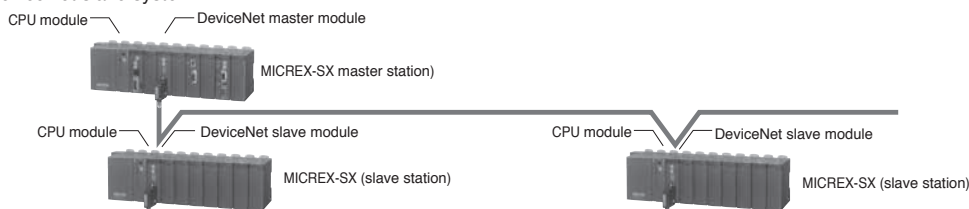
●DeviceNet remote I/O system

DeviceNet master module

MICREX-SX   DeviceNet

DeviceNet-based POD
from other manufacturers

I/O terminal

DeviceNet-based servo system
from other manufacturers

Inverter

DeviceNet interface module

DeviceNet collective extension unit
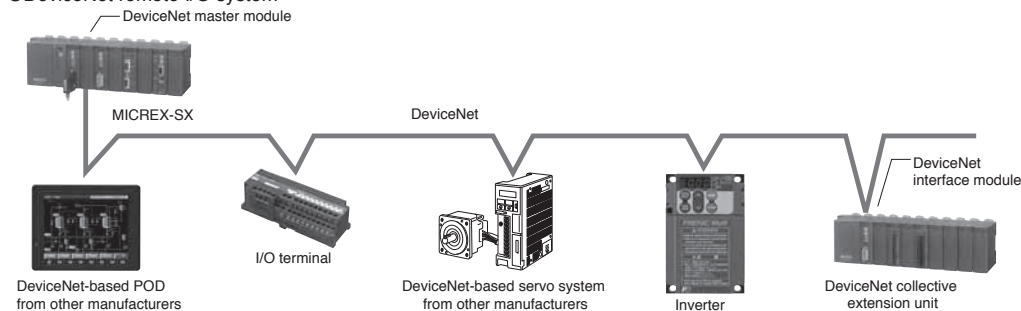
MICREX-SX series SPH

Communication Module

T-link Master Module: NP1L-TL1
T-link Slave Module: NP1L-TS1
T-link Interface Module: NP1L-RT1

■ Features

NP1L-TL1
- Up to 8 units can be connected in a single system configuration.
- Up to 32 units of slave equipment can be connected to a single master unit.
- Number of I/O points is maximum 8192 points (512 words). For SPH200, up to 2048 points (128 words)
- T-link equipment for such as MICREX-F and FLEX-PC can be used. (Some types excluded.)

NP1L-TS1
- Data link by I/O data between CPUs through T-link is possible.
- Five different number of I/O points (1 word/1 word, 2 words/2 words, 4 words/4 words, 8 words/8 words, 32 words/32 words) can be selected according to application.

NP1L-TL1
AF98-132

NP1L-RT1
- Realizes small economic collective remote I/O as a T-link slave station.

■ Communication specifications

Item	Specification		
Type	**NP1L-TL1**	**NP1L-TS1**	**NP1L-RT1**
No. of SX bus connectable modules	Max. 8 /configuration		–
No. of connectable T-link slaves	32 /master module * 2	–	
Transmission line format	Bus configuration (multi-drop)		
Transmission line (Max. total length) * 1	Bus transmission line: Shielded twisted pair cable Total length: Max. 1000m Optical transmission line: SI/GI quarts cable, multicomponet cable (Optical connector FNC120/130 is needed for the optical transmission line)		
Transmission method	Half-duplex, serial transmission		
Data exchange method	1:N (polling / selecting) method		
Transmission speed	500kbps		
Error check	FCS ($X^{16}+X^{12}+X^5+1$)		
No. of I/O points	Normal mode: Max. 2048 points (128 words) Extension mode or I/O Extension mode: Max. 8192 points (512 words)		
No. of message points	Max. length per transmission: 220 bytes		
Internal current consumption	24V DC, 140mA or less		
Weight	About 200g (module), about 40g (T-link connector)		

* 1 Transmission distance is the length when using the T-KPEV-SB 1.25mm^2 cable manufactured by Furukawa Electric Co. However, note that the distance may occasionally vary due to the cable characteristics.

* 2 Up to 64 units can be connected as slaves when using the T link electric repeater.

■ System configuration

●T-link slave system
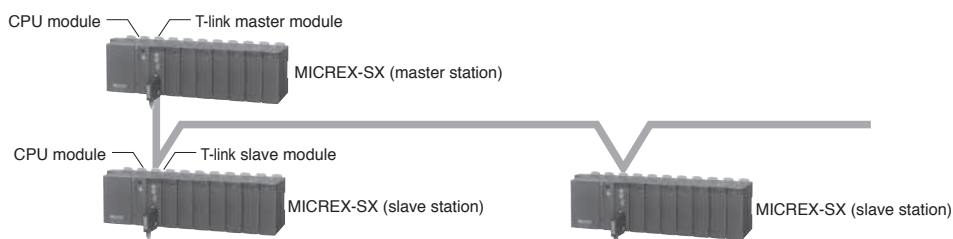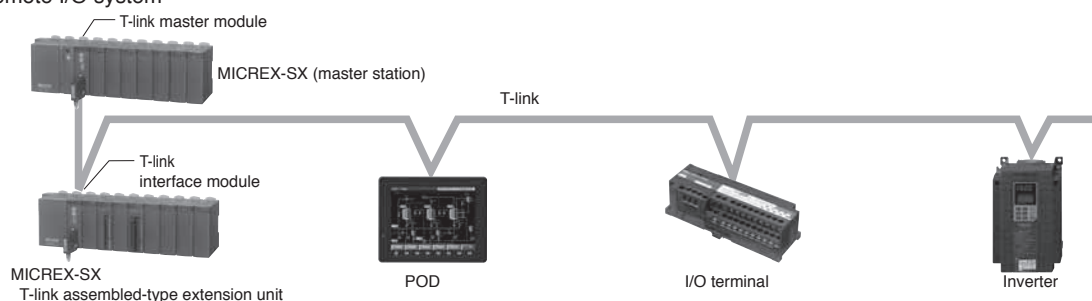
CPU module — T-link master module
MICREX-SX (master station)

CPU module — T-link slave module
MICREX-SX (slave station)

MICREX-SX (slave station)

●T-link remote I/O system

T-link master module
MICREX-SX (master station)

T-link

T-link interface module

MICREX-SX
T-link assembled-type extension unit

POD

I/O terminal

Inverter

PROFIBUS-DP Master Module: NP1L-PD1
PROFIBUS-DP Slave Module: NP1L-PS1
PROFIBUS-DP Interface Module: NP1L-RP1

■ Features
NP1L-PD1
- Open system
  Diverse slave products of PROFIBUS-DP can be connected (from more than 300 vendors). As for the DP slave, the compatibility authenticated by the PROFIBUS association has been confirmed.
- Flexible system configuration
  In addition to the basic configuration consisting of one DP master and multiple DP slaves, combination with multiple DP masters and multiple DP slaves are possible, making it easier to distribute master functions.
  The maximum number of unit connections (including master stations) is 126. With 33 units or more, repeaters are required.
- Transmission rate
  Can be selected from nine options: 9.6/19.2/93.75/187.5/500/1500/ 3000/6000/12000kbps. (The upper limit depends on the type of the DP slave.)

NP1L-PD1	NP1L-PS1/RP1
KD02-038A	KD03-023

NP1L-PR1
- This communication module realizes collective remote I/O as a PROFIBUS-DP slave station.

NP1L-PS1
- A data link of input/output data can be established between CPUs via PROFIBUS-DP.
- A maximum of 128 words can be controlled as an input/output total of I/O points.

■ Performance specifications

Item	Specification		
Type	**NP1L-PD1**	**NP1L-PS1**	**NP1L-RP1**
No. of SX bus connectable modules	Max. 8/configuration		—
Applicable standards	IEC 66158, EN 50170, DIN 19245	PROFIBUS-DP slave function	
Communication function	PROFIBUS-DP master (DPM1) function	—	
No. of slave station connections	Up to 32 units (up to 126 units with repeaters)	0 to 99	
Station No. (station address) setup range	0 to 125		
Transmission line form	Bus configuration (multi-drop)		
Communication standard	Applicable to EN 50170 and DIN 19245.		
Data exchange system	1:N (polling/selecting)		
Transmission rate	Nine options (set by configuration of the programming loader)		
	9.6/19.2/93.75/187.5/500/1500/3000/6000/12000 kbps		
Transmission distance	1200m with a transmission rate of 9.6kbps, 100m with a transmission rate of 12Mbps (Refer to the table below.)		

Baud rate (kbps)	9.6	19.2	93.75	187.5	500	1500	3000	6000	12000
Distance/segment	1200m	1200m	1200m	1000m	400m	200m	100m	100m	100m

Item	Specification		
Cable	PROFIBUS-DP cable		
	(Shielded twist pair cable)		
No. of I/O points	Normal mode: Max. 2048 points (128 words) *1	In total I/O: Max. 128 words	
	Extension mode or I/O Extension mode: Max. 8160 points (510 words)	(Each I/O: Max. 122 words)	
Internal current consumption	24V DC, 200mA or less	24V DC, 150mA or less	
Mass	Approx. 250g	Approx. 180g	

*1 SPH200 supports standard mode only.

■ System configuration

- PROFIBUS-DP master module
- MICREX-SX (master station)
- PROFIBUS-DP
- PROFIBUS-DP slave module
- PROFIBUS-DP interface module

POD | Inverter | PROFIBUS-DP-based Servo system from other manufacturers | PROFIBUS-DP-based actuator from other manufacturers | PROFIBUS-DP-based sensor from other manufacturers | MICREX-SX (slave station) | MICREX-SX Assembled-type extension unit

■ Configurator Software: KONF-PDP
Used to download the system configuration information to the PROFIBUS-DP master module. Required to update the initial setup or system configuration.

- **Please purchase from**
HMS INDUSTRIAL NETWORKS

Programmable Controllers
MICREX-SX series SPH
Communication Module

I/O Terminal: NR1 □ Series
: NR2 □ Series

Compact type I/O terminal applicable to diverse field networks with a common frame size.

■ Features
- Compatible with diverse device level networks
  Device level network which performs high-speed communication of I/O information and messages between a programmable controller, a personal computer, and other controllers and an inverter, a servo, an MMI device, and other FA devices, among diverse networks consisting of an FA system, ranging from the computer level to the bit level. The I/O terminal corresponds to open device level networks: OPCN-1, DeviceNet, T-link, LONWORKS, and SX bus.
- Easy maintenance
  Since removable terminal blocks are used as the terminal blocks for the communication section, power supply, and I/O, the main unit can be attached and removed easily.

NR1 series

NR2 series

- Preventing mis-wiring
  Uses different colors for the surface sheets of the main unit: input (white), output (black), and I/O mixture (zebra). Applicable networks are also displayed, enabling determination of the unit type at a glance.

- NR1 series
Input unit (white)

Output unit (black)

NR2 □ Series
KD04-021
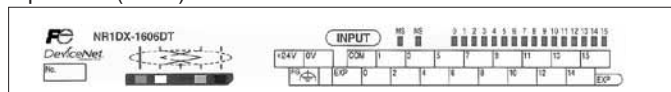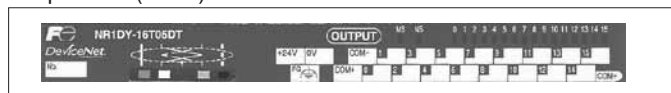
NR1 □ Series
AF00-187

I/O mixture unit (zebra)
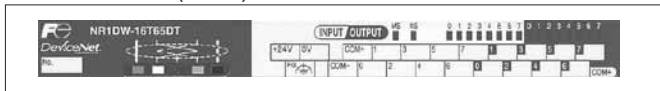
- NR2 series
Input unit (white)
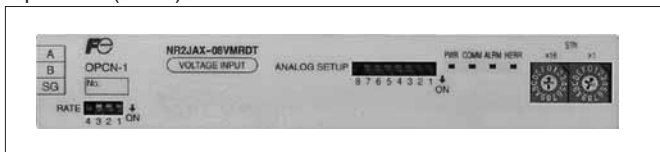
Output unit (black)

- Enabling DIN rail attachment
  Not only usual screw attachment but also DIN rail attachment is possible.

■ Features of the NR1 Series
- Efficient safe terminal block structure
  This terminal block has terminal screws which are self-lifting by themselves after loosening, thus preventing screws from being lost at the time of wiring to the round amplifier terminal, increasing the wiring work efficiency.
  The use of power supply and I/O terminal blocks with the finger protection fitting (IP20) contributes to the safety of machines and equipment.

(Self-lifting screw terminals/Finger protection fitting)

- Contributing to panel design standardization
  The unit frame is unified to a compact size of 148x50x40 (WxHxD: mm), allowing design standardization without worrying about external view modifications by I/O specifications and network specifications. Network modifications can be dealt only with unit replacement.

• 25% reduction of total installation space
"Common extension terminal block" which extends the number of common terminals with one-touch operation is optionally available.
The use of "common extension terminal block" eliminates the necessity of the separate relay terminal block for common extension, reducing the total installation space by 25%.

25% reduction of the total installation space
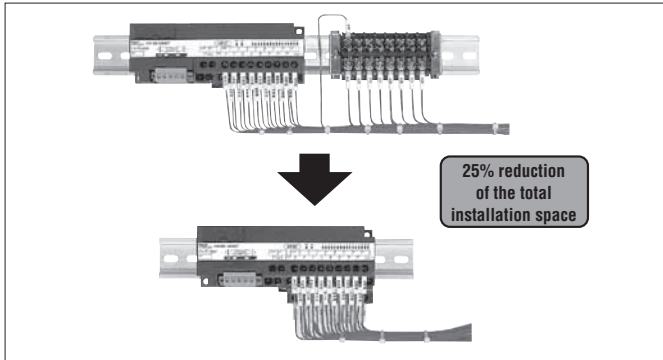
■ **Common extension bar**
Used to extend the common terminal block that is mounted on the lower side of the main unit.
(Except for NR1 X Y-08R07DT)
Type: **NR1XV-CB1**

The terminals are divided into two groups for electrical connection: □ and ■ as shown below.

To COM/EXP of the main unit

To mounting screw of terminal block (right side)
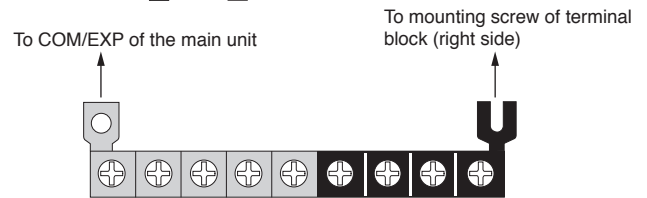
■ **Models**

NR1 □ series

Product name		Model (= Product code)	Specification
OPCN-1	16-point input	**NR1□X-1606DT**	24V DC, 16-point bi-directional input, removable terminal block
SX bus	8-point Ry output	**NR1□Y-08R07DT**	240V AC/110V DC, 8-point Ry output, removable terminal block
T-link	16-point Tr output *[2]	**NR1□Y-16T05DT**	24V DC, 16-point Tr sink output, removable terminal block
DeviceNet *[1]	8/8-point mixture	**NR1□W-16T65DT**	24V DC, 8-point source input, 12-24V DC, 8-point Tr sink output, removable terminal block
	4-axis pulse train output *[3]	**NR1SF-HP4DT**	Pulse train output comand, 250kHz, 4-axis (2 points / 1-axis)
LONWORKS	16-point input	**NR1LX-1606DT**	24V DC, 16-point bi-directional input (4 points can be used as pulse inputs), removable terminal block
	8-point Ry output	**NR1LY-08R07DT**	240V AC/110V DC, 8-point Ry output, removable terminal block
	9-point input/2-point output	**NR1LW-11R80DT**	24V DC, 9-point source input (4 points can be used as pulse inputs), 2-point Ry output, removable terminal block
Option		**NR1XV-CB1**	Common extension terminal block (9 pins)

*[1]: □ specification (applicable network specification): J=OPCN-1, S=SX bus, T=T-link, D=DeviceNet
*[2]: Tr output products without a fly-wheel diode are also offered. (Model: **NR1 □ Y-16T05DTZ701**)
*[3]: Four-axis pulse train output is supported only by the SX bus.

NR2 □ series

Product name	Model (= Product code)	Specification
Digital input 32-points	**NR2DX-3206DT**	DeviceNet based on, digital input 32 points, removable terminal block
Digital Tr output 32-points	**NR2DY-32T05DT**	DeviceNet based on, digital transistor sink output 32 points, removable terminal block
Digital I/O 32-points	**NR2DW-32T65DT**	DeviceNet based on, digital input 16 points/transistor sink output 16 points, removable terminal block
Digital Ry output 16-points	**NR2DY-16R07DT**	DeviceNet based on, digital relay output 16 points, removable terminal block
Analogue 8-ch voltage input type	**NR2JAX-08VMRDT**	OPCN-1 based on, multi range input 8 ch, resolution 13 bits (voltage type), removable terminal block
Analogue 8-ch current input type	**NR2JAX-08IMRDT**	OPCN-1 based on, multi range input 8 ch, resolution 13 bits (current type), removable terminal block
Analogue 4-ch voltage output type	**NR2JAY-04VMRDT**	OPCN-1 based on, multi range output 4 ch, resolution 13 bits (voltage type), removable terminal block
Analogue 4-ch current output type	**NR2JAY-04IMRDT**	OPCN-1 based on, multi range output 4 ch, resolution 13 bits (current type), removable terminal block

■ **Specifications**

• General specifications

Item		Specification
Applicable standards		IEC 61131-2/Ed2, EN 50081-2, UL508 *
Physical environment	Operating ambient temperature	0 to ±55˚C (Lon Works-based product: -10 to +55˚C)
	Storage temperature	-20 to +70˚C
	Relative humidity	20 to 95%RH (without condensation)
	Dust	No dust present
	Contamination	Contamination level 2
	Corrosion resistance	No corrosive gas is present, no organic solvent adhesion
	Operating altitude/air pressure	Altitude of 2000m or less (air pressure of 70kPa or higher during transportation)
Mechanical operating condition	Resistance to vibration	One amplitude: 0.15mm, constant acceleration: 19.6m/s^2, 1.5 hours for each direction, 4.5 hours total
	Resistance to shock	Peak acceleration: 147m/s^2, 3 times for each direction
Electrical operating condition	Electrostatic discharge	Contact discharge: ±6kV, air discharge: ±8kV
	Radiative radio frequency electromagnetic field	80 to 1,000MHz: 10V/m
	Fast transient burst wave	Power supply: ±2kV
	Conductive radio frequency interference	0.15 to 80MHz, 10Vrms
	Square wave noise	Noise power supply 1.5kV, pulse width 1μs, Rising time 1ns
Installation and wiring conditions	Structure	IP20 Panel-mount type
	Screw fastening torque	Terminal screw, terminal block mounting screw: 0.5-0.6N·m, Unit mounting screw: 1 to 1.5N·m
	Cooling system	Natural cooling

* Acquisition of UL508 is scheduled for the NR2 series.

• Power supply specifications

Item	Specification		
Unit type	**NR1□□**	**NR2D□**(digital I/O)	**NR2JA□**(analog I/O)
Power supply method	External power supply	DeviceNet communication cable	External power supply
Rated input voltage	24V DC	24V DC	24V DC (Three phase full-wave rectification can not be used.)
Input voltage range	21.6 to 26.4V DC, (LᴏɴWᴏʀᴋs-based product: 20.4 to 27.6V DC)	11 to 25V DC	20.4 to 26.4V DC
Dropout tolerance	1ms (at 21.6V), LᴏɴWᴏʀᴋs-based product (at 20.4V)	1ms (at 20.4V)	1ms (at 20.4V)
Inrush current	5A, 1ms or less (LᴏɴWᴏʀᴋs-based product: 3A, 5ms or less, 25A, 5ms or less for the **NR1LY-08R07DT**)	7A, 0.4ms or less	5A, 1ms or less
Dielectric strength	1500V AC, 1 minute (Between power supply input terminal and frame ground)	500V AC, 1 minute (Between power supply input terminal and I/O terminal)	500V AC, 1 minute (Between analog I/O terminal and frame ground)
Insulation resistance	10MΩ or more (500V DC megger) (Between input terminal and frame ground)	10MΩ or more (500V DC megger) (Between power supply input terminal and I/O terminal)	10MΩ or more (500V DC megger) (Between analog I/O terminal and frame ground)
Power consumption	OPCN-1 SX bus T-link DeviceNet — **NR1□X-1606DT**: 1.4W or less / **NR1□Y-08R07DT**: 3W or less / **NR1□X-16T05DT**: 1.4W or less / **NR1□X-16T65DT**: 1.4W or less / **NR1SF-HP4DT**: 3.5W or less; LᴏɴWᴏʀᴋs — **NR1LX-1606DT**: 1.6W or less / **NR1LY-08R07DT**: 3W or less / **NR1LW-11R80DT**: 1.6W or less	**NR2DX-3206DT**: 2.5W or less / **NR2DY-32T05DT**: 2.5W or less / **NR2DW-32T65DT**: 2.5W or less / **NR2DY-16R07DT**: 4.5W or less	**NR2JAX-08VMRDT**: 4.8W or less / **NR2JAX-08IMRDT**: 4.8W or less / **NR2JAX-04VMRDT**: 5.6W or less / **NR2JAX-04IMRDT**: 6.3W or less

• I/O specifications
(1) NR1 type: I/O specifications of OPCN-1/SX bus/T-link/
    DeviceNet-based products

• Input specifications

Item	Specification
Rated input voltage	24V DC
Max. input voltage	26.4V DC
Ripple percentage	5% or less
Rated input current	7mA
Input type	No polarity
Input impedance	3.3kΩ
Operating voltage	ON voltage range: 15 to 26.4V / OFF voltage range: 0 to 5V
Input delay time ON/OFF filtering time	OPCN-1, DeviceNet: 3ms/3ms / SX bus: Can be changed collectively through parameter setup. * / T-link: 5ms/5ms
No. of points per common	16 points/common (Mixture model: 8 points/common)
Isolation	Photocoupler
Dielectric strength	1500V AC, 1 minute (Between input terminals and frame ground)
Insulation resistance	10MΩ or more (500V DC megger) (Between input terminals and frame ground)

* [OFF to ON] - [ON to OFF]: 1-1, 3-3 (default), 3-10, 10-10, 30-30, 100-100ms

• Transistor output specifications

Item	Specification
Rated output voltage	24V DC
Allowable output voltage range	19.2-30V DC
Output format	Sink
Rated load current	0.5A/point (30V DC), 4A/common
Max. load current	0.6A/point (30V DC), 4.8A/common
Output voltage drop	1.5V or less (0.5A)
Output delay time	OFF to ON: 1ms or less / ON to OFF: 1ms or less
Leakage current when OFF	0.1mA max.
Surge current	2A, 10ms
Surge suppresser circuit	Clamp diode
Common configuration	16 points/common (8 points/common only for mixture products)
Insulation method	Photocoupler insulation
Dielectric strength	1500V AC, one minute, between input terminals and FG
Insulation resistance	10MΩ or more with a 500V DC megger Between input terminals and FG

• Relay output specifications

Item	Specification
Rated output voltage	240V AC, 110V DC
Max. allowable output voltage	264V AC or less, 110V DC or less
Max. load current	30/250V DC: 2A/point, 110V DC: 0.2A/point
Output delay time	OFF to ON: 10ms or less / ON to OFF: 10ms or less
Leakage current when OFF	None
Surge suppresser circuit	None
Min. load voltage, current	5V DC, 1mA
Max. open/close frequency	1800 times/hour
Common configuration	1 point/common
Insulation method	Relay insulation + photocoupler insulation
Dielectric strength	1500V AC, one minute, between output terminals and FG
Insulation resistance	10MΩ or more with a 500V DC megger Between output terminals and FG

(2) Four-axis pulse train output of SX bus compatible products
SX bus compatible products can output four-axis pulse trains.
A high-precision positioning system can be built by combining
with the servo amplifier/motor of the pulse train command
input type or the stepping motor driver.

• Specifications

Item		Specification
Type		**NR1SF-HP4DT**
No. of control axes		4 axes
Speed command	Command signal	Pulse train command
	Max. command frequency	250kHz (Conditions: Shielding twist pair cable: 2m or less)
	Output type	Open collector, sink output
	Max. load current	50mA (24V DC)
	Insulation method	Photocoupler
	Signal type	forward pulse (CW) + reverse pulse (CCW)
Feedback pulse input		None
External pulse input		None
DI signal	No. of points	8 points (2 points / axis) Original point LS (x 4 ch) timing signal / Z phase (x 4 ch)
	Input type	Source input (Non voltage contactor input)
	Input model	DC (IEC 61131-2 type 2)
	Rated current	Approx. 4mA (24V DC)
	Input impedance	Approx. 5.6kΩ
	Insulation method	Photocoupler
	Common configuration	2 points (Extension can be used to the Common extension bar)
Occupied words		Up to 40 words in total (input: 16words / output: 24words)

(3) I/O specification of LONWORKS-based product
• Input specification

Item	Specification	
	NR1LX-1606DT	**NR1LW-11R80DT**
No. of input points	DI: 12 points, PI (Pulse input): 4 points *1	DI: 5 points, PI (Pulse input): 4 points *1
Input common composition	16 points/common	9 points/common
Input type	None polarity	Source input
Rated voltage	24V DC	
Max. voltage	26.4V DC	
Rated current	7mA	
Input inpedance	3.3kΩ	
Max. pulse input frequency	20Hz	
Pulse input measurement range	0-2147483648 (31 bits, incremental method)	
Standard operation range	OFF to ON 15 to 26.4V, ON to OFF 0 to 5V	
Input delay time	OFF to ON 10ms or less, ON to OFF 10ms or less	
Input type	DC (EN 61131 Type 2)	
Insulation	Photo coupler	
Delating condition	None	

* 1 PI can be used also as DI.

• Output specification

Item	Specification	
	NR1LY-08R07DT	**NR1LW-11R80DT**
No. of output points	DO: 8 points	DO: 2 points
Output common composition	1 point/common	
Rated voltage	240V AC 110V DC	
Max. load current	Relay output 30V DC/240V AC: 2A, 110V DC: 0.2A	
		Voltage output 24V DC: 50mA/point
Min. load current	5V DC: 1mA	
Output delay time	OFF to ON 10ms or less	
	ON to OFF 10ms or less	
Leakage current at the time of OFF	0.1mA or less (200V AC 60Hz)	
Surge protection	None	Varistor
Output protection	None	
Max. operating frequency	1800 times/hour	
Insulation	Photo coupler+Relay	Relay
Output type	Relay output	Relay output or 24V DC voltage output
Delating condition	None	

(4) NR2 type: I/O specifications of the DeviceNet-based products
• Input specifications

Item	Specification
Rated input voltage	24V DC
Max. input voltage	26.4V DC
Ripple percentage	5% or less
Rated input current	5mA
Input type	No polarity
Input impedance	4.7kΩ
Operating voltage	ON voltage range: 15 to 26.4V
	OFF voltage range: 0 to 5V
Input delay time ON/OFF filtering time	3ms/3ms
No. of points per common	16 points/common (Mixture model: 8 points/common) x 2 circuits
Isolation	Photocoupler
Dielectric strength	1500V AC, 1 minute (Between input terminals and communication terminals)
Insulation resistance	10MΩ or more (500V DC megger) (Between input terminals and communication terminals)
Delating condition	0 to 40˚C: None, 40 to 55˚C: 75%

• Transistor output specifications

Item	Specification
Rated output voltage	24V DC
Allowable output voltage range	19.2-30V DC
Output format	Sink
Rated load current	0.5A/point (30V DC), 2A/common
Max. load current	0.6A/point (30V DC), 2A/common
Output voltage drop	0.1V or less (at 0.5A)
Output delay time	OFF to ON: 1ms or less
	ON to OFF: 1ms or less
Leakage current when OFF	0.1mA max.
Surge current	4A, 10ms
Surge suppresser circuit	Zener diode
Common configuration	32 points/common (16 points/common only for mixture products)
Insulation method	Photocoupler insulation
Dielectric strength	1500V AC, 1 minute Between output terminals and communication terminals
Insulation resistance	10MΩ or more with a 500V DC megger Between output terminals and communication terminals

• Relay output specifications

Item	Specification
Rated output voltage	240V AC, 120V DC
Max. allowable output voltage	264V AC or less, 120V DC or less
Max. load current	30/250V DC: 2A/point, 110V DC: 0.2A/point
Output delay time	OFF to ON: 10ms or less
	ON to OFF: 5ms or less
Leakage current when OFF	None
Surge suppresser circuit	None
Min. load voltage, current	5V DC, 1mA
Max. open/close frequency	1800 times/hour
Common configuration	1 point/common
Insulation method	Relay insulation
Dielectric strength	1500V AC, 1 minute Between output terminals and communicatioin terminals
Insulation resistance	10MΩ or more with a 500V DC megger Between output terminals and communicatioin terminals

(5) Analog I/O specification
• Analog voltage input type

Item	Specification			
Type	**NR2JAX-08VMRDT**			
No. of input points	8 points			
Analog input range	0 to 5V	1 to 5V	0 to 10V	-10 to +10V
Input impedance	1MΩ			
Max. input voltage	±15V			
Input filter	Approx. 100µs or less (Hardware: Primary delay time constant)			
Resolution	1.25mV	1.25mV	1.25mV	1.25mV
Digital value (INT type)	0 to 4000		0 to 8000	-8000 to 8000
Measurement accuracy	±0.1% of F.S.R (Ta=23˚C ±5˚C)			
	±0.3% of F.S.R (Ta=0 to 55˚C)			
Sampling period	4ms or less / 8 points			
Response time	4ms or less / 8 points + transmission periods (ms)			
Occupied words	Input: 8 words			
Isolation method	Between analog input terminals and FG: Isolation			
	Between analog input terminals and communication terminals: Isolation			
	Between analog input terminals and channels: Not isolation			
Dielectric strength	500V AC, 1 minute,			
	(Between analog input terminals and FG (Shorted current: 5mA))			
Insulation resistance	10MΩ or more (500V DC megger)			
	(Between analog input terminals and FG)			
External connections	External power supply, analog input connection: Detachable screw terminals (M3) 38 poles			
	Communication connection: Detachable screw terminals (M3) 3 poles			

• Analog current input type

Item	Specification		
Type	**NR2JAX-08IMRDT**		
No. of input points	8 points		
Analog input range	±20mA	0 to 20mA	4 to 20mA
Input impedance	250Ω		
Max. input voltage	±30mA		
Input filter	Approx. 100µs or less (Hardware: Primary delay time constant)		
Resolution	2.5µA		
Digital value (INT type)	±8000	0 to 8000	
Measurement accuracy	±0.1% of F.S.R (Ta=23˚C ±5˚C)		
	±0.4% of F.S.R (Ta=0 to 55˚C)		
Sampling period	4ms or less / 8 points		
Response time	4ms or less / 8 points + transmission periods (ms)		
Occupied words	Input: 8 words		
Isolation method	Between analog input terminals and FG: Isolation		
	Between analog input terminals and communication terminals: Isolation		
	Between analog input terminals and channels: Not isolation		
Dielectric strength	500V AC, 1 minute,		
	(Between analog input terminals and FG (Shorted current: 5mA))		
Insulation resistance	10MΩ or more (500V DC megger)		
	(Between analog input terminals and FG)		
External connections	External power supply, analog input connection: Detachable screw terminals (M3) 38 poles		
	Communication connection: Detachable screw terminals (M3) 3 poles		

• Analog voltage output type

Item	Specification			
Type	**NR2JAY-04VMRDT**			
No. of input points	4 points			
Analog output range	0 to 5V	1 to 5V	0 to 10V	-10 to +10V
Load impedance	1kΩ or more	1kΩ or more	2kΩ or more	2kΩ or more
Resolution	1.25mV	1.25mV	1.25mV	1.25mV
Digital value (INT type)	0 to 4000		0 to 8000	-8000 to 8000
Measurement accuracy	±0.1% of F.S.R (Ta=23˚C ±5˚C)			
	±0.3% of F.S.R (Ta=0 to 55˚C)			
Sampling period	2ms or less / 4 points			
Response time	2ms or less / 4 points + transmission periods (ms)			
Load short protection	Provided			
High frequency noise (100kHz or more)	150mVp-p or less			
Output ripple	50mVp-p or less			
Occupied words	Output: 4 words			
Isolation method	Between analog input terminals and FG: Isolation			
	Between analog input terminals and communication terminals: Isolation			
	Between analog input terminals and channels: Not isolation			
Dielectric strength	500V AC, 1 minute,			
	(Between analog input terminals and FG (Shorted current: 5mA))			
Insulation resistance	10MΩ or more (500V DC megger)			
	(Between analog input terminals and FG)			
External connections	External power supply, analog input connection: Detachable screw terminals (M3) 38 poles			
	Communication connection: Detachable screw terminals (M3) 3 poles			

• Analog current output type

Item	Specification	
Type	**NR2JAY-04IMRDT**	
No. of input points	4 points	
Analog output range	0 to 20mA	4 to 20mA
Load impedance	500Ω or less	
Resolution	2.5µA	
Digital value (INT type)	0 to 8000	
Measurement accuracy	±0.2% of F.S.R (Ta=23˚C ±5˚C)	
	±0.4% of F.S.R (Ta=0 to 55˚C)	
Sampling period	2ms / 4 points	
Response time	2ms or less / 4 points + transmission periods (ms)	
High frequency noise (100kHz or more)	300µAp-p or less	
Output ripple	100µAp-p or less	
Occupied words	Output: 4 words	
Isolation method	Between analog input terminals and FG: Isolation	
	Between analog input terminals and communication terminals: Isolation	
	Between analog input terminals and channels: Not isolation	
Dielectric strength	500V AC, 1 minute,	
	(Between analog input terminals and FG (Shorted current: 5mA))	
Insulation resistance	10MΩ or more (500V DC megger)	
	(Between analog input terminals and FG)	
External connections	External power supply, analog input connection: Detachable screw terminals (M3) 38 poles	
	Communication connection: Detachable screw terminals (M3) 3 poles	

• Characteristec of the analog voltage/current input type

Characteristic pattern

Converted value (INT)

8000

4000

1600

Input value

-10 / 20   0 : 5 10 (V)
             4   20 (mA)

-8000

±10V
±20mA

Characteristic pattern

Converted value (INT)

8000
(4000)

4000
(2000)

Input value

0 5 10 (V)
   2.5 5 (V)

( ) Converted value:
0 to 5V input

0 to 5V
0 to 10V

Characteristic pattern

Converted value (INT)

8000
(4000)

4000
(2000)

0

Input value

1 3   5 (V)
4 12 20 (mA)

-2000
(-1000)

( ) Converted value:
1 to 5V input

1 to 5V
4 to 20mA
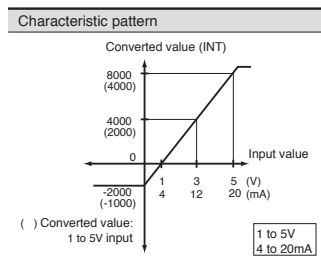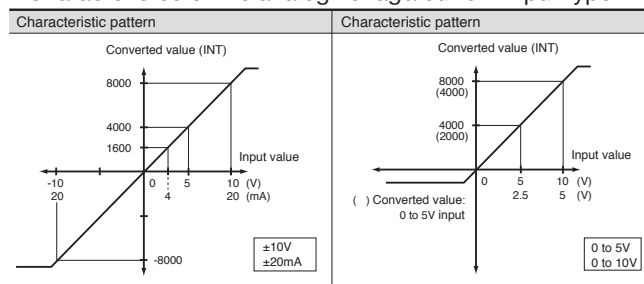
• Characteristec of the analog voltage/current output type

Characteristic pattern

Converted value (V)

10

5

Input value

-8000 0 4000 8000 (INT)

-10

±10V

Characteristic pattern

Converted value (V)

10
(5)

5
(2.5)

Input value

0 4000 8000 (INT)
   (2000) (4000)

( ) Converted value:
0 to 5V output

0 to 5V
0 to 10V

Characteristic pattern

Converted value (mA)

20

Input value

8000 (INT)

0 to 20mA

Characteristic pattern

Converted value (mA)

20
(5)

12
(3)

4
(1)

Input value

0 4000 8000 (INT)
   (2000) (4000)

( ) Converted value:
1 to 5V output

1 to 5V
4 to 20mA

• Communication specifications

Item	Specification				
	OPCN-1	DeviceNet	T-link	SX bus	LONWORKS
Transmission line format	Bus configuration (multi-drop)	Bus configuration (multi-drop, T-branching)	Bus configuration (multi-drop)	Bus configuration (ring)	Free topology (bus-structure/star-structure)
Max. signal point	127 words (2032 /master)	127 words (2032 points)/master (When configurator is not used)	128 words (2048 points)	512 words (8192 points)	228 bytes
Transmission speed/distance	125kbps/1km 250kbps/800m 500kbps/480m 1Mbps/240m (Changes with the switch)	125kbps/500m 250kbps/250m 500kbps/100m (Changes with the switch)	500kbps/1km	25Mbps/25m	78kbps/500 to 2700m
No. of connected stations	31 stations	64 node	32 stations	254 stations (including CPU module) *2	64 units/segment
Electric characteristics	EIA RS-485	–	Pulse transfer method	EIA RS-422	–
Transmission line	Shielded twist pair cable	DeviceNet cable	Shielded twist pair cable	SX bus expansion cable	Twist pair (1P-S)
No. of occupied words *1	8 points: 1 word, 16 points: 1 word, 32 points: 2 word, 8/8 (Mixture): 2 words, 16/16 (Mixture): 2 words, analog input: : 8 words, analog output: 4 words, NR1SF-HP4DT: 40 words				

*1 When the master module of MICREX-SX series is used

*2 The maximum number of the I/O terminal connections are each 10 units at inside and outside per one base board.
Consumes the SX bus transmission power supply by 25mA per one I/O terminal.

■ System configuration

<MICREX-SX: SPH>
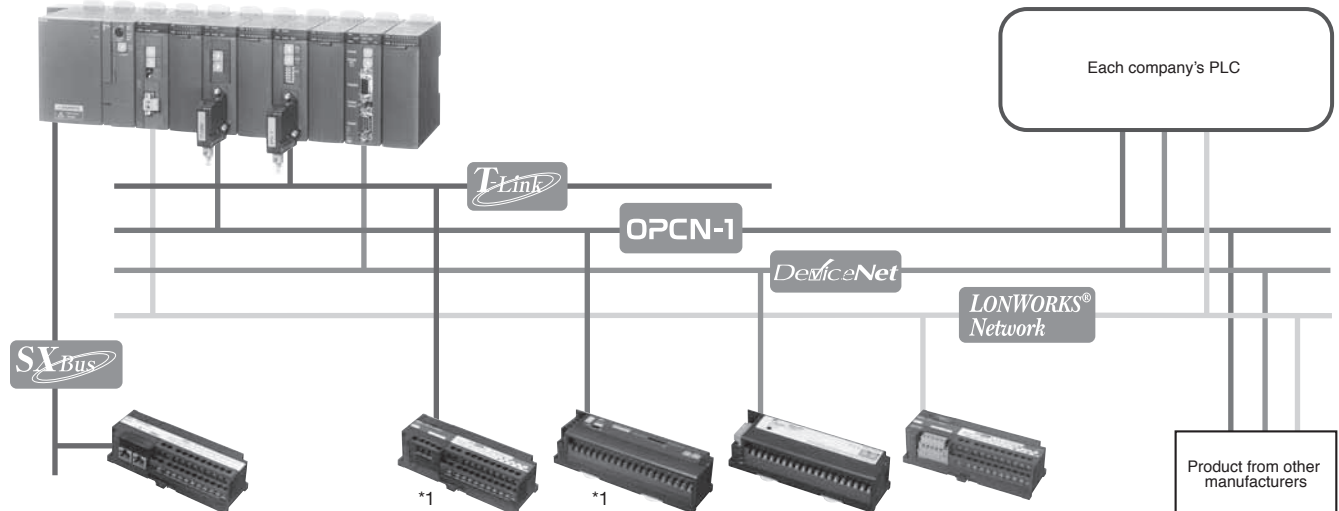
*1 Please mounting the terminating resistor with accessory of the master module (2 pieces provided on the SX), in case if the I/O terminals for OPCN-1 or for T-link are terminating station.

Bit-level Communication Module
AS-i Master Module: NP1L-AS2

NP1L-AS2
AF00-196

■ Features
- The **NP1L-AS2** is based on the AS-i communication protocol Version 2.1.
- Up to 12 units can be connected in a single system configuration. configuration.
- Can be connected to diverse types of actuators and sensors conforming to the AS-i Standards.
- Line length: Total 100m
- Up to 62 slave stations can be connected to a single master station.
- Up to 434 I/O points can be controlled.
- The AS-i master module is communicate to between the analog slave station automatically.

■ Communication specifications

Item	Specification
No. of SX bus connectable modules	Max. 12 /configuration
No. of connectable slaves	Max. 62 /master module
Transmission line format	Tree-structure, line-structure, star-structure, ring-structure
Transmission distance	100m (Max.300m at using a repeater)
Transmission method	Half-duplex, serial transmission
Transmission speed	167kbps
Applicable cable	AS-i cable
Refresh time	Approx. 10ms (when 62 units connected) Approx. 5ms (when 31 units connected)
No. of I/O points	Input points: Max. 248 Output points: Max. 186 (Input / Output: 21 words / 21 words)
Current consumption of AS-i master section	30V DC, 100mA or less (supplied from the AS-i power supply, and insulated from the SX bus.)
Internal current consumption	24V DC, 100mA or less
Mass	Approx. 180g

■ System configuration
- System configuration example with the AS-i master
- System configuration example via the gate way
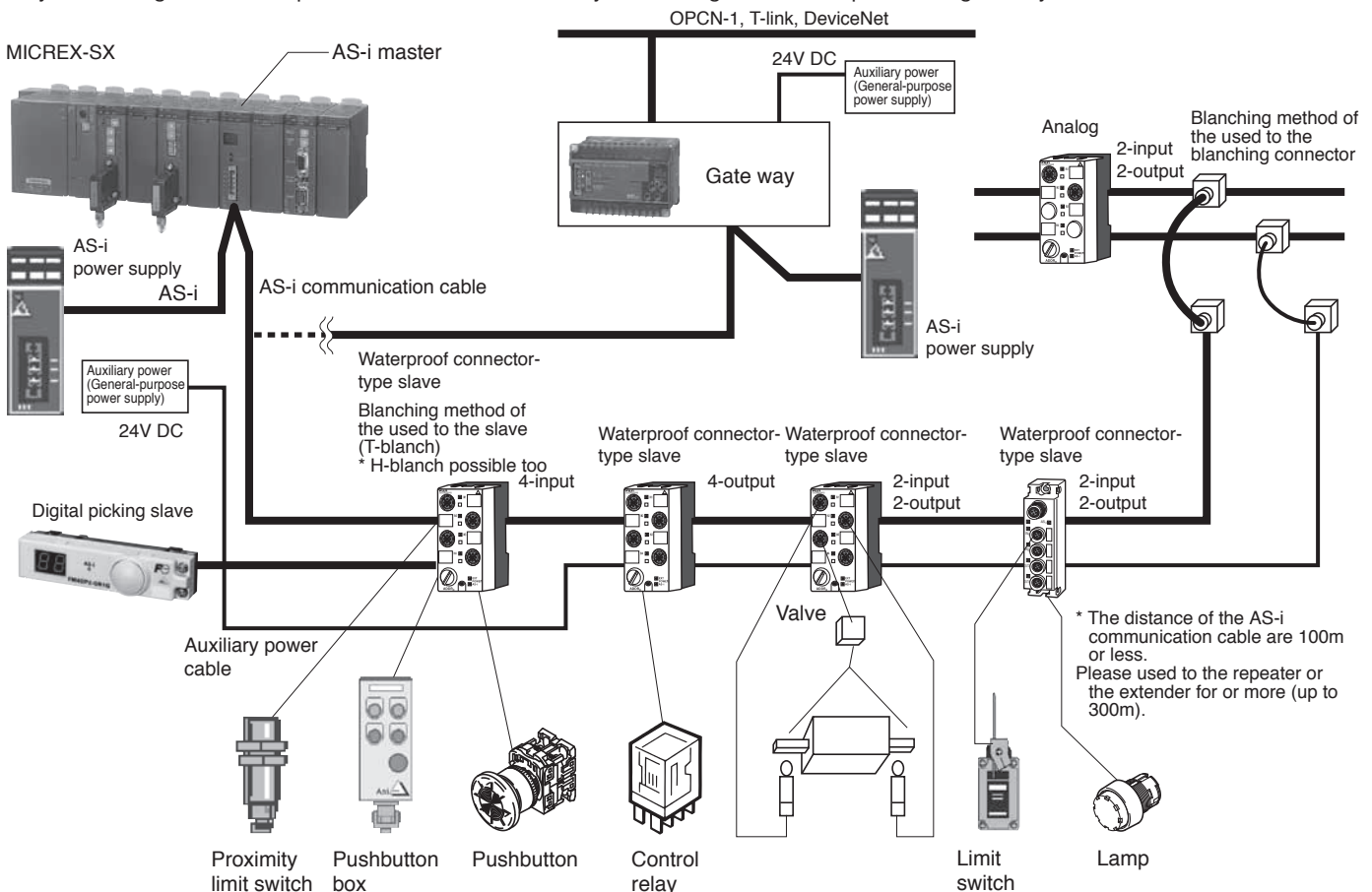
S-LINK Master Module: NP1L-SL1

■ Features
- Connected to the S-LINK (bit) level serial transmission provided by SUNX.
- 128-point I/O control can be performed for each master station. There is no limitation on the number of master connections.

NP1L-SL1
AF01-102

■ Communication specifications

Item	Specification
No. of SX bus connections	No limitation (within the limit of the maximum number of SX bus connections of 8192 points)
No. of slave connections	No limitation
Transmission system	Bi-directional time-division multiplex transmission system
Synchronization system	Bit synchronization, frame synchronization
Protocol	2-wire protocol
Transmission rate	28.5kbps
	Signal trunk line: Total length 200m
Connection method	Multi-drop connection
No. of I/O points	Up to 128 points
Cable	Cable from SUNX: 4-wire flat cable
Refresh time	32 points: 1.4 to 2.9ms
	64 points: 2.5 to 5.2ms
	96 points: 3.6 to 7.4ms
	128 points: 4.7 to 9.6ms
S-LINK master section current consumption	24V DC, 1.6mA or less (supplied from an external power supply, and insulated from the SX bus.)
Internal current consumption	Inside of module (supplied from the SX bus): 24V DC, 80mA or less, S-LINK communication section (supplied from an external power supply): 24V DC, 1.6A or less
Mass	Approx. 200g

■ System configuration

S-LINK master module

External 24V DC power supply for S-LINK

Loop wiring is possible.

Unique station No. is set to each slave.

T-branch connection is possible.
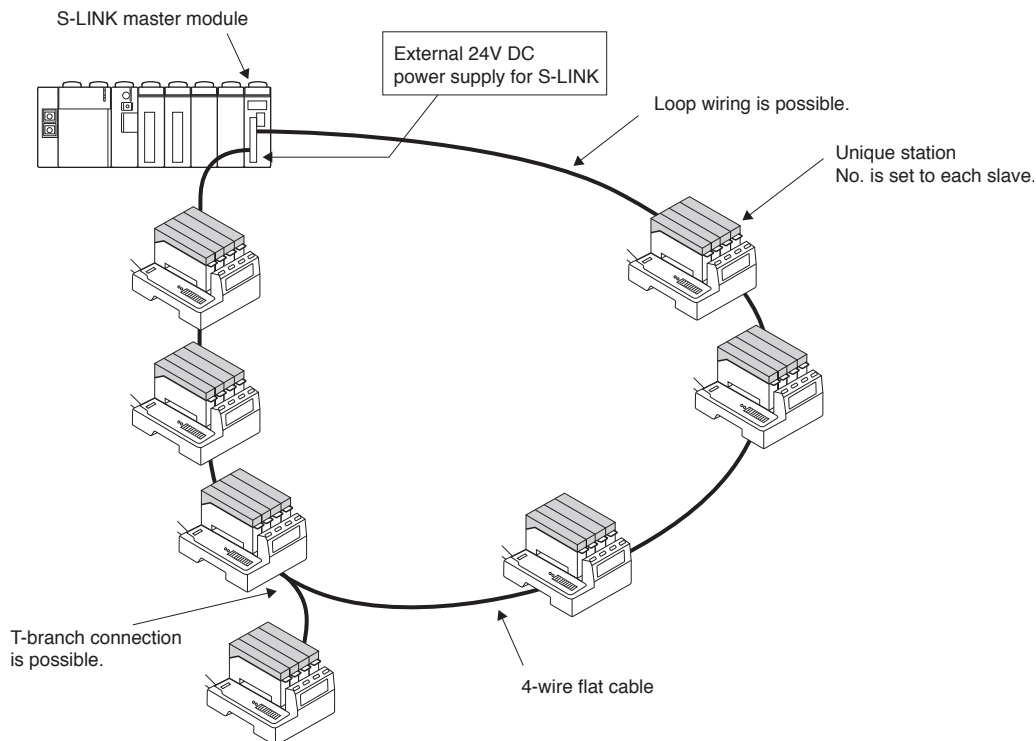
4-wire flat cable

Remote Terminal Master/Slave Module: NP1L-RM1

■ Features
- Connectable to Fuji Electric's RM20 and RM21 remote terminal series.
- Data can be transmitted up to 5km between master/slave modules and remote terminals.
- The use of a signal converter makes it possible to use existing, unoccupied cables and trolley lines.

NP1L-RM1
GKDD06-002

■ Communication specifications

Item		Specification
No. of SX bus connections		Max. 8/configuration
No. of SX remote terminal link		1 system
No. of connectable remote terminals (No. of I/Os)		1:1 mode: Max. 64 words
		1:N or N:N mode: Max. 128 units or 1024 points
No. of connectable remote terminals		1:1 mode: 1 slave/1 master
		1:N mode: RM20/21 series terminal units
Remote terminal specification	Transmission system	Time sharing cyclic multiplex transmission system
	Signal/Transmission speed	RZ signal/2400 boud (Built-in modulation/demodulation reference clock 7.2K)
	Transmission method	1:1 transmission (connection of between the SX master and slave station)
		1:N or N:N transmission (Connects existing remote terminals. The NP1L-RM1 slave mode cannot be connected.)
	Signal transmission cable	Twisted pair cable (CPEV, KPEV), CVV, trolley wires
	Transmission distance	0.9 mm dia.: 2.0km (at max. 128 remote stations)
		1.2 mm dia.: 3.5km (max. 128 remote stations)
		2mm^2: 5.0km (max. 64 remote stations)
		2 to 5km: Varies with the cable and connection configuration.
External wire connections		Terminal block 6 poles
		(for transmission wire connections, for 24V DC external power supply connections, for grounding etc.)
External power supply (for communication)		20 to 30V DC, 3.6VA (When 24V DC: 0.15A)
Internal current consumption		24V DC 140mA or less
Mass		Approx. 210g

■ System configuration

1:1 slave mode

1:N master mode

Signal converter
(RM20-WA)

Trolley wire

Signal converter (RM20-WA)
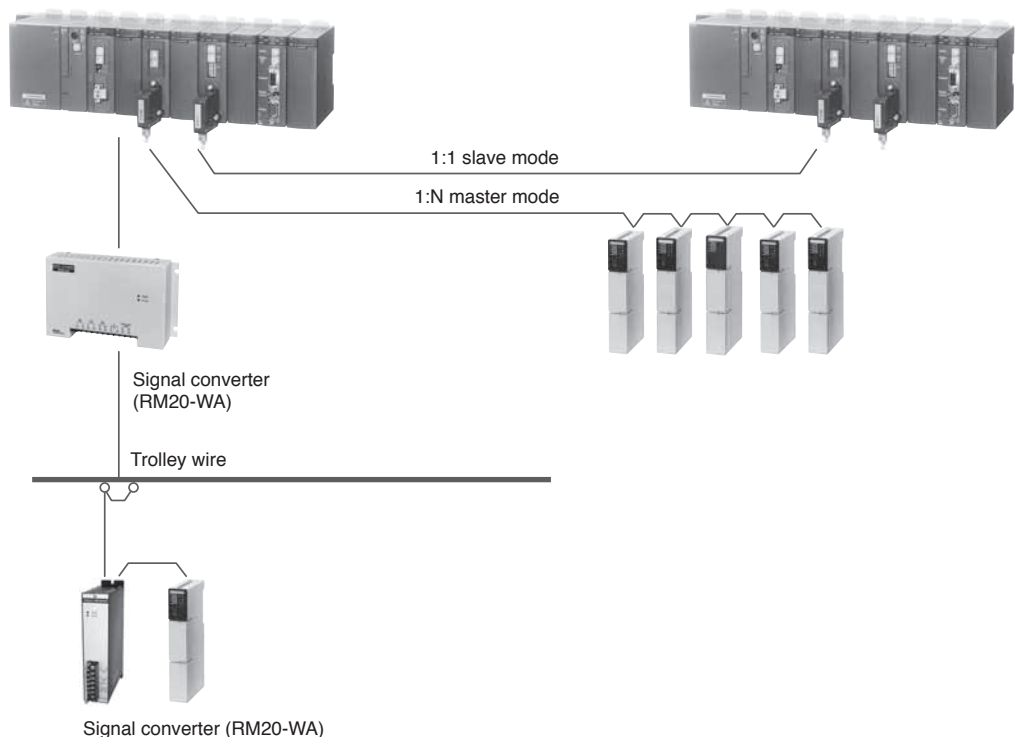
SX Bus Optical Link Module: NP1L-OL1/OL2
SX Bus Optical Converter Unit: NP2L-OE1

■ Features
NP1L-OL1/OL2
- Mounted on the base board to transmit the SX bus signal as an optical signal.
- Applicable optical fiber cables are PCF and quartz glass fiber cables with a maximum transmission distance of 64 km.

NP2L-OE1
- This unit connects between the SX bus cable and optical fibre cable to transmit the SX bus signal as an optical signal.
- Available optical fibre is the PCF, and maximum transmission distance is 25.6km (25°C).

NP1L-OL1
AF00-195

NP2L-OE1
AF00-198

■ Transmission specifications

Item		Specification		
Type		**NP2L-OE1**	**NP1L-OL1**	**NP2L-OL2**
No. of connectable modules		Max. 64 /configuration (Total No. of **NP1L-OL1** and **NP1L-OL2** and **NP2L-OE1**)		
Optical fibre	Type	PCF (Polymer clad fiber), GI type		quartz glass fiber, GI type
	Core/Clad diameter	Core: 200μm Clad: 230μm		Core: 50μm Clad: 125μm
	Min. bending radius [1]	50mm		
	Optical connector	Type: F07		8C connector
Transmission distance (Between stations: Max/Total extension distance) [1]		800m/25.6km		2km/64km
Internal current consumption		–	24V DC 54mA or less	24V DC 30mA or less
Power supply terminal (External power supply) [2]	Rated input voltage	24V DC, 70mA or less	–	
	Rush current	165mA or less: When a switching power supply is used [3]	–	
		50Ao-p-70μs: When 24V DC is directly turned ON		
Mass		Approx. 155g	Approx. 135g	

[1] Minimum bending radius depends on what type of optical-fibre cable is used. Above table shows the values when the HG-20/08 from Sumitomo Electric Industries, Ltd. is used.
[2] As an external power supply, use a switching power supply (conforming to the UL standard) with "reinforced insulation" of 24V DC 1A or more for each unit.
[3] When 24V DC is directly turned ON, the rush current is 50Ao-p, 70μs (reference value). This value depends on power conditions.

- When you use the quartz optical fibre cable, please contact our sales section.

■ System configuration
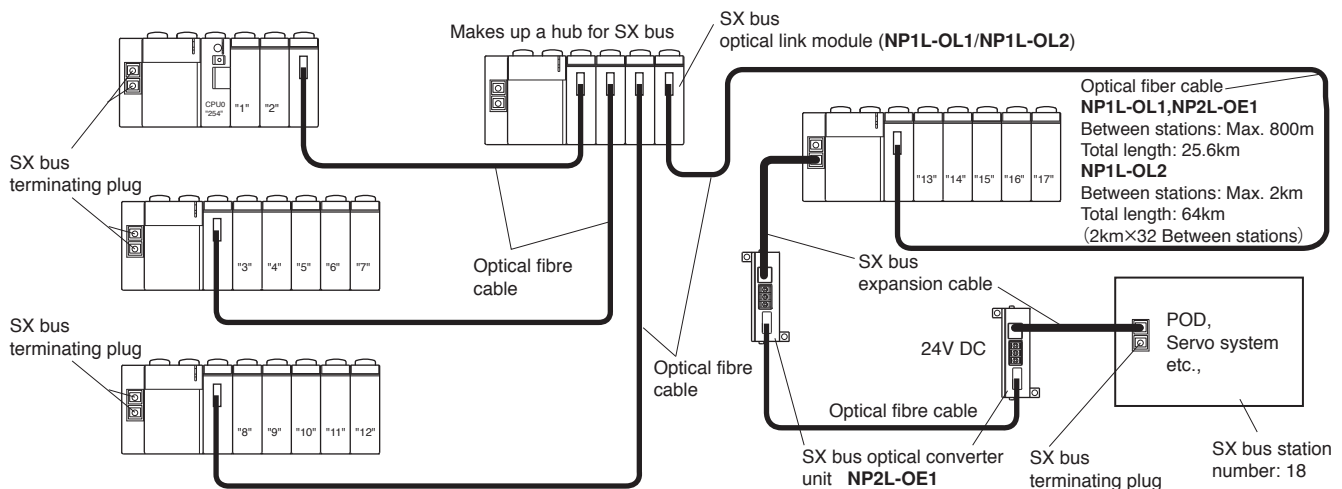
Makes up a hub for SX bus

SX bus optical link module (**NP1L-OL1**/**NP1L-OL2**)

Optical fiber cable
NP1L-OL1,NP2L-OE1
Between stations: Max. 800m
Total length: 25.6km
NP1L-OL2
Between stations: Max. 2km
Total length: 64km
(2km×32 Between stations)

CPU0 "254" "1" "2"

SX bus terminating plug

"3" "4" "5" "6" "7"

Optical fibre cable

SX bus terminating plug

"8" "9" "10" "11" "12"

"13" "14" "15" "16" "17"

SX bus expansion cable

Optical fibre cable

24V DC

Optical fibre cable

SX bus optical converter unit **NP2L-OE1**

SX bus terminating plug

POD, Servo system etc.,

SX bus station number: 18

SX Bus Electric Repeater Unit: NP2L-RP1

■ Features
- SX bus connection using another 25m electric cable is enabled by correcting the signal waveforms of the SX bus electric cable.
- Up to three units can be used in one SX system, increasing the total extension length of the SX bus electric cable to a maximum of 100m.

NP2L-RP1
KD03-017

■ Specifications

Item	Specification	Remarks
Rated power supply voltage	24V DC	Uses externally supplied power supply
Power supply voltage tolerance	22.8 to 26.4V DC	Uses externally supplied power supply
		When connecting servo and inverter: 24V to 26.4 V DC
Current consumption	Up to 1470mA	Current consumption: Approx. 70mA
		24V power supply to the SX bus cable: Up to two 700mA systems
Dimensions (W x H x D) in mm	50 x 95 x 95	-
SX bus transmission distance	25m	Total extension of the SX bus cable connected to each connector
No. of max. usable units	3 units	The maximum total extension of the SX bus cable is 100m.

■ Example of the system configuration
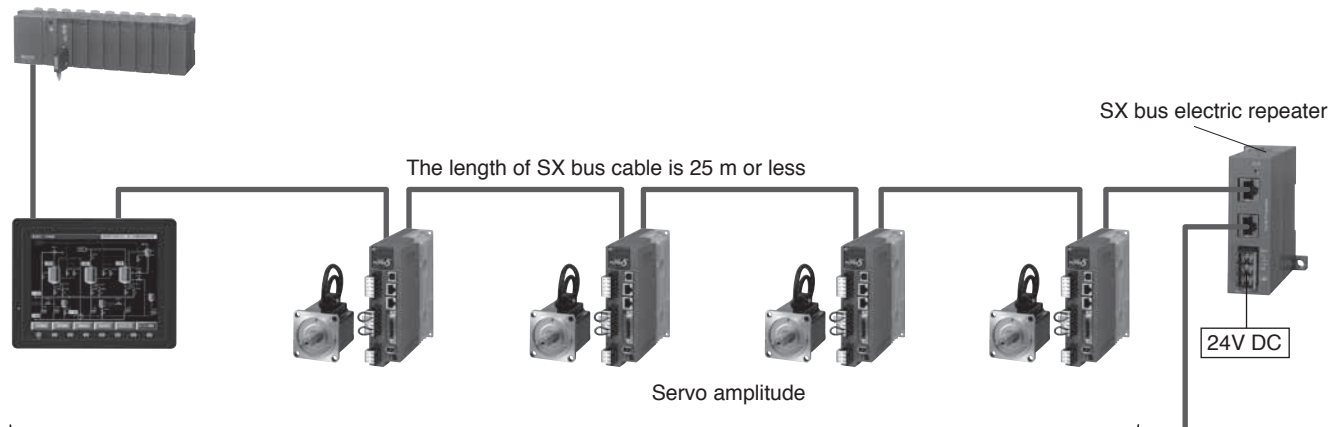
SX bus electric repeater

The length of SX bus cable is 25 m or less

Servo amplitude

24V DC

Up to 10 units that supply power from the SX bus cable can be connected per an electric repeater.

The length of SX bus cable is 25 m or less

The length of SX bus cable is 25 m or less

24V DC

Remote I//O

Remote I//O   Servo amplitude
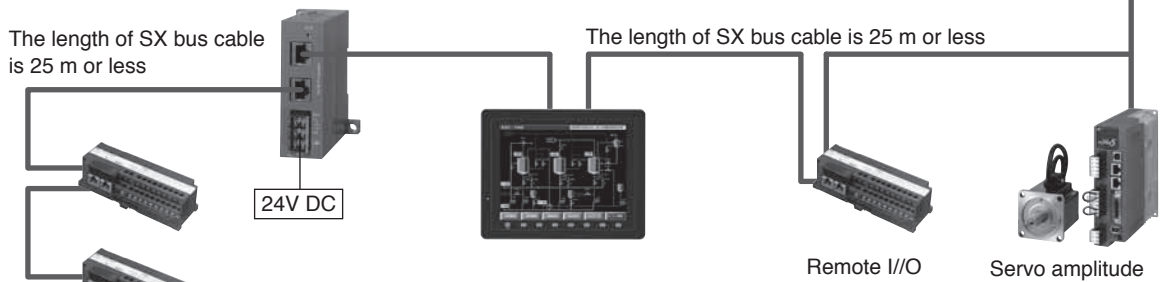
Up to 10 units that supply power from the SX bus cable can be connected per an electric repeater.
Up to 20 units can be connected if there are electric repeater on the both sides.

Up to 10 units that supply power from the SX bus cable can be connected.
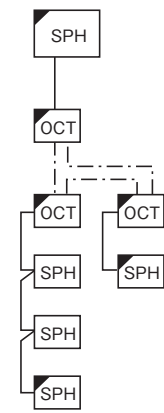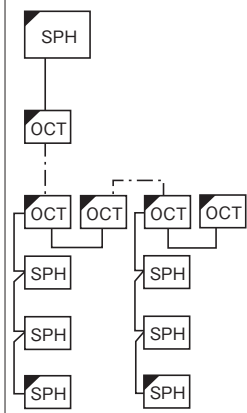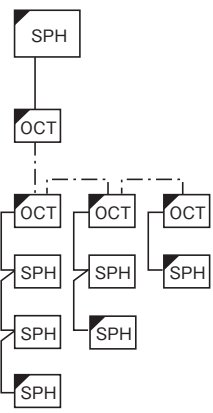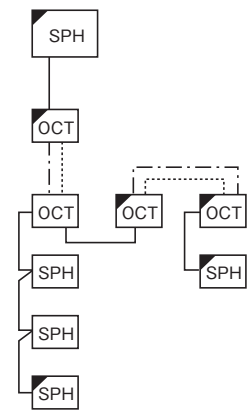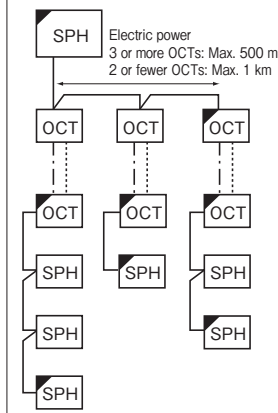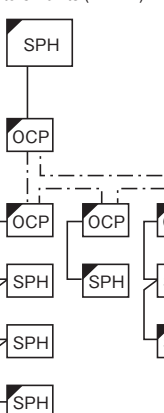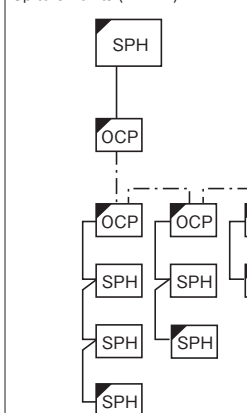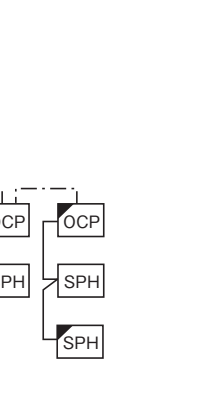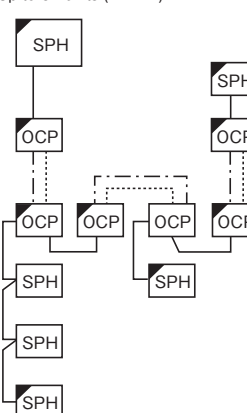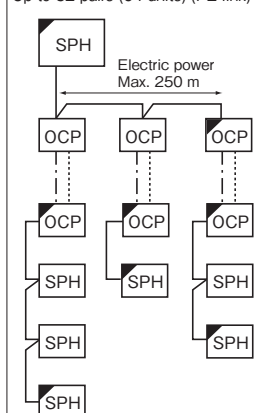
Optical T-link and P/PE-link systems

The optical T-link and P/PE-link systems ensure superior network configuration with distinguished noise resistance by making use of an optical converter and optical fiber cables.
The optical T-link and P/PE-link systems combine the following features:
• System configurations, such as redundant optical lines, can be established.
• Since an electric transmission system and an optical transmission system can be mixed, you can build an economical system by adopting optical transmission systems only for the required portions.
• Optical link systems as shown in the table below can be configured according to your application.

■ Configuration examples

System	Loop connection	Cascade connection 1	Cascade connection 2 (single)	Cascade connection 3 (redundant)	Star connection (can be redundant)
Features	Economical configuration with the least number of optical converters.	Suitable for long-distance transmission.	Suitable for long-distance transmission.	Ensures a higher degree of reliability by adding redundancy backup to the system shown on the left.	**a** Minimizes down units in the system. **b** Consists of units positioned at a long distance from one another in a star-shaped pattern.
Example of an optical T-link system configuration	[Constraint] OCT: Up to three units	[Constraint] OCT: Up to 16 units	[Constraint] OCT: Up to 16 units	[Constraint] OCT: Up to 16 units	[Constraint] OCT: Up to 8 pairs (16 units)
Optical converter for OCT T-link system					Electric power 3 or more OCTs: Max. 500 m 2 or fewer OCTs: Max. 1 km
Example of optical P/PE-link system configuration	[Constraint] OCP: Up to 16 units (P-link) Up to 64 units (PE-link)	[Constraint] OCP: Up to 16 units (P-link) Up to 64 units (PE-link)		[Constraint] OCP: Up to 16 units (P-link) Up to 64 units (PE-link)	[Constraint] OCP: Up to 8 pairs (16 units) (P-link) Up to 32 pairs (64 units) (PE-link)
Optical converter for OCP P/PE-link system					Electric power Max. 250 m
Operation in case of an error	Loop wiring can maintain transmission even if an optical fiber cable between optical converters is broken.	If an error occurs in any of the optical converters, transmission will be interrupted at the faulty unit.			The effect of an optical converter error is limited to the faulty unit, allowing for a highly reliable system.

(Note 1) The cable symbols shown in the figure above are as follows:
— · — · —— :Optical fiber cable (main)
·················· :Optical fiber cable (redundancy backup)
———————— :Cable for a T-link or cable for a P-link
(Note 2) Connect a terminal resistor for a T-link (100 Ω) or for a P-link (75 Ω) to each unit marked with ◣ in the figure.
(Note 3) When a cable for a T-link or for a P/PE-link is not connected to an optical converter, connect a terminal resistor to the converter.

T-link Optical Converter : FNC160A-C20

■ Features

- This optical converter has two optical transmit/receive modules (two channels).
- The main power supply has a wide input ranging from 100 to 240 V AC/110 V DC.
- System configurations such as cascade connections (up to 16 units), loop connections (up to three units), star connections (up to 8 pairs), and redundant optical lines can be established.
- Function to detect optical transmission line breakage that enables the relay contact to turn on in case of a line breakage.
- This optical converter has a mounting hole compatible with the FNC110A and F □□ 140 modules.

FNC160A-C20
(写 No. KKD10-008)

■ Specifications

Item		Specification
Model compatible with T-links	Number of connectable modules	32 slave stations on a T-link per master
	Transmission speed	500 kbps (RZ)
	Cable	Shielded twisted pair cable
	Terminal	100 Ω terminal at both segment ends
	Transmission distance	Max. distance 1 km
		1 km when a pair of T-KPEV-SB 1.25 mm2 cables manufactured by Furukawa Electric Co. is used
		700 m when a pair of TKPEV-SB 0.75 mm2 cables manufactured by Furukawa Electric Co. is used
Model compatible with optical fiber	Type	Multimode quartz glass fiber (2-core)
	Refractive index profile	GI type
	Core diameter/Clad diameter	50/125 µm
	Numerical aperture	0.2
	Transmission loss	3 dB/km
Compatible with optical modules	Optical connector	SC type connector
	Emission wavelength	860 nm (typ)
	Permissible loss (transmit, receive)	10 dB or below (when 3 dB/km fiber is used: 3 km)

P/PE-link Optical Converter : FNC360A-C20

■ Features

- This optical converter has two optical transmit/receive modules (two channels).
- The main power supply has a wide input ranging from 100 to 240 V AC/110 V DC.
- For P-link system configurations, cascade connection (up to 16 units), loop connections (up to 16 units), and star connections (up to 8 pairs) can be established.
- For PE-link system configurations, cascade connections (up to 64 units), loop connection (up to 64 units), star connection (up to 32 pairs), and redundant optical lines can be established.
- Function to detect optical transmission line breakage that enables the relay contact to turn off in case of a line breakage.
- This optical converter has a hole compatible with the FNC320A, FNC302A, FNC300, and FNC200 modules.

FNC360A-C20
(写 No. KKD10-007)

■ Specifications

Item		Specification
Model compatible with P/PE-links	Number of connectable modules	P-link: 16 units
		PE-link: 64 units
	Transmission speed	5 Mbps (RZ)
	Cable	Coaxial cable (5C2V)
	Terminal	75 Ω terminal at both segment ends
	Transmission distance	P-link: Max. 250 m
		PE-link: Max. 500 m Between stations: Min. 1 m
Model compatible with optical fiber	Type	Multimode quartz glass fiber (2-core)
	Refractive index profile	GI type
	Core diameter/Clad diameter	50/125 µm
	Numerical aperture	0.2
	Transmission loss	3 dB/km
Compatible with optical modules	Optical connector	DL type connector
	Emission wavelength	840 nm (typ)
	Permissible loss (transmit, receive)	10 dB or below (7.5 dB or below considering aged deterioration)

Memory Card Interface Module: NP1F-MM1

■ Features
- Equipped with 1 slot for PC card interface (PCMCIA) as standard.
- Use of commercially available memory card enables storing data from the CPU modules or reading control and/or management information from the memory card.
- Programs can be uploaded/downloaded from/to CPU module.
- Files can be read/written from the personal computer via the PC card slot.
- Used to back up programs when configuring a redundant (N:1) system for CPU modules.

NP1F-MM1
AF99-14

■ Performance specifications

Item	Specification
No. of SX bus connectable modules	Max. 16 /configuration
Memory card interface	Based on JEIDA Ver. 4.1 /PCMCIA Rel.2.01 Type I, II x 1 slot, 5V
Card type	SRAM card
Internal current consumption	24V DC, 90mA or less
Mass	Approx. 210g (excluding the memory card)

■ Functional specifications

Item	Specification
Data read/write from CPU module	Data read/write between CPU module and memory card by application programs
Program read/write from memory card interface module	Program read/write between CPU module and memory card by the front SW operation of the memory card interface module. Program write to the memory card by the Expert (D300win) operation after memory card installation in the PC card slot of the personal computer.
Self-diagnosis/RAS function	Supervise the current status of the local station for error detection, and notify the error to the CPU module.

■ Memory card selection reference

Item	Specification (Example)	Application restrictions and conditions	Remarks
Power supply voltage	5 ±0.25V DC	Available if the product is specified for 5V	Give priority to the memory card specification range rather than the operating range of this module.
Current consumption	90mA or less at 5V DC	**NP1F-MM1**: Available if the total is 300mA or less.	
Operating temperature range	0 to 60˚C	When a memory card is mounted in the module, heat generation in the module increases the temperature by 10C. Thus, the max. operating temperature with this memory card used is 50˚C.	
Operating humidity range	10 to 90% RH, no condensation	No problem because wider than the environment range of this module.	
Storage temperature range	-20 to 70˚C	No problem due to the same conditions as the common specification of this module.	
Card removal count	5,000 times or more (outdoor) 10,000 times or more (indoor)	Make sufficient consideration for the removal count.	
Vibration/shock	Vibration: 147m/s²p-p (max.) in operation Shock: 490m/s² (max.) in operation	Module's vibration/shock resistance performance can be met by securing the memory card with the metal bracket, included in this module.	

Note: Be sure to purchase the memory card for which "electrostatic countermeasure" has been taken as well as having the items specified above.

- The following are recommended Memory cards;
  SRAM card, JS series (256K/512K1024K2048K4096Kbites): Made by FUJISOKU, LTD.

■ System configuration

Active system
Backup system
Memory card interface module

Faulty CPU

Active system No. 1 CPU	Active system No. 2 CPU	Active system No. 3 CPU	Backup system No. 4 CPU	Memory card interface module	Memory card

Memory card: No. 1 CPU program / No. 2 CPU program / No. 3 CPU program

No. 3 CPU program downloading
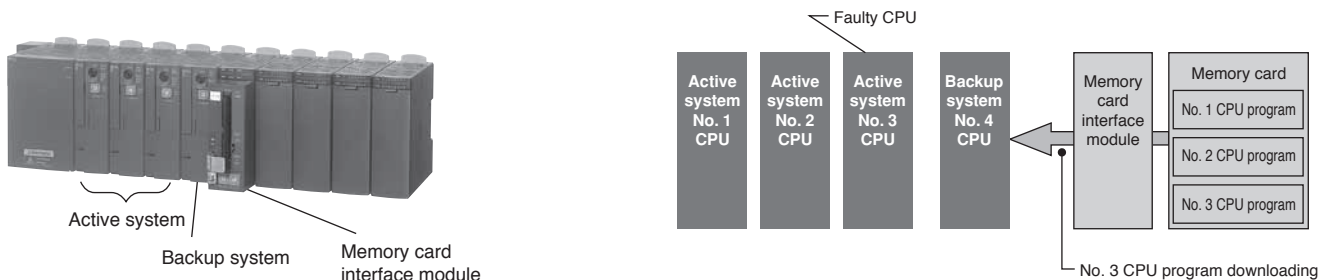
Dummy Module: NP1F-DMY

■ Features

• When your system will be expanded in the future, the dummy module can be used as a substitute for the extension module.

• If an active module has failed during operation of the system, the system can be restarted when you replace the failed module with the dummy module (which, however, cannot perform the functions of the failed module).

NP1F-DMY
AF00-44

■ Specifications

Item	Specification
Type	**NP1F-DMY**
Substituted module	All modules except power module and CPU module
Mounting place	On a base board directly connected to SX bus Cannot be mounted on a T-link base board or other remote I/O module.
Occupied words	0 word
Internal current consumption	24V DC, 26mA or less
Mass	Approx. 120g

Multiuse Communication Module: NP1F-MU1

■ Features
- High-speed communication (RS-485: max. 460.8 kbps) with actuators and sensors can be implemented.
- Optimal communication with devices of various manufacturers can be implemented by freely creating a communication protocol. Protocols can be created by modifying the sample FB.
- Microcomputer circuit boards can be replaced by creating original firmware.

NP1F-MU1
KDD05-018

■ Performance specifications

Item	Specification	
Type	**NP1F-MU1**	
Port	RS-232C	RS-485
No. of ports	1 channel	1 channel
Transmission method	Half-duplex communication method	
Synchronisation method	Start-stop synchronous transmission	
Transmission speed	300/600/1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200bps	300/600/1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200/230,400/460,800bps
Transmission distance	15m or less	1km or less (transmission speed: 19.2kbps or less)
No. of connectable module	1: 1 (including the external device)	1: 31 (max.)
Connection method	D-sub, 9-pin connector (male)	6 poles terminal block
Transmission method	Transmission protocol by creating program	
Internal current consumption	24V DC, 80mA or less	
Mass	Approx 140g	

■ System configuration

MICREX-SX

Communication software is described in a program as an extended FB and stored in a CPU module.

RS-232C

RS-232C equipment including personal computer and barcode reader

RS-485

Others:
- Actuator
- Sensor etc.,
- Personal computer

Inverter   Inverter
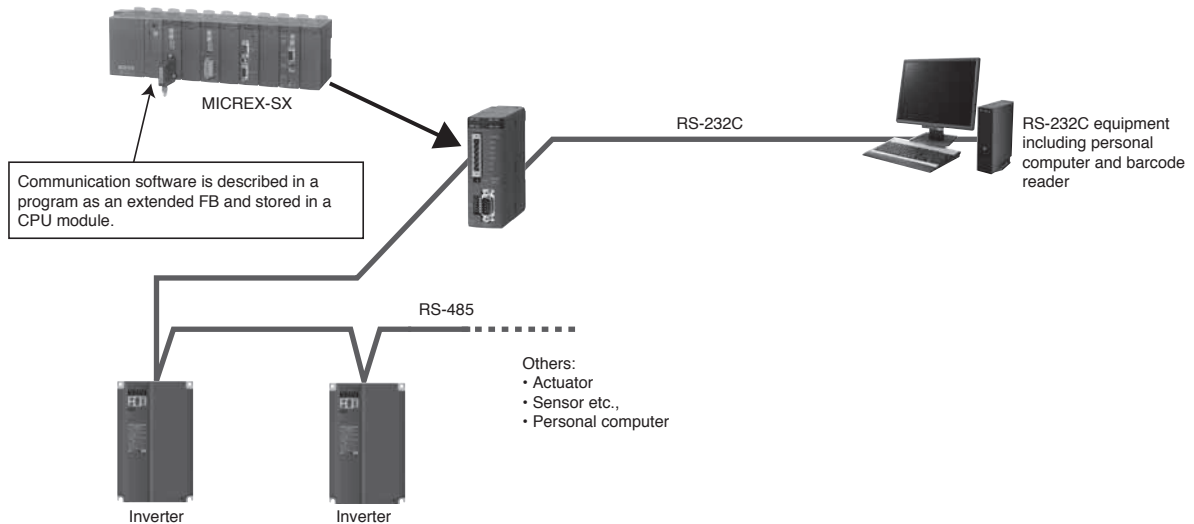
■ Outline of Original Firmware Development
Original high-speed communication modules can be built by combining user programs developed in C language programming, service functions for multiuse communication modules that can be downloaded from homepages, and system objects.
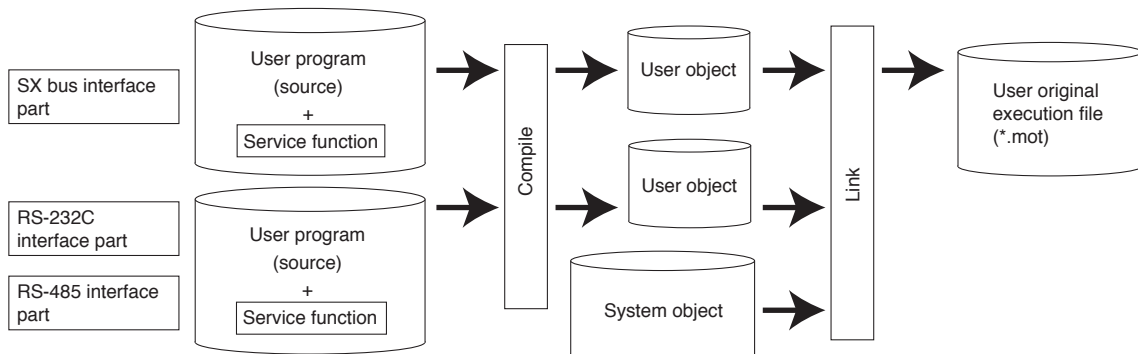
SX bus interface part

User program (source) + Service function

Compile

User object

RS-232C interface part

RS-485 interface part

User program (source) + Service function

User object

System object

Link

User original execution file (*.mot)

59

Flowmeter F/AD Conversion Module: NP1F-PI4

■ Features

- Instantaneous and cumulative flows can be displayed at the same time.
- Various flowmeters can be connected.
  1) No-voltage semiconductor input (two-wire/three-wire)   2) Voltage input (two-wire/three-wire)
  3) Two-wire current input   4) Two-wire contact input
- A transducer is unnecessary as the module insulated with high pressure-resistance (1000V AC) between channels.

■ Specifications

Item		Specification
Item		**NP1F-PI4**
No. of input channels		4 channels
Connected sensor inputs		No-voltage contact pulse, 2-wired open-collector pulse, 3-wired open-collector pulse, 2-wired voltage pulse, 3-wired voltage pulse, 2-wired current pulse
Input frequency		0 to 10kHz
Input wave form		Nearly square wave
Pull-up resistor		22kΩ
Input tolerance		-1 to 30V, 0 to 30mA
Minimum pulse width		50μs or more (50ms or more when filter is set)
Input signal level	Contact input (relay/transistor)	Detection level; ON: 200Ω or less, OFF: 100 kΩ or more
		Contactor capacity; when the sensor power supply is 13.5V: 15V DC, 15mA or more
		when the sensor power supply is 24V: 30V DC, 30mA or more
	Voltage/current pulse	Detection level 3Vp-p
Input impedance		Disabled (10kΩ or more), 200Ω, 500Ω or 1kΩ can be selected.
Input pulse detection		AC coupling or rising-edge detection
Integrated value update cycle		5ms/4 points (1ms, when for only integrated value mode)
Input response time		Integrated value update cycle + tact cycle (ms)
		Instant value update cycle + tact cycle
Power supply for transmission machine (Ta = 25°C) *1		1) Output voltage: 13.5V DC ±15% and/or 24V DC ±15%
		2) Permissible current; when 13.5V DC: 35mA or less, when 24V DC: 24mA or less
		3) Short-circuit limitation current; when 13.5V DC: approx. 40mA, when 24V DC: approx. 28mA
		4) Ripple noise: approx. 250mV (p-p) or less
		5) Suddenly change of the load: 3V (0-P) or less (condition of the suddenly change of the load: 0 to 40mA)
Input filter		The filter for the chattering removal can be selected. (time constant: approx. 4ms)
Occupied words		8 input words + 4 output words (fixed)
Insulation method		Photo-coupler insulation and transformer insulation(between pulse input terminals and FG)
		Transformer insulation (between pulse input terminals and channels)
Dielectric strength		1000V AC 1 minute (between pulse input terminals and FG) (short circuit current: 10mA)
		1000V AC 1 minute (between pulse input terminals and channels) (short circuit current: 10mA)
Insulation resistance		10MΩ or more with 500V DC megger (between pulse input terminals and FG)
		10MΩ or more with 500V DC megger (between pulse input terminals and channels)
Internal current consumption *2		390mA or less (When the sensor power supply used.)
		200mA or less (When the sensor power supply unused.)
Non use output treatment		Opening.
Use cable		Use the twisted pair wire with the shield. (Wiring length: 500m or less)
Mass		Approx. 330g
External connection		Detachable terminal block (M3 x 20 poles)

* 1 An ambient air temperature during short circuit should be 40°C or less.
* 2 This can be reduced according to the used number of channels and the used number of sensor power supplies. For more information, refer to User's Manual FEH431.

■ Characteristic diagram

In the case of the input frequency range: 0 to 200Hz, and the instant value unit (INT type): 0 to 23000.
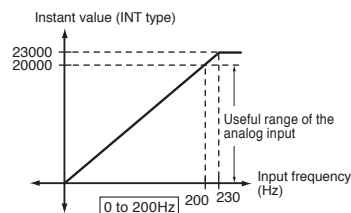
High-speed Counter Module: NP1F-HC □

■ Features

NP1F-HC2 □
- Fast input pulses can be counted up to 2-channels.
- Compatible with 3 types of input signals.
  1) 90° phase-difference pulse
  2) Forward/reverse pulse
  3) Pulse + sign
- 4 types of operation modes
  1) Ring operation
  2) Gating operation
  3) Compare detecting operation
  4) Phase-Z detecting operation
- Since the input voltage for **NP1F-HC2MR** supports DC 5/12/24 V, it

becomes possible to standardize the external power supply at DC 24 V and to improve pulse input connectivity.
- The pulse input filter of **NP1F-HC2MR1** is set so that connection with the inverter FRENIC5000 VG7 of Fuji Electric is optimized.

NP1F-HC8
- Fast input pulses can be counted up to 8-channel 50kHz.
- Compatible with 3 types of input signals.
  1) 90° phase-difference pulse
  2) Forward/reverse pulse
  3) Pulse + sign

NP1F-HC2
AF97-520

- 3 types of operation modes
  1) Ring operation
  2) Gating operation
  3) Reset operation

■ Performance specifications

Item		Specification			
Type		**NP1F-HC2**	**NP1F-HC2MR**	**NP1F-HC2MR1**	**NP1F-HC8**
Count input signal	Input signal	2-phase signal (90 phase difference), forward /reverse signal, coded pulse (Selected by the software)			
	Level	Open collector signal or differential signal (Differential signal is based on **NP1F-HC2** only)			
	Input voltage	5V DC	5/12/24V DC		5V DC
Counter	Function	Ring counter function, reset function, gate function, comparison function (**NP1F-HC2**), phase Z detection (**NP1F-HC2**)			
	No. of channels	2 channels (independent)			8 channels (independent)
	Counting speed	500kHz	200kHz	50kHz	50kHz
	Counting range	Signed 32-bit binary (80000000H to 7FFFFFFFH)			Signed 16-bit binary (8000H to 7FFFH)
	Multiplication function	x 4 (2-phase signal, 90 phase difference only)			
	Reset function	Soft command			
	Gate function	External input signal and soft command			
	Comparison function	Hard circuit and soft command			–
	Phase Z detection	External input signal and soft command			–
Comparison	No. of output points	1 point /channel			–
	Comparison range	Same as the counting range			–
	Comparison contents	(Counted value) ≥ (Compared value) to Output ON			–
	Comparison output	Open collector output (sink type) 24V DC			–
Occupied words		Input: 8 words / Output: 8 words (total: 16 words)			Input: 10 words / Output: 2 words (total: 12 words)
Internal current consumption		24V DC 85mA or less			24V DC 100mA or less
Mass		Approx. 140g			Approx. 195g

■ Functions

Function	Description
Linear operation (**NP1F-HC2 □**)	Counting operation for detecting underflow/overflow when the pulse count value is under/over the minimum/maximum value.
Ring operation	Ring-type counting operation to set the minimum value when the pulse count value exceeds the maximum value or to set the maximum value when the count value is less than the minimum value.
Gating operation	Pulse counting operation activated only when the internal or external gate input is in the counting enabled state.
Reset operation	Resetting the counter value to zero (0) by internal command.
Compare detecting operation (**NP1F-HC2 □**)	Comparing the preset compare value and a count value to output the result to the compare output.
Phase-Z detecting operation (**NP1F-HC2 □**)	Reading a count value for each phase-Z detection.

■ System configuration
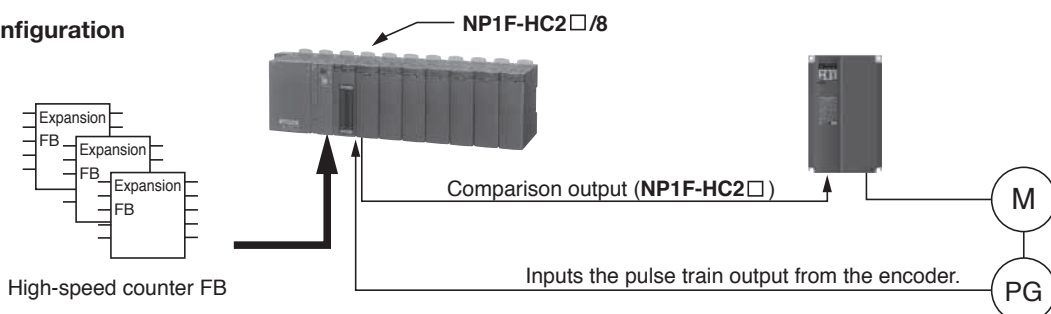
NP1F-HC2 □/8

High-speed counter FB

Comparison output (**NP1F-HC2 □**)

Inputs the pulse train output from the encoder.

M

PG

Two-axis Pulse Train Output Positioning Control Module: NP1F-HP2

■ Features
- Combined with the servo amplifier motor of the pulse train command input type or the stepping motor driver allows high-precision positioning.
- Use of an expansion FB facilitates embedding necessary functions including axis-independent single-function positioning to multi-axis simultaneous start positioning (pseudo linear interpolation).

NP1F-HP2
AF97-517

■ Performance specifications

Item		Specification
No. of control axes		2 axes
Positioning control		Open loop
Acceleration /deceleration characteristics		Trapezoidal (at pulse generation mode)
Position data		Max. $2^{32}-1$ pulse /command
Command pulse	Command frequency	250kHz
	Frequency resolution	16 bits /20 bits
	Output type	Open collector output (forward pulse + reverse pulse)
Control function		Pulse generation mode
Combination actuator		Servo system prepared pulse train command input or stepping motor
Occupied word		Input: 8 words/Output: 8 words (total: 16 words)
Internal current consumption		24V DC 95mA or less
External power supply		24V DC 35mA or less
Mass		Approx. 180g

■ System configuration

NP1F-HP2

Command pulse

Servo amplifier

Servo amplifier

P G

P G

-OT   Origin   +OT
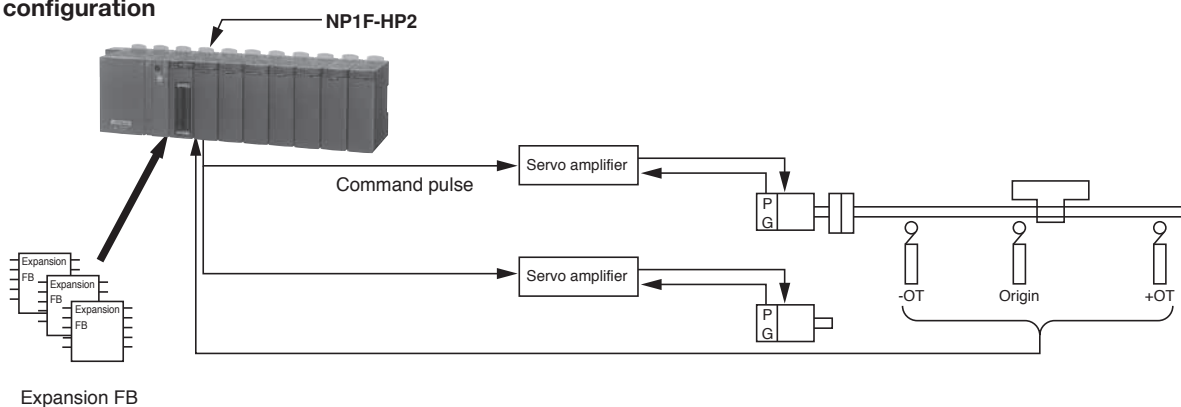
Expansion FB

Two-axis Pulse Train Multiple Positioning Control Module: NP1F-MP2

■ Features
- Combined with the servo amplifier motor of the pulse train command input type or the stepping motor driver allows high-precision positioning.
- Use of an expansion FB facilitates embedding necessary functions including axis-independent single-function positioning to multi-axis simultaneous start positioning (pseudo linear interpolation), interpolation, and cam/running cut.
- Current position (current feedback value) can be detected with the feedback pulse. 2 types of operation modes are available: pulse generation mode and position command mode.

NP1F-MP2
AF97-518

■ Performance specifications

Item		Specification
No. of control axes		2 axes
Positioning control		Open loop
Acceleration /decelerations characteristics		Trapezoidal (at pulse generation mode)
Position data		Max. $2^{32}-1$ pulse /command
Command pulse	Command frequency	250kHz
	Frequency resolution	16 bits /20 bits
	Output type	Open collector output (forward pulse + reverse pulse)
Feedback pulse	Input frequency	500kHz
	Input type	Open collector input or differential signal (90 phase difference, phase A, B and phase Z)
Manual pulse unit	Input frequency	500kHz
	Input type	Open collector input or differential signal (90 phase difference, phase A, B or forward pulse + reverse pulse)
Control function		Pulse generation mode, positioning command mode
Combination actuator		Servo system prepared pulse train command input or stepping mode
Occupied word		Input: 14 words / Output: 8 words (total: 22 words)
Internal current consumption		24V DC 95mA or less
External power supply		24V DC 35mA or less
Mass		Approx. 200g

■ System configuration

NP1F-MP2

Command pulse

Feedback pulse

Servo amplifier

P G

Servo amplifier

P G

Expansion FB

-OT   Origin   +OT

PG

Two-axis Analog Multiple Positioning Control Module: NP1F-MA2

■ Features
- Combined with the servo amplifier motor of the pulse train command input type or the stepping motor driver allows high-precision positioning.
- Use of an expansion FB facilitates embedding necessary functions including axis-independent single-function positioning to multi-axis simultaneous start positioning (pseudo linear interpolation), interpolation, and cam/running cut.
- 3 types of operation modes are available: pulse generation mode, position control mode, and position command mode.

NP1F-MA2
AF97-519

■ Performance specifications

Item		Specification
No. of control axes		2 axes
Positioning control		Semi-closed loop
Acceleration /deceleration characteristics		Trapezoidal (at pulse generation mode)
Position data		Max. $2^{32}-1$ pulse /command (at pulse generation mode)
Speed command	Command voltage	Analog speed command (0 to ±10.24V)
	Signal type	Analog voltage command
Feedback pulse	Input frequency	500kHz
	Input type	Open collector input or differential signal (90° phase difference, phase A, phase B and phase Z)
Manual pulse unit	Input frequency	500kHz
	Input type	Open collector input or differential signal (90° phase difference, phase A, phase B, or forward pulse + reverse pulse)
Control functions		Pulse occurrence mode, positioning command mode, positioning control mode
Combination actuator		Servo system prepared analog speed command input
Occupied words		Input: 14 words / Output: 8 words (total: 22 words)
Internal current consumption		24V DC 150mA or less
Mass		Approx. 200g

■ System configuration
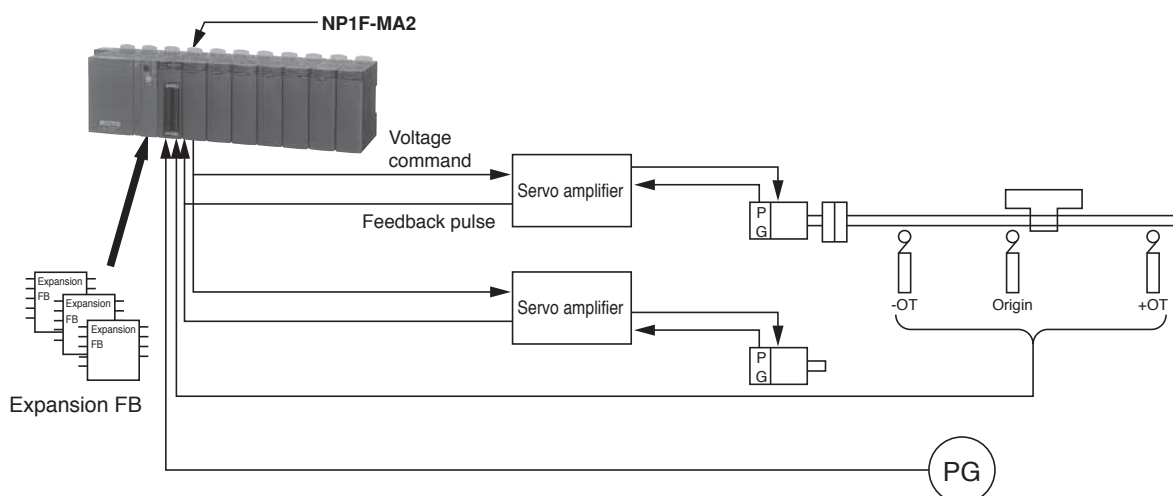
4-axis Pulse Train Output Positioning Control Unit: NR1SF-HP4DT

■ Features
• Combination of this module and driver for servo amplifier and motor of pulse sequence command input type or driver for stepping motor allows you to carry out highly precise positioning.
• Minimum program for data setting and command operation that does not need an expansion FB allows you to control the positioning.

NR1SF-HP4DT

■ Performance specifications

Item		Specification
Type		**NR1SF-HP4DT**
No. of control axes		4 axes
Speed command	Command signal	Pulse train command
	Max. command frequency	250kHz (condition: Sealded twisted pair cable, length: 2 m or less)
	Output format	Open-collector sink mode output
	Max. load current	24V DC 50mA
	Insulation method	Photo-coupler insulation
	Signal form	Foward pulse (CW) + Reverse pulse (CCW)
Feedback pulse input		None
External pulse		None
DI signal	No. of points	8 points (2 points / axis) Origin LS (x 4 CH) Timing signal / Phase Z (x 4 CH)
	Input format	Source input (non-voltage contact)
	Input type	DC (IEC61131-2 Type 2)
	Rated current	Approx. 4mA (24V DC)
	Input impedance	Approx. 5.6kΩ
	Insulation method	Photo-coupler insulation
	No. of points for common	2 points (It allows with the common extension bar.)
No. of occupied words		Total: 40 words (input: 16 words / output: 24 words)
Internal current consumption		24V DC 20mA or less
External power supply		24V DC 150mA or less
Mass		Approx. 230g

■ System configuration
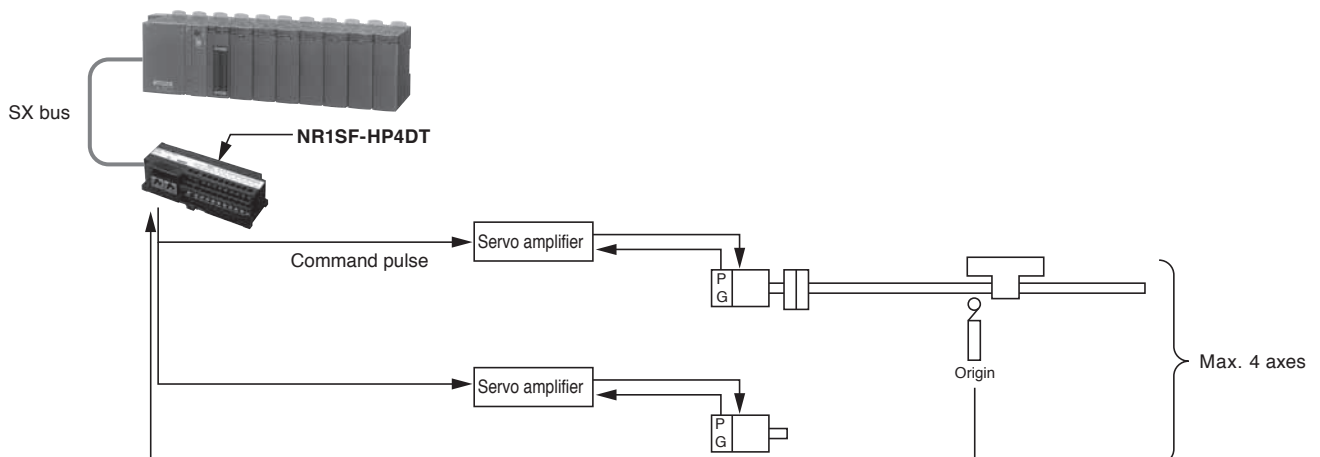
SX bus

NR1SF-HP4DT

Command pulse

Servo amplifier

P G

Origin

Servo amplifier

P G

Max. 4 axes

■ **Positioning Module Function List**

No.	Function	Description	NP1F-HP2	NP1F-MP2 Pulse generation	NP1F-MP2 Position command	NP1F-MA2 Pulse generation	NP1F-MA2 Position control	NP1F-MA2 Position command	NR1SF-HP4DT
1	Pulse train command	Outputs the pulse train command signal for forward and reverse pulses.	○	○					○
2	Pulse generation mode positioning	References the pulse count and frequency data in the CPU module and carries out positioning by generating the command pulse using the built-in pulse generator.	○	○		○			○
3	Position control mode positioning	Directly references position and speed data in the CPU module and carries out positioning.					○		
4	Position command mode positioning	References position data in the CPU module and carries out positioning by generating the command pulse using the built-in pulse generator.			○			○	
5	Current value count	Counts the command pulse and detects the current command value (multiplied by 4).	○	○	○	○	○	○	○
		Counts the feedback pulse and detects the current feedback value (multiplied by 4).		○	○	○	○	○	
6	Phase-Z position detect (Origin return operation)	Detects the command position at the phase-Z rising edge (or falling edge).	○	○	○				○
		Detects the deviation amount at the phase-Z rising edge (or falling edge).		○	○	○	○	○	
		Detects the current feedback position at the phase-Z rising edge (or falling edge).		○	○	○	○	○	
7	Interrupt position detect (Interrupt positioning operation)	Detects the command position at the rising edge (or falling edge) of the external interrupt signal.	○	○	○				○
		Detects the deviation value at the rising edge (or falling edge) of the external interrupt signal.		○	○	○	○	○	
		Detects the current feedback position at the rising edge (or falling edge) of the external interrupt signal.		○	○	○	○	○	
8	Automatic-start frequency setting	Allows the user to set the automatic-start frequency.	○	○		○			○
9	Trapezoidal acceleration/ deceleration computation	Computes trapezoidal acceleration/deceleration.	○	○		○			○
10	Deceleration point automatic computation	Automatically computes the deceleration point.	○	○		○			○
11	Continuous frequency change	Continuously updates the command frequency of the pulse generator.	○	○		○			○
12	Command pulse count additional setting	Sets the additional command pulse count during pulse generator output.	○	○		○			○
13	Pulse output stop processing	Two types of acceleration can be selected for trapezoidal deceleration when the pulse output is interrupted.	○	○		○			○
14	Emergency stop processing	Carries out quick stop when an emergency stop error is detected.	○	○					○
		Immediately stops the pulse output.			○				
		Immediately clears the speed command voltage to 0V.				○	○	○	
15	Over travel (Plus or minus error detection)	Carries out deceleration and stop when a +/-OT error is detected.	○	○		○			○
		Immediately stops the pulse output.			○				
		Performs exponential deceleration and stop.					○	○	
16	Transmission error monitoring	Monitors a module control program error on the CPU module side, and carries out quick stop when a transmission error is detected.	○	○		○			○
		Immediately stops the pulse output.			○				
		Performs exponential deceleration and stop.					○	○	
17	External pulse count	Counts the external input pulse for manual pulse unit operation or synchronous operation.		○	○	○	○	○	
18	Positioning data first read	Up to four items of positioning data per axis can be registered in the FIFO buffer. The registered positioning data is executed sequentially. It is also possible to make additional settings in the FIFO buffer during operation.		○		○			
19	Positioning data write	Sets additional positioning data during continuous frequency change processing.		○		○			
20	External input signal detect	Detects the input status of all DI signals.	○	○	○	○	○	○	○
21	External output signal setting	All DO signals can be switched with the CPU module.	○	○	○	○	○	○	○

Functional Extension FB Software

■ Easily realizes functional extension by software

External fault diagnostic and adjustment system functions can also be implemented with software (an expansion FB) by using the enhanced processing functions of the CPU module.

The software processing section is placed in the CPU section as an expansion FB and only the external equipment interface processing is separately performed in the I/O section. Thus, an optimum system can be configured according to the function and performance requirements.

■ Diagnostic FB

Necessary diagnosis can be conducted only by selecting an extended FB for each diagnostic function. If this software is stored in the CPU module for control programs, it is not necessary to add any other special function module. When it is used in the multi-CPU configuration, independence of the control CPU can also be preserved.

For notification of the diagnostic results to the external equipment, Ethernet or a network of general-purpose communication modules or equivalent can also be used.

Expansion FB which implement the fault diagnostic functions
The following diagnostic and data sampling FBs are available:
・Sequence/time diagnostic FB
・Time diagnostic FB
・Upper/lower limit diagnostic FB
・Data sampling FB

■ PID FB

Instrumentation control and sequence control were conventionally separated with respect to both hardware and software. When packaged as an extended FB, this adjustment system computing function is a true linkage between instrumentation control and sequence control. In addition, the restriction on the control loop count has sufficient expandability in a multi-CPU configuration. (The number of FBs that can be stored in a CPU module is limited by the number of program steps and the sampling rate.)

Extension FB realizing the temperature regulation system operation function
・ON/OFF control FB
・PID FB with auto-tuning

Note: This software will be available for download free of charge from our website.

Programming Support Tool

Programming Support Tool SX-Programmer Expert (D300win): NP4H-SEDBV3

■ Features

• Complete conformity to IEC 61131-3 International Standard

D300win supports five types of program representations completely conforming to the IEC 61131-3 International Standard. It allows the programmer to code the combination of program representations best suited for the control target.

• Supported representations

- IL (Instruction List)
- LD (Ladder Diagram)
- FBD (Function Block Diagram)
- ST (Structured Text)
- SFC (Sequential Function Chart)
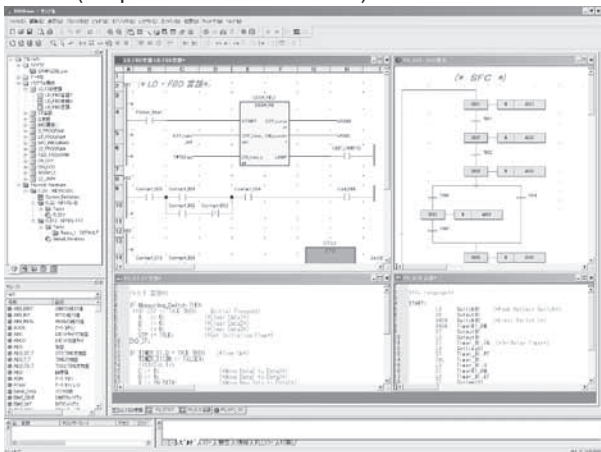
• Structured programming

Programming in units of POU or worksheets allows the use of the structured design method by which a program is created by dividing it by functionality or process. This method enables multiple designers to divide the program design among them so that substantial reduction in the program creation time can be achieved.
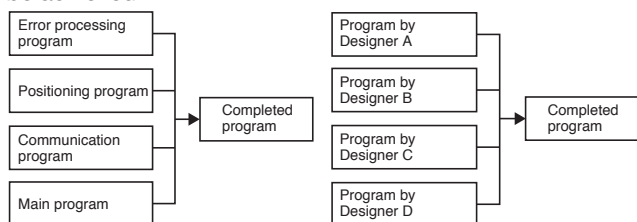
• Ladder programming using key operations (grid fixed method)

Ladder programming can be performed using familiar key operations:
· Standard display mode (variable only)
· Extended display mode (variable + AT specification address)
· All display mode (variable name + AT specification address + variable comment)
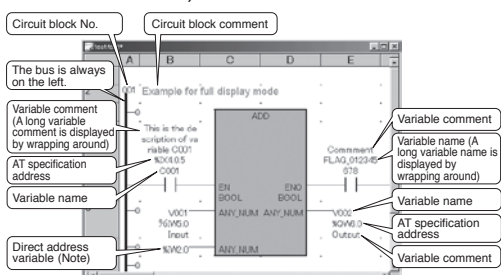
Note: If a direct address variable (= no variable name) is used, no variable comment is displayed, even if it is registered.

• Free description of programs and comments (Free editing style)

Programs can be described in any location on a worksheet to facilitate understanding of the processing relationships such as in linkage between the interlock condition and the sequence processing section/computing section, allowing efficient programming.

In addition, when a comment is described on a worksheet, the programmer can put a local comment for each circuit block as well as a comment in units of contacts, coils, or circuits, greatly contributing to ease of reading and understanding.
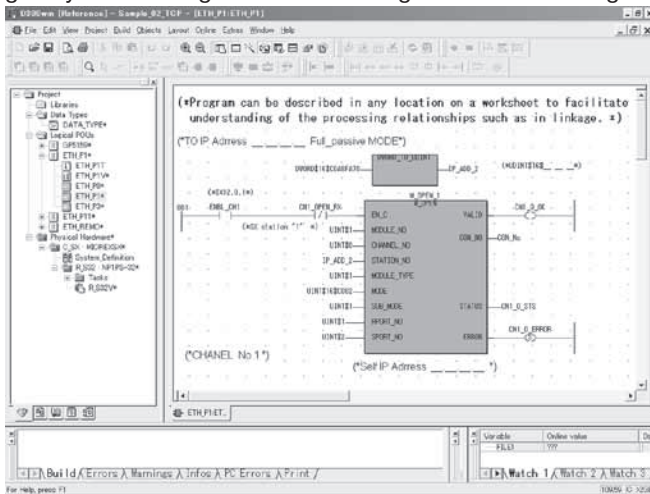
• Programming with variables (labels)

Differing from conventional programming, the Expert (D300win) Programming Support Tool uses label programming (addresses are automatically assigned) in which the address section is described like conventional comments, enabling program coding without being conscious of memory addressing. After the programming, any changes in address assignment can be accommodated by merely changing the corresponding label definition to update the program.
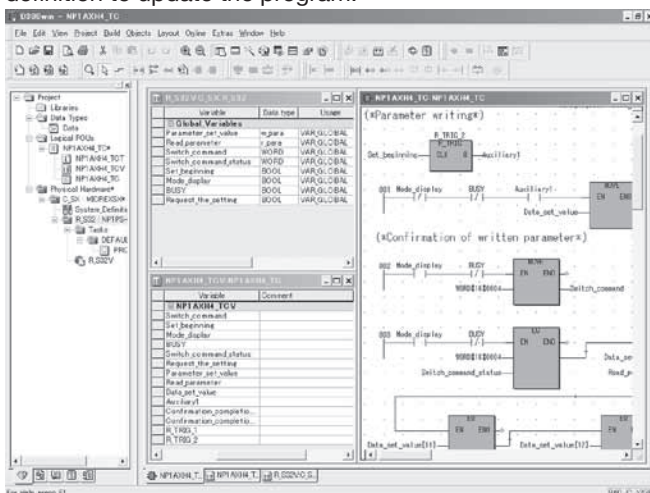
• **Integrates user-original circuits into an FB**
Frequently used routine programs or circuits can be integrated into an FB so that the programmer can easily reuse them. For FB generation, the user can select a language compatible with IEC 61131-3 supported by Expert (D300win) instead of a special language. If the programs or circuits are stored in library form, the target function can be effectively used without being conscious of debugging.
This is also effective for circuit standardization or structuring if a single control block is integrated into an FB.

• FB internal program (LD/FBD language)
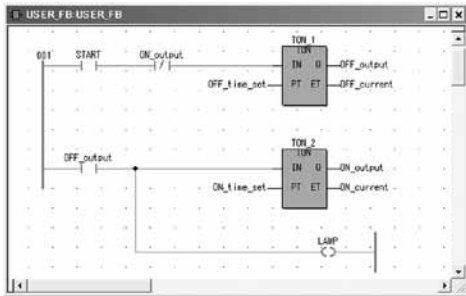
• When FB is used (FBD language)
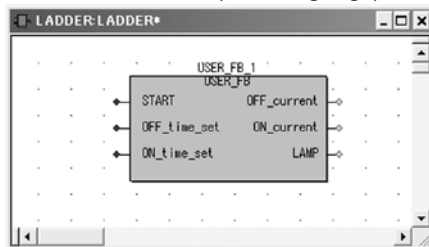
• FB internal program (ST language)

• When FB is used (FBD language)
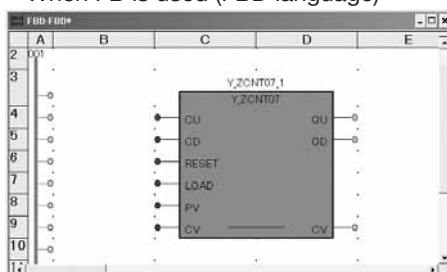
• **Simulation function**
This tool enables program logic test using the software PLC function for simulation built in Expert (D300win), without using the actual unit.
It performs operating simulation of a program written with a programming language conforming to IEC 61131-3. It enables forced ON/OFF and monitoring of any signal, exhibits its power in remarkable improvement of the programming and debugging efficiency for the SX series.
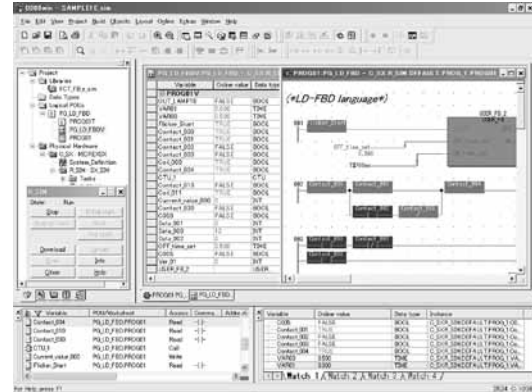
• **Error & jump check function**
The tool performs program syntax check at the time of program compilation to detect syntax errors. It is possible to jump to an error position by double-clicking an error detection section. This function, together with the cross-reference function and data watch window function, exhibits its power in program correction and testing.
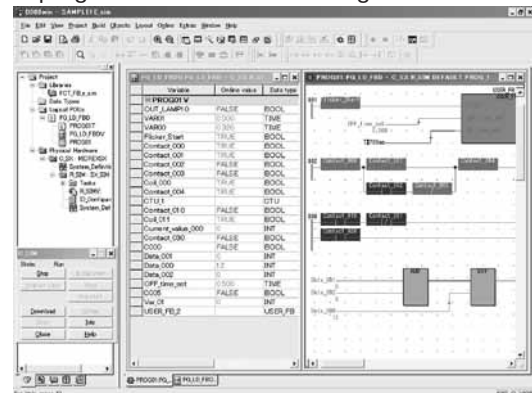
• **Sampling trace**
Sampling trace function saves variable (memory) data change during PLC is in RUN. It is possible to show sampling data on sampling trace window as graph. Sampling data is automatically saved with project file. This saved sampling data can be exported as csv file (ASCII data).

69
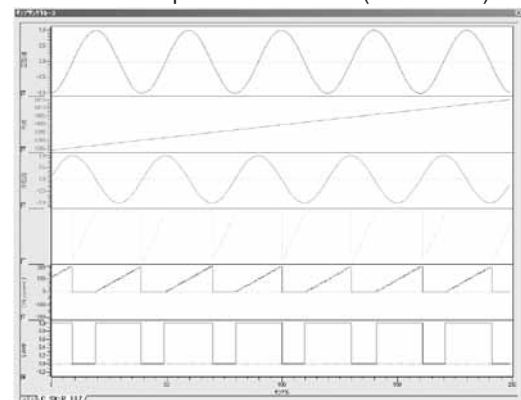
Programming Support Tool Expert (D300win)

• Documentation function
The documentation preparation function has been substantially improved. Not only can it print drawing numbers, dates, page, and drawing borders, but also company logos and comments.
It also augments the print preview function, which allows the user to verify the print state on the screen before beginning printing, and the scaled printing function which eliminates the need to select the paper size.

• Layout function
The layout function allows the user to print a program list in a free, user-original format. The created layout can be stored as a layout library, which can be used when necessary.

Frame creation: Program list can be printed with frames. The frames can be freely designed facilitating reproduction of a conventionally used drawing sheet.

Company logo: Company logo can be attached to a document. It is created as BMP data and pasted to the frames.

Drawing number: Drawing number can be placed in a specified position within the frame.

Page: Page number can be placed in a specified position within the frame.

Comment: Comments can be placed in a specified position within the frame.
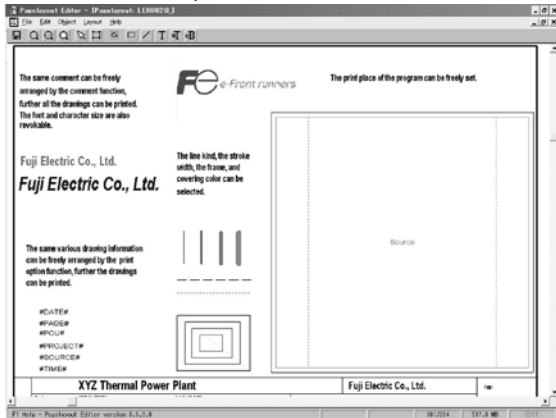
• Preview function
Use of the preview function before printing allows the user to verify the print image.
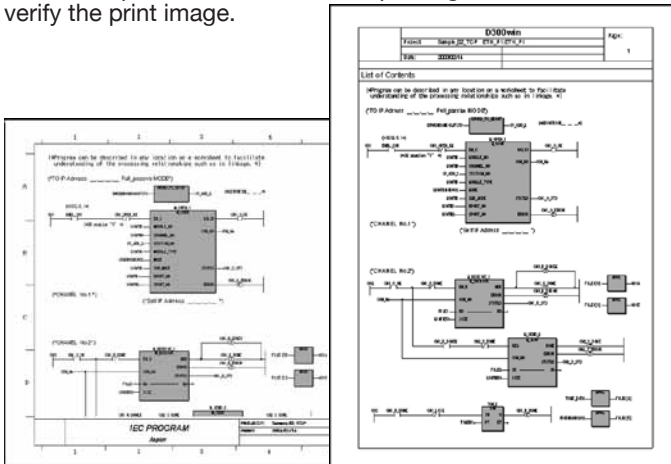
• Scaled printing
Documents can be printed in enlarged or reduced size. The paper size can be freely selected according to the purpose. The number of programs printed on a single sheet can be freely adjusted to provide united documentation.

• Function module support
The function module support (built-in each extended FB software package) has been realized as a common support tool. Thus, a dedicated loader is not required.

• Sharing program definitions including variable names
Labels and files defined/created with the Expert (D300win) programming support tool can be used as is from the function module support tool. This allows not only reducing the programming workload, but also unifying management of programs.

• Sharing the support tool connection port
The function module support tool can be used even when the IEC programming support tool remains connected to the CPU module. The support function can be used only by starting the function module support tool, thus, it is not necessary to change the connection by replacing the CPU module with the function module. Parameter transmission between the CPU module and the function module is carried out by the extended FB.

Function module

CPU support tool connecting slot
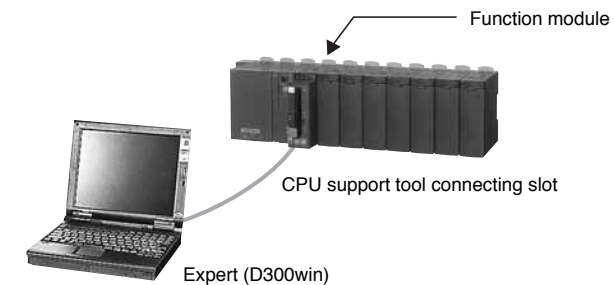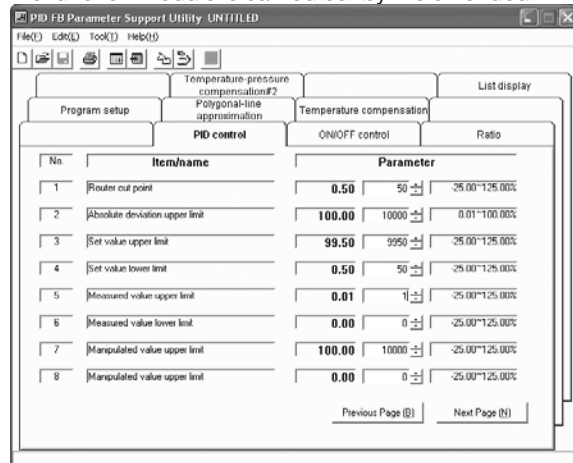
Expert (D300win)

• POD cooperated support
Screen creation for the Programmable Operation Display (POD) can be performed using variable names set with Expert (D300win).

• POD screen creation software
POD screen creation software and Expert (D300win) run on a personal computer, which is the common platform.

• **Multi-user support**

A development environment that allows multiple users to simultaneously access a source project and has a mechanism for exclusive access control is offered. Exclusive control of projects is automatically performed by support tool operations.

• Management, registration, and creation of client projects with respect to a server project
• Check-in/check-out in units of POU

• **USB interface**

The connection method using the full-speed USB (Universal Serial Bus) 1.1 has been added as a loader connection method.
Communication with the SPH300 (**NP1PS- □□R**), SPH300EX and SPH2000 or SPH3000 can be performed at high speed using a commercial USB cable.

• **Data access to the user ROM**

Projects can be downloaded from/uploaded to the user ROM card (compact flash card) supplied with SPH300 (**NP1PS- □□R**), SPH300EX , SPH2000 or SPH3000. Also, data can be written into/read from the user ROM card.

• **Password function**

By setting an access authentication password for on-line functions, operation of the PLC can be limited to three levels, i.e., level 1, level 2, and level 3.

■ Operating environment

Item		Specification
Hardware		IBM-PC/AT compatible
CPU		Intel Pentium 400MHz or higher (800MHz or higher recommended)
Hard disk		Free space of 140M bytes or more { Expert (D300win) system software: 100MB or more / Standard extension FB software package: 40MB or more }
CD-ROM unit		1 unit (x 4 speed or faster), media: ISO 9660 format
Memory capacity		64M bytes or more (256M bytes or more recommended)
Keyboard		101 keyboard
Mouse		USB mouse, bus mouse, or PS2 mouse
Indicator		800 x 600-dots resolution or higher (1024 x 768-dots resolution or higher recommended)
Communication interface	RS-232C	9600bps-57600kbps (default setup according to resource model selection)
	Ethernet	Possible
	ISDN	Possible (analog port is used)
	USB	Possible with V1.1 (Target CPU: **NP1PS- □□R**, SPH300EX and SPH2000 or SPH3000)
	P/PE-link	Possible
	SX bus	Possible
	FL-net	Possible
OS		Windows2000/XP/Vista
Portability		Depends on commercial mobile personal computer.
Environmental durability		Depends on environmental conditions of commercial personal computer.

■ System configuration

SPH2000/SPH3000

Ethernet crossover cable (commercialized product)

Personal computer

USB/USB-miniB cable (commercialized product)

SPH300 (R type)/
SPH300EX/SPH3000

USB/USB-B cable (commercialized product)

SPH200/SPH300/
SPH300EX/SPH2000
/SPH3000

Support tool connection cable: **NP4H-CB2**
+
RS-232C/RS-422 signal converter: **NW0H-CNV**

RS-232C

Expert

USB/RS-232C
Signal converter cable
(commercialized product)

When PC does not have
a RS-232C port:

Programmable Controllers
MICREX-SX series SPH
Programming Support Tool Standard

Programming Support Tool
Programming Support Tool SX-Programmer Standard: NP4H-SWN

■ Features
• Familiar user interface
The user interface and ladder programming support SPB programming equivalent to a FLEX-PC Windows-compatible PC loader.
Support for full-keyboard operation is also handy for on-site debugging and maintenance. With a whopping 202 different instruction words, the possibilities for your programs are limited only by your imagination.
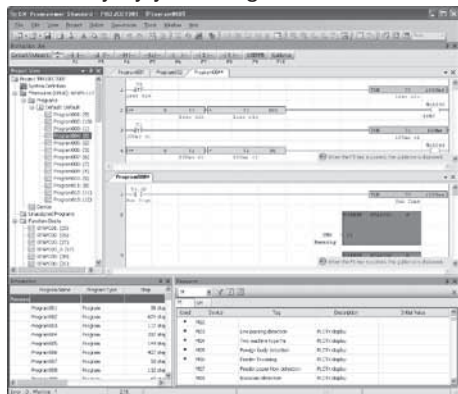
• Compatible with the international standard IEC 61131-3
Program representations support the LD language, which is most standard. The ST and FBD programming languages are also supported. Programming in units of POU in which the structured design method is applicable can be performed.

• Intuitive screen operation
The easy-to-see and understandable layout enables you to intuitively operate the screen.
· Command word input is simplified by the command jog bar and the command word candidate narrow-down function based on a keyword search.
· Multiple sheet display and a flexible layout help improve operation efficiency.
· Input can be completed on a single screen because operands can be input in succession.
· Operation help corresponding to the screen displayed makes the manual no longer necessary.
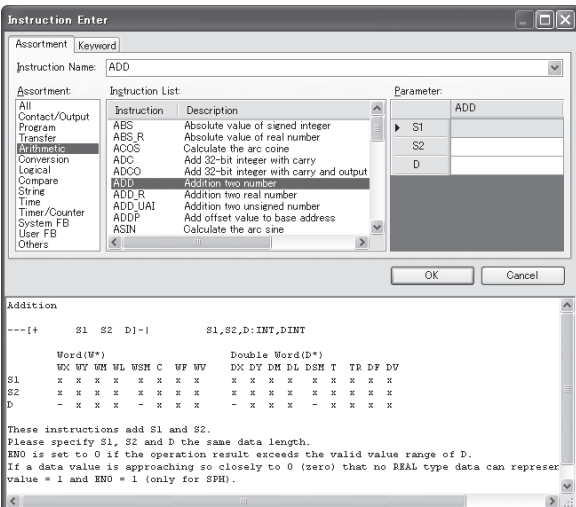
•Supports a variety of input methods
Standard supports three input methods, and you can select the optimum input method for the situation.
· Data can be input simply by operating the mouse wheel and clicking the mouse button. You can register any command words you desire.
· Even if you do not know a command word, you can easily narrow down command words through a keyword search.
· Candidates can be automatically displayed by mnemonic input mainly using the keyboard and the Intellisense function.
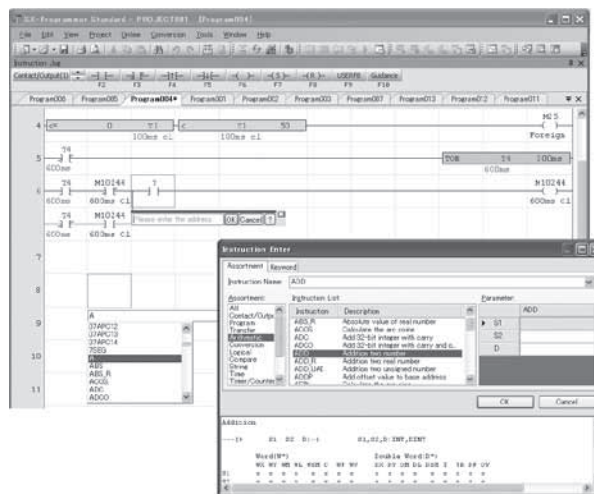
• Leverage your program assets
You can make good use of program assets for the MICREX-F and FLEX-PC series of our PLC. For circuits and commands not supported by Standard, alternative methods are described in the Help section.
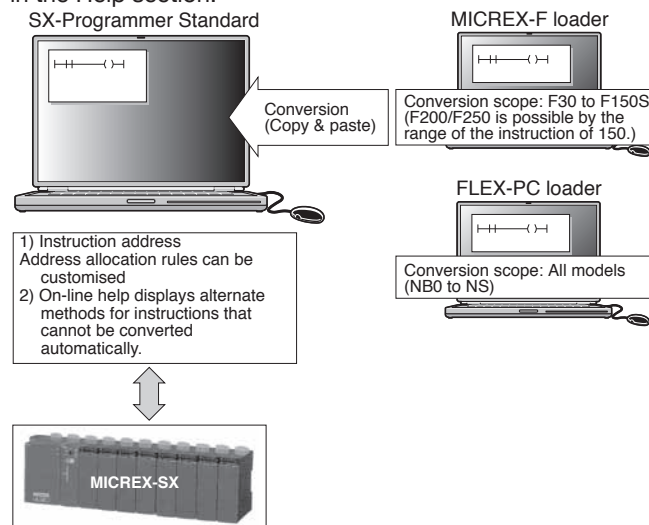
• Resume feature
When the software is started, the previous edit/monitor position is automatically displayed.
When you go on-line, monitoring starts at the position you were monitoring last time. When you are off-line, the system transitions to edit mode displaying the point you were editing last time.

•CPU modules not supported
Standard is not compatible with the SPH300EX, and the SPH3000.

•**Device Editor**

Device information is displayed on a single screen, for example, in the form of a list of the operating states of devices, enabling you to save time in memory management.
・Key operations are similar to those in Excel.
・All addresses can be displayed.
・The Device Editor not only displays the operating state of devices but also enables you to edit programs.

• **Data access to the user ROM**

Projects can be downloaded from/uploaded to the user ROM card (compact flash card) supplied with SPH300 (**NP1PS-**□□**R**), SPH2000. Also, data can be written into/read from the user ROM card.
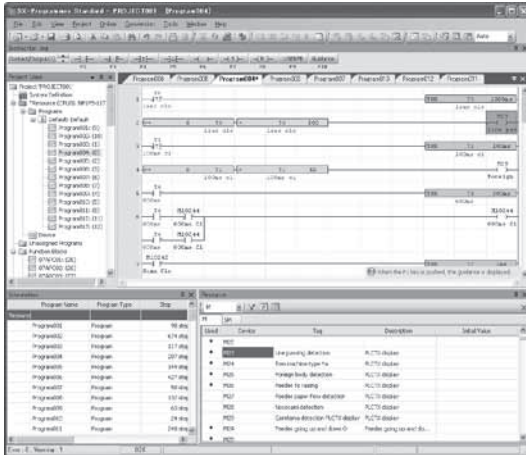
• **Collation function**

With the collation function, you can display the details of different points in programs and edit by referring to the collation results.
・You can quickly check different points with the aid of a filter display of collation results.
・You can edit a program while checking different points.
・With the Update button, programs can be promptly updated to the latest comparison results after editing.

• **Password function**

By setting an access authentication password for on-line functions, operation of the PLC can be limited to three levels, i.e., level 1, level 2, and level 3.

■ **Operating environment**

Item		Specification
Hardware		IBM-PC/AT compatible
CPU		Intel Pentium 233MHz or higher (350MHz or higher recommended)
Hard disk		Free space of 200M bytes or more
CD-ROM unit		1 unit (x 4 speed or faster), media: ISO 9660 format
Memory capacity		64M bytes or more (256M bytes or more recommended)
Keyboard		101 keyboard
Mouse		USB mouse, bus mouse, PS2 mouse
Indicator		800 x 600-dots resolution or higher (1024 x 768-dots resolution or higher recommended)
Communication interface	RS-232C	9600bps-57600kbps (default setup according to resource model selection)
	Ethernet	Possible
	ISDN	Possible (analog port is used)
	USB	Possible with V1.1 (Target CPU: **NP1PS-**□□**R**, SPH2000)
	P/PE-link	Possible
	SX bus	Possible
	FL-net	Possible
OS		Windows2000/XP/Vista
Portability		Depends on commercial mobile personal computer.
Environmental durability		Depends on environmental conditions of commercial personal computer.

■ **System configuration**

For information on how to connect Standard with PLC, refer to "System configuration" in Expert.
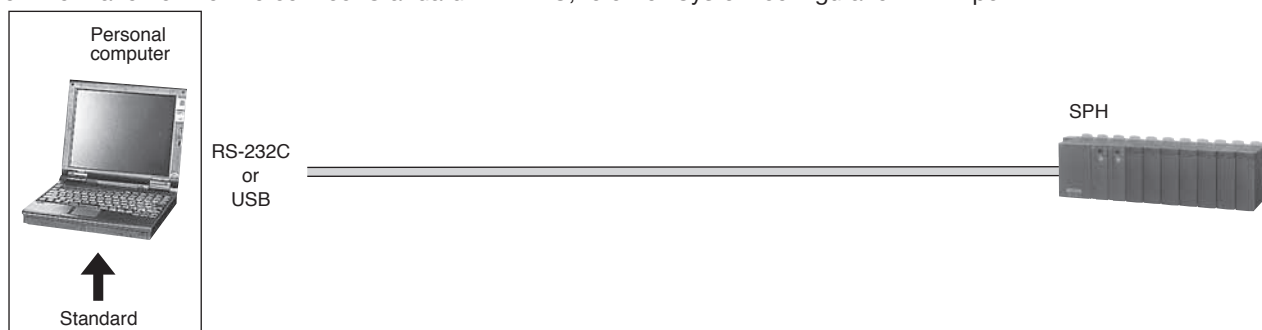
MICREX–SX series SPH

Fuji Integrated Support Tool @E.Integrator

Fuji Integrated Support Tool: NP4N-ITGR

■ Overview

Fuji integrated support tool: @E.Integrator is a FA system integrated management tool that integratedly manages the support tools for PLC, POD, INV, and SV.

■ Features

• **Easy**
· Relieved from cable switch work
· Transparent connection with the network
· Relieved from tool select operation

• **Economy**
· Enhanced efficiency of content management
· Enhanced engineering efficiency of all processes

• **Evolution**
· Pursuit of further convenience

Inverter loader

Servo loader

PLC loader

POD editor

Engineering from one location is possible and switching of the loader cable is unnecessary

Data flow

Ethernet, FL-net, etc.

SX bus

POD
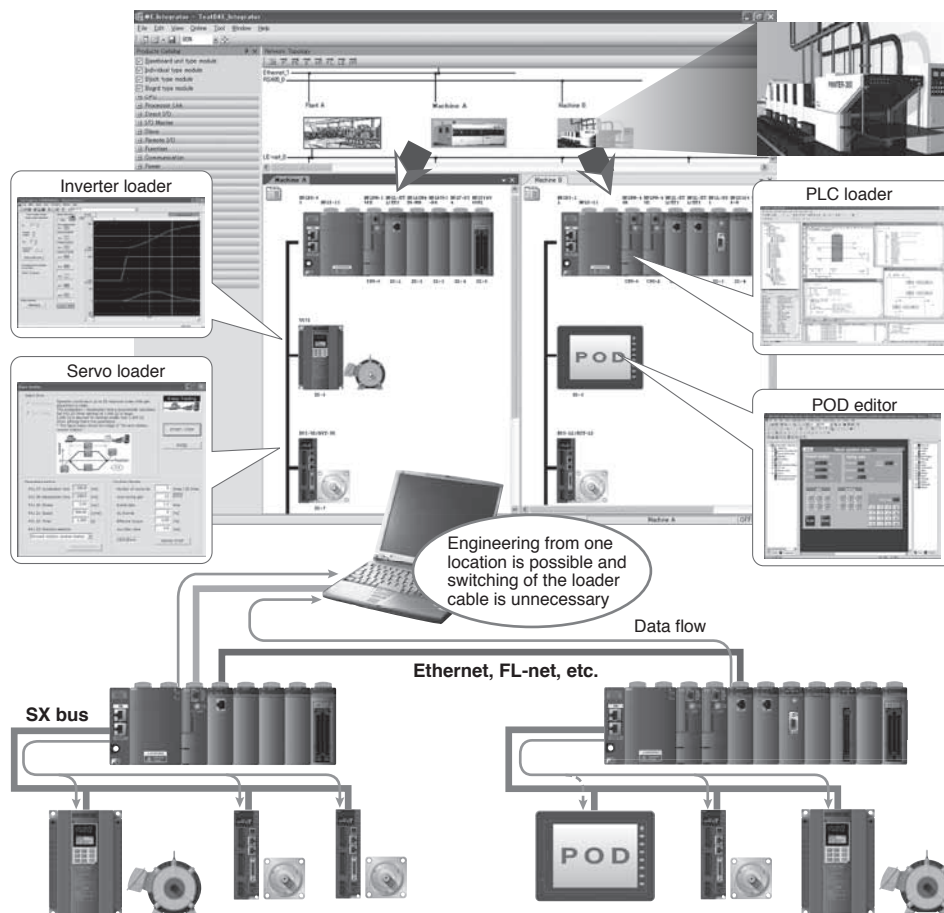
■ Supported devices

Support Tool		Function & Description	Model	Version (or Later)
Fuji Integrated Support Tool @E.Integrator		FA system integrated management tool that integratedly manages the support tools for PLC, POD, INV, and SV.	**NP4N-ITGR**	V1.0.0.0
PLC loader	Expert	Support tool for PLC. Edits the MICREX-SX program and monitors the state.	**NP4H-SEDBV3**	V3.4.4.0
SX-Programmer	Standard		**NP4H-SWN**	V2.3.5.1
POD editor		Support tool for POD. Edits and operates the POD screen.	**V-SFT-5**	V5.3.0.0
Inverter loader PC Loader for FRENIC5000VG7		Support tool for vector inverter VG7. Adjusts parameters and monitors the state.	**WPS-VG7-PCL**	V2.1.0.1
Servo loader PC Loader for ALPHA5		Support tool for ALPHA5. Adjusts parameters and monitors the state.	**–**	V1.8

Note: These support tools are not included in the Fuji integrated support tool.
Purchase or download these support tools separately from home page.

■ Operating environment

@E.Integrator operating environment

Item	Contents
Operating system *1	Windows 2000 Professional, Windows XP
Language	Japanese, English
Processor	Pentium 800MHz or more
Hard disk	30MB
Memory	256MB
Display	SVGA
Disk unit	CD-ROM drive unit (Used during installation)
Communication interface	RS-232C, USB, Ethernet
Software *1	Microsoft Internet Explorer Version 5.01 or later
	Microsoft .NET Framework 2.0
	Microsoft .NET Framework 2.0 Japanese Language Pack *2

Operating environment combining @E.Integrator with each support tool

Item	Contents
Operating system *1	Windows 2000 Professional (Service Pack 4 or later) Windows XP (Service Pack 1 or later)
Processor	Pentium III 1GHz or more
Hard disk	Free space of 1.5GB or more
Memory	1GB
Display	Recommended XGA or more

*1 Apply the latest service pack to your operating system.
*2 If the Japanese Language Pack is not installed when using a Japanese OS, some messages will be displayed in English.

OPC-Coordinated Library SX Communication Middleware

■ Features
• OPC-coordinated library
Among various specifications established by OPC Foundation, this library is compatible with the OPC common specification and data access specification. The OPC automation interface and OPC custom interface are prepared as programming interfaces.

• In combination with a commercial SCADA software (RSView32 from ROCKWELL AUTOMATION, Intouch from Wonderware, etc.), this library makes it possible to display the SPH-controlled data to the supervisory screen and utilize the data for the SPH setup data from the operation screen.

OPC specification

(OPC Common)

(OPC Data Access 1.0)

(OPC Data Access 2.0)

(Alarm and Events)

(Historical Data Access)

OPC interface specification

OPC automation interface (About 120 types, VB, etc., for simplified access)

OPC custom interface (About 80 types, C/C++, etc., for specialized applications)

Shaded portions are applicable to the SX communication middleware.

■ Operating environment

Item		Specification
Hardware		IBM-PC/AT compatible
CPU		Intel Pentium 233MHz or higher
Hard disk		Free space of 10M bytes or more (with additional disk space for Programming support tool)
CD-ROM unit		1 unit (x 4 speed or faster), media: ISO 9660 format
Memory capacity		128M bytes or more
Keyboard		101 keyboard
Mouse		USB mouse, bus mouse, or PS2 mouse
Indicator		1024 x 768-dots resolution or higher
Communication interface	Ethernet	Commercial Ethernet board
	RS-232C	Commercial personal computer
	Modem	Commercial personal computer
	FL-net	Commercial Ethernet board
Software (OS)		Windows 2000/XP/NT4.0
Environmental durability		Depends on environmental condition of a commercial personal computer.
Models to be connected		MICREX-SX SPH series
Language for user application software development		Microsoft Visual Basic
		Microsoft Visual C++

■ Sample application system
The example at right is a centralized monitor system for line equipment configured using SPH as a controller.
• The monitor screen makes status display and data collection of each I/O device.
• The operation screen sets production command data for each line.

■ Sample application monitor screen
The following is a sample application monitor screen using the SCADA software.
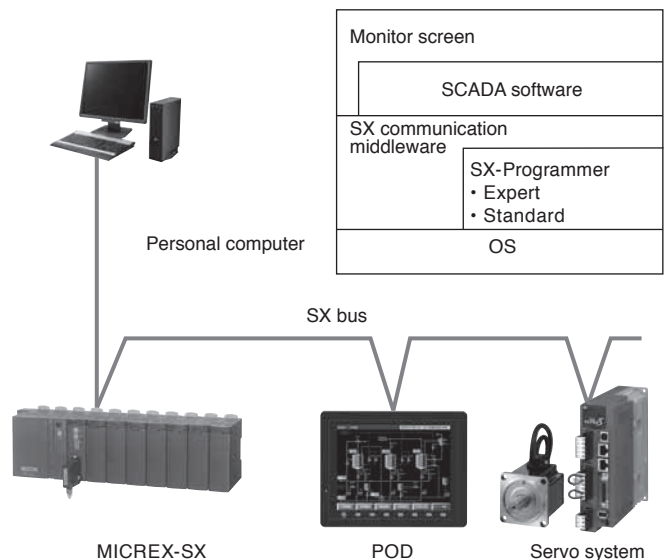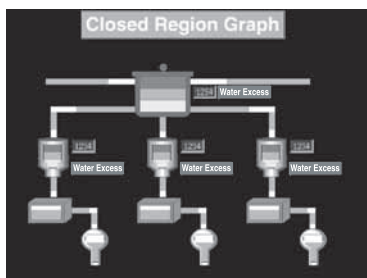
Monitor screen

SCADA software

SX communication middleware

SX-Programmer
• Expert
• Standard

OS

Personal computer

SX bus

MICREX-SX

POD

Servo system

This software will be available for download free of charge from our website.

MICREX-SX series SPH
SX Instrumentation Package

SX Instrumentation Package: NP4N-IPAC

■ Features

• Remarkably improved application development efficiency
- An instrument screen is easily generated from an application program using the instrumentation FB.
- Abundant instrumentation FBs allow you to support various areas.
- Programming support tool is compliant with IEC61131-3, allowing you to select a language suitable for componentizing and processing control programs.
  As languages, LD, IL, FBD, ST, and SFC are supported.

• System configuration with general-purpose PLC and touch panel
- One CPU can afford loop control, sequence control, and data processing.
- Touch panel can afford operation, tuning, and monitoring.
- Instrumentation system can be configured with reasonable cost.

Instrumentation FB library
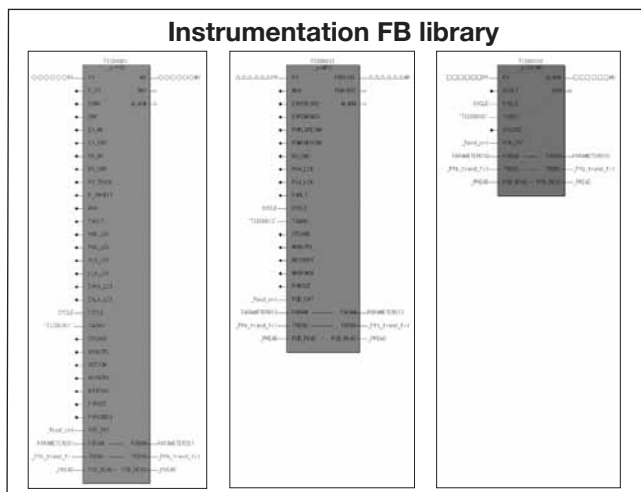
Easily Generated
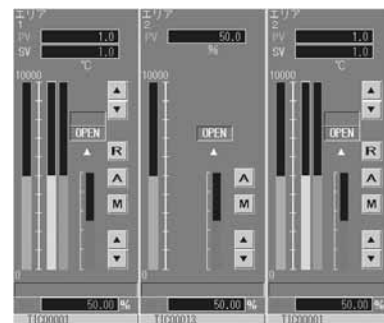
• Abundant instrument FB libraries
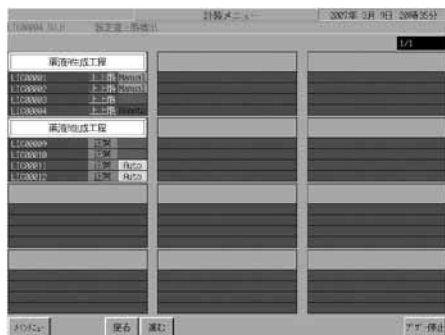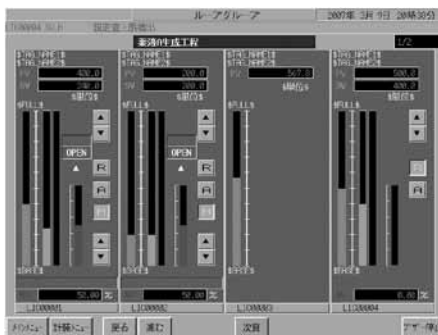
Overview — Group monitoring — Loop tuning
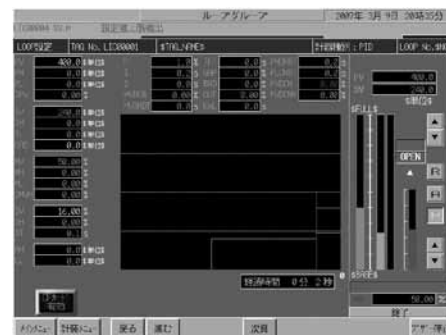
■ System configuration

Personal computer

Ethernet crossover cable (commercialized product)

USB/USB-miniB cable (commercialized product)

SPH2000

RS-232C

Support tool connection cable: **NP4H-CB2**
+
RS-232C/RS-422 signal converter: **NW0H-CNV**

USB/RS-232C Signal converter cable (commercialized product)
When PC does not have a RS-232C port:

Expert   SX Instrumentation package   POD EDITOR

(SVGA resolution)

Screen data transfer cable: V-CP

Handy Monitor: NW0H-S3ES

■ Features
• Portable tool during maintenance
Allows you to monitor and set up the data without the knowledge of programming support tool. As it is dedicated hardware with handy design for ease of use, you can easily bring it out and install it.
• Support for SPH
Supports SPH which did not have a handy design up to now.
Allows you to start up and stop PLC and display its failure state.
Also, supports SPB (SX mode).

NW0H-S3ES
KDD07-001

■ Performance specification

Item	Specification
Display unit	Liquid Crystal Display, 16 characters x 2 lines, LCD with backlight
Language	English
Keyboard unit	Embossed sheet key, electronic buzzer sound, 36 keys
How to connect with processor	RS-422
Data monitor function *1	Bit data ON/OFF monitor
	Internal memory (I, Q, M / X, Y, M, L, and SM) monitor (word, double-word)
Data setting function *1	Bit data ON/ OFF (overwrite), compulsory I/O ON/ OFF
	Internal memory (I, Q, M / X, Y, M, L, and SM) setting (word, double-word)
Password input	Password input when password is needed for writing data
Failure message display	Displays the message which indicates failure details when connected to a PLC in fault state (fatal / non-fatal fault)
Auxiliary functions	Startup/Stop of PLC
	Calendar setting
	Buzzer ON/OFF
	Inverter connection function *2
	(Display / Set up function code data, monitor operation, and display alarm information)

Note 1: The device address representation used supports both SX-Programmer Expert (D300win) and Standard. (Loader type setting)
Note 2: Applicable to an inverter connected to the RS-485 interface of board controller.

■ System configuration

Handy monitor

Connection cable (accessory)

SPH

PCI-Bus-Based SPH300 CPU Board
: NP3PS-SX1PCS □□

■ Features
- The board is provided with an extension connector of the SX bus, allowing connection to diverse SX-based devices (indicators, remote I/Os, servo units, etc.) as well as standalone operation on a personal computer.
- When programming supporting tool Expert (D300win) conforming to IEC is installed in a personal computer with this board mounted, programming and maintenance can be performed from the personal computer. Like the SPH300, this board is provided with a loader connector as standard. This makes it possible to perform programming and maintenance also from other personal computers with Expert (D300win).
- This board is connected to the PCI bus through 8K-word dual port memory, allowing high-speed data transmission. It can interface to applications for personal computers.
- A communication driver for data access with this board has been prepared.

NP3PS-SX1PCS32
KDD07-011

- Using the high-speed data exchange function, data in the general memory of PLC can be read at high speed from the personal computer or data can be written into the standard memory.

■ Performance specifications
Performance and specifications of the built-in board type CPU board **NP3PS-SX1PCS32/NP3PS-SX1PCS74** are equivalent to those of the module type **NP1PS-32R/NP1PS-74R**.

Built-in board type	Module type	Program memory capacity
NP3PS-SX1PCS32	**NP1PS-32R**	32768 steps
NP3PS-SX1PCS74	**NP1PS-74R**	75776 steps

For details on performance and specifications, refer to "CPU Module: **NP1PS-**□□" on this catalog.

■ Operating environment

Item	Specification
Hardware	IBM-AT compatible [*1], [*2]
CPU	Intel Pentium 233MHz or higher
Hard disk	Free space of 10M bytes or more (and necessary disk capacity for Expert (D300win) too)
CD-ROM unit	At least 1 unit, (x 4 speed or faster recommended), media: ISO 9660 format
Memory capacity	32M bytes or more (256M bytes or more recommended for Expert (D300win) operation)
Keyboard	101 English keyboard
Mouse	USB mouse, bus mouse, PS2 mouse
Indicator (resolution)	800 x 600-dots resolution or higher
Operating system	Windows2000/XP/NT4.0
Environmental durability	Depends on environmental conditions of commercial personal computer.
Others	TCP/IP protocol

*1 This board is not applicable to the multi-CPU configuration. Use a personal computer with the single-CPU configuration.
*2 The board size supports a full-size PCI slot (For more information, refer to the Dimensions "PCI-bus based board" on this catalog).

PCI-Bus-Based FL-net (OPCN-2) Ver. 2.0 Board: NP3L-FL3PCS

■ Features
- Two different communication functions by application
  With cyclic communication, this board supports both the common memory function, which allows each node to share the same data, and the message communication function, which exchanges only necessary information when required.
- Large capacity common memory
  The capacity of the common memory is 8K bits and 8K words.
- High-reliability by the master-less method
  Since no master exists, participation and removal of each node can freely be performed without affecting communication of other nodes. The power of any node can be turned ON or OFF, allowing easy maintenance.

NP3L-FL3PCS
AF02-80

■ Performance specifications
Performance and specifications of the built-in board type FL-net board NP3L-FL3PCS are equivalent to those of the module type NP1L-FL3.
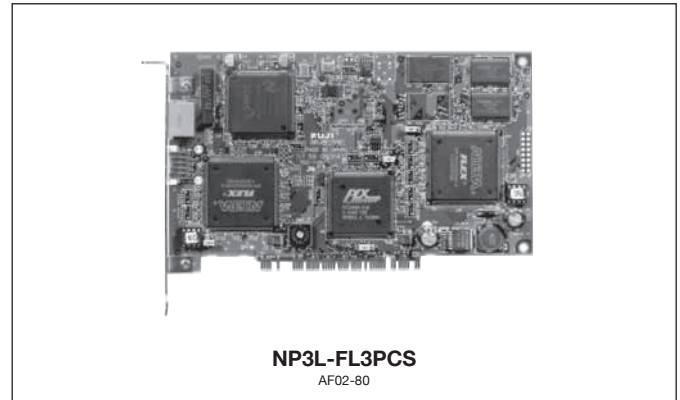
For details on performance and specifications, refer to "FL-net (OPCN-2) Ver. 2.0 Module: NP1L-FL3" on this catalog.
This board conforms, however, only to the transmission specification 10BASE-T, 100BASE-TX, and not to 10BASE5.

■ Operating environment

Item	Specification
Hardware	IBM-AT compatible * 1, * 2
CPU	Intel Pentium 233MHz or higher
Hard disk	Free space of 10M bytes or more (and necessary disk capacity for Expert (D300win) too)
CD-ROM unit	At least 1 unit, (x 4 speed or faster recommended), media: ISO 9660 format
Memory capacity	64M bytes or more (256M bytes or more recommended for Expert (D300win) operation)
Keyboard	101 English keyboard
Mouse	USB mouse, bus mouse, PS2 mouse
Indicator (resolution)	800 x 600-dots resolution or higher
Operating system	Windows2000/XP/NT4.0
Environmental durability	Depends on environmental conditions of commercial personal computer.
User's application	Microsoft Visual Basic
development language	Microsoft Visual C++
Others	TCP/IP protocol

* 1 This board is not applicable to the multi-CPU configuration. Use a personal computer with the single-CPU configuration.
* 2 The board size supports a full-size PCI slot (For more information, refer to the Dimensions "PCI-bus based board" on this catalog).

PCI-Bus-Based LE-net Loop 2 Board: NP3L-LL2PCS

■ Features
- LE-net is an original network of Fuji Electric. It is a low-priced link module between processors to conduct communication with other nodes connected to the LE-net.
- Using the LE-net, broadcast communication and message communication can be conducted.
- The LE-net can be connected either as a multi-drop network or a single loop redundant wiring network. The loop network includes a loop-2 network in which the user data send/receive area is extended.
- If the transmission line is broken, a transmission error occurs in a multi-drop network, but in a loop network, data communication between nodes can continue. This enables construction of a highly reliable system at a relatively low cost.
- It is possible for the loop-2 module to make the LE-net modules redundant by using the redundancy maintenance FB (provided free of charge). The single configuration and the redundant configuration can coexist within a loop.

NP3L-LL2PCS
KD04-018

- Since this board uses the loop 2 mode, LE-net loop 2 modules can be connected to the same system.

■ Performance specifications
Performance and specifications of the built-in board type LE-net loop 2 board NP3L-LL2PCS are equivalent to those of the module type NP1L-LL2.

However, the board cannot be made redundant.
For details on performance and specifications, refer to "LE-net loop 2 Module: NP1L-LL2" on this catalog.

■ Operating environment

Item	Specification
Hardware	IBM-AT compatible * 1, * 2
CPU	Intel Pentium 300MHz or higher
Hard disk	Free space of 10M bytes or more
CD-ROM unit	At least 1 unit, (x 4 speed or faster recommended), media: ISO 9660 format
Memory capacity	128M bytes or more recommended
Keyboard	101 English keyboard
Mouse	USB mouse, bus mouse, PS2 mouse
Indicator (resolution)	800 x 600-dots resolution or higher
Operating system	Windows2000/XP/NT4.0
Environmental durability	Depends on environmental conditions of commercial personal computer.
User's application	Microsoft Visual Basic
development language	Microsoft Visual C++
Others	TCP/IP protocol

* 1 This board is not applicable to the multi-CPU configuration. Use a personal computer with the single-CPU configuration.
* 2 The board size supports a full-size PCI slot (For more information, refer to the Dimensions "PCI-bus based board" on this catalog).

Renewal Tool

This renewal tool (I/O terminal conversion unit) makes the MICREX-F F250, F120-F150S, and F120H/F80H series I/O units usable with MICREX-SX series units as they are.
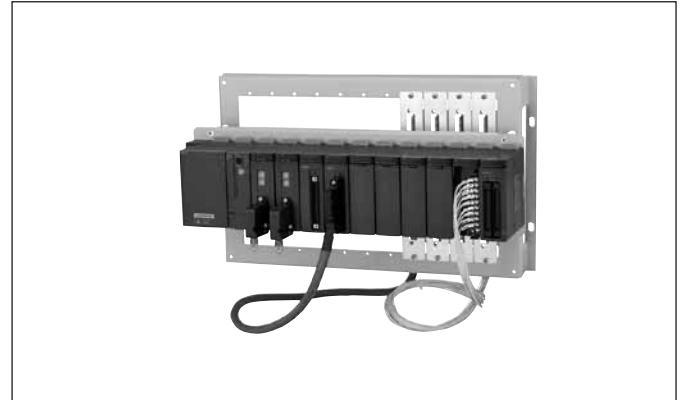
■ Features
• Significantly reduced I/O wiring work
  Since I/O wiring is usable as it is, wiring work and checking can be omitted, and wiring work time can be significantly reduced to 1/5.
• Speedy board modifications on site
  The dimensions of the frame of the renewal tool are the same as those of the MICREX-F series base board. You do not have to perform any on-site additional work such as drilling.

•Easy mounting and replacement, easy checking of state indication LEDs
  SX series modules are designed to be mounted on the renewal tool and can be replaced with a single motion. The state indication LEDs can also be checked.
•Flexible layout
  SPH modules can be mounted not only on but also beside and above the renewal tool. You can arrange them any way that you wish according to the field layout.

Item	Type	Specification outline
Frame set (SPH mounting board + base unit)	**NP8REFSS-0□**	Set of 1 NP8REFSF-0□ and 1 NP8REFSB-0□
SPH mounting board	**NP8REFSF-0□**	SPH mounting board for base unit NP8REFSB-0□
base unit	**NP8REFSB-0□**	Unit for mounting conversion adapter
Conversion adapter	**NP8REFSA-□□□**	20-/38-pin MICREX-F terminal block, conversion adapter for AC and DC signals
Conversion cable	**NP8REFSC-□□□□□**	Conversion cables for conversion from 20-pin terminal to 20-pin terminal
		Conversion cable for conversion from 38-pin terminal to two 20-pin terminals
		Conversion cables for conversion from 38-pin terminal to 40-pin terminal
		Conversion cables for conversion from 40-pin terminal to 40-pin terminal
		Conversion cable for conversion from 20-pin terminal to two 10-pin terminals

Frame set (SPH mounting board + base unit)

・base unit (mounting 1 SX base unit)
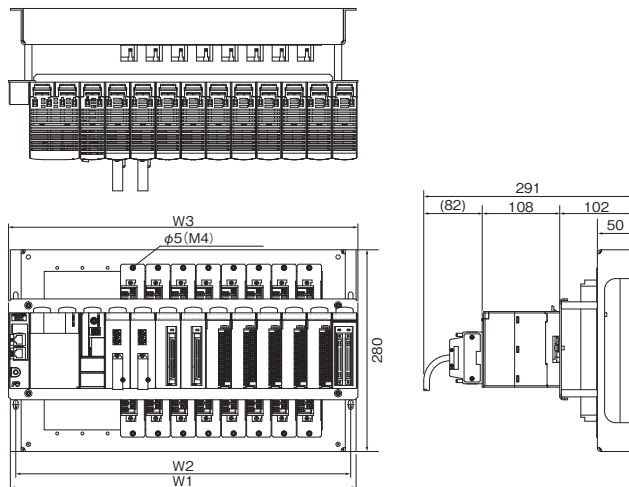
・base unit (mounting 2 SX base unit)

〔mm〕
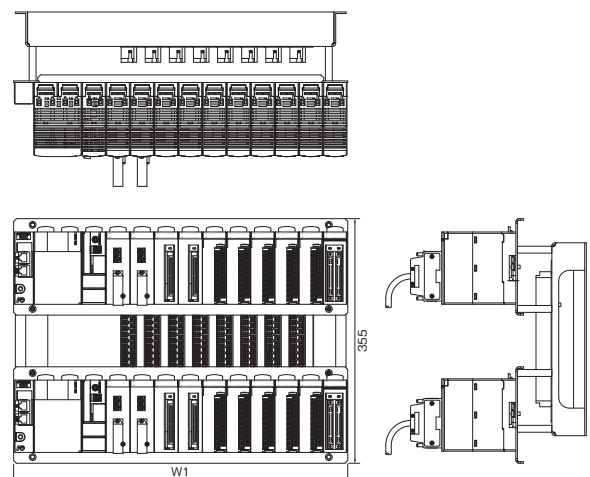
			Frame set			
Type			**NP8REFSS-08**	**NP8REFSS-06**	**NP8REFSS-04**	**NP8REFSS-02**
dimensions	W1	Mounting dimensions of base unit	480	407	334	261
	W2	Mounting dimensions of base unit	465	392	319	246
	W3	Outside dimensions of SPH mounting board	485	377	310	240

■ Dimensions

(1) Power supply module
1) **NP1S-22**, **NP1S-42**

(64)
69.8   90
105

2) **NP1S-91**, **NP1S-81**

(29.1)
35   90
105
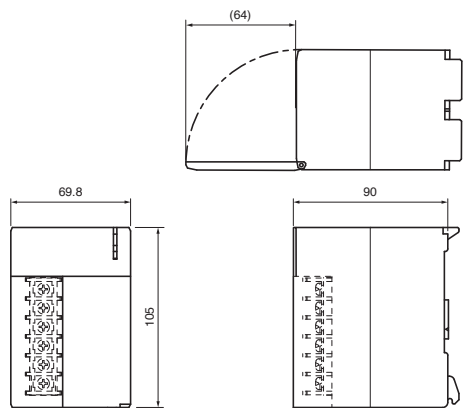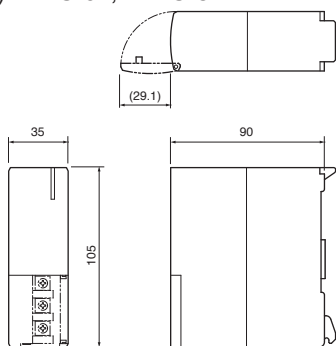
(2) CPU module
1) SPH200 **NP1PH-16**, **NP1PH-08**

35   (65)   90
14.7
105
Battery folder   34.4 (Note)
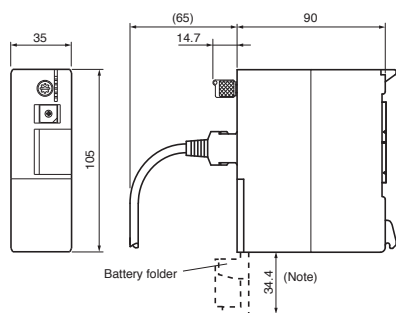
Note: For the SPH200, open the battery folder at an angle of 180° when user ROM card is removed.

2) SPH300/SPH2000/SPH3000
NP1PS-32/32R, NP1PS-74R, NP1PS-117R, NP1PS-245R, NP1PM-48R/48E, NP1PM-256E, NP1PM-256H, NP1PU-048E/256E

35   (Note)   93
11.7
105
USB cable
LAN cable
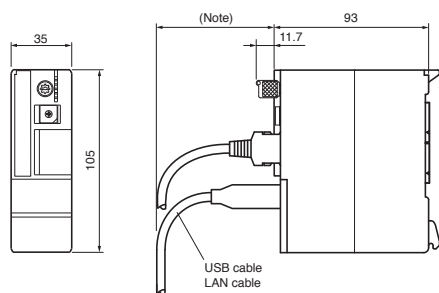
Note: For bend radius, check the specification for the loader cable you use.

3) SPH300EX
NP1PS-74D

70   (74)   93
(Note)
11.7
105
USB cable
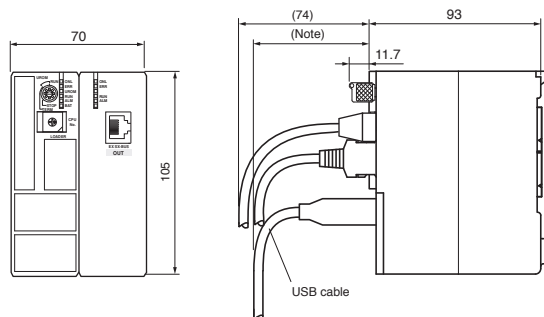
Note: For bend radius, check the specification for the loader cable you use.

(3) Base board
1) **NP1BP-13, NP1BS-13, NP1BP-13S, NP1BS-13S, NP1BS-13D, NP1BP-13D**
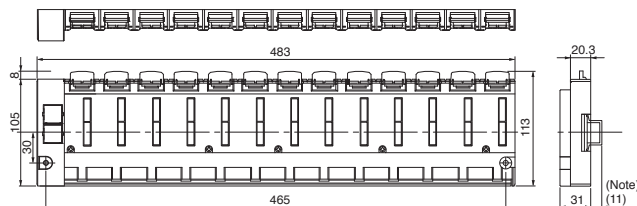
483   20.3
8
105   113
30
465   31   (Note) (11)

2) **NP1BS-11, NP1BS-11S, NP1BS-11D**

413   20.3
8
105   113
30
395   31   (Note) (11)

3) **NP1BS-08, NP1BS-08S, NP1BS-08D**

308   20.3
8
105   113
30
290   31   (Note) (11)

4) **NP1BS-06**

238   20.3
8
105   113
30
220   31   (Note) (11)

5) **NP1BS-03**

133   20.3
8
105   113
30
115   31   (Note) (11)
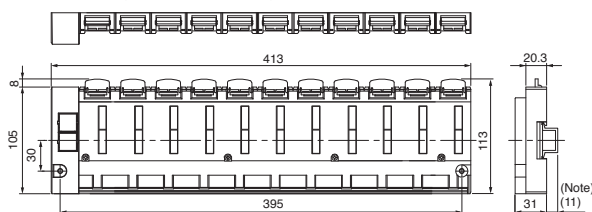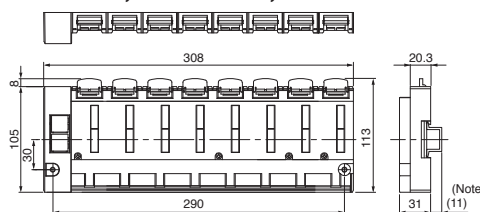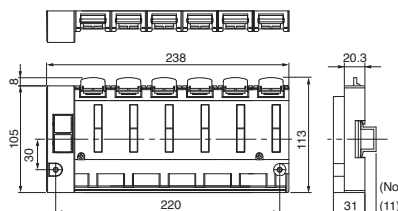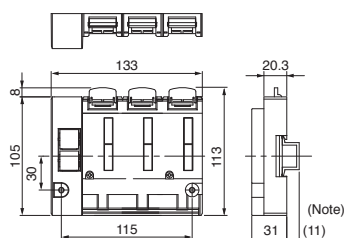
Note: ( ) means to use the rail (**TH35-15AL)** made by FUJI.

(4) Base board mounting bracket (accessories for base board)

Type	L (mm)
For NP1BP-13/NP1BS-13/NP1BP-13S/NP1BS-13S/ NP1BS-13D/NP1BP-13D	476.5
For NP1BS-11/NP1BS-11S/NP1BS-11D	406.5
For NP1BS-08/NP1BS-08S/NP1BS-08D	301.5
For NP1BS-06	231.5
For NP1BS-03	126.5
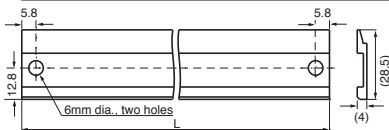
(5) Base board mounting stud NP8B-STK1
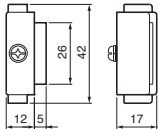
(6) I/O module

1) 6-point/8-point module (digital)
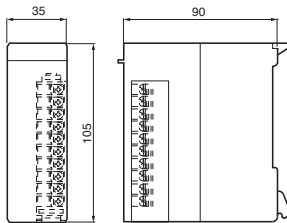
Note: Transistor sink 8-point output type (NP1Y08T0902) and SSR 8-point output type (NP1Y08S) are equivalent to the 16-point module below.

2) 16-point module (digital) / Analog input module / Analog output module
(NP1AY□2-MR, NP1AX□4-MR, NP1AX08V-MR, NP1AX08V-MR)
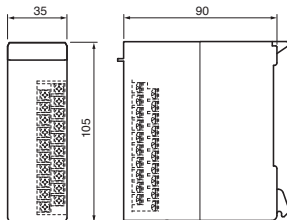
3) 32-point module
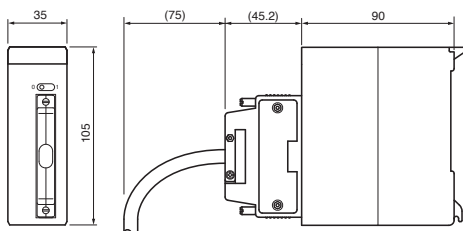
4) 64-point module
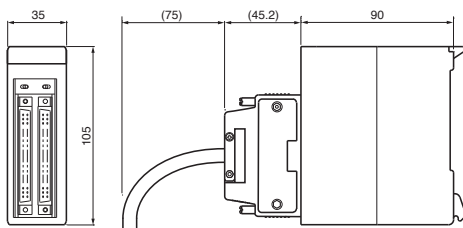
5) Terminal block protrusion module
(Resistance temperature sensor input module **NP1AXH4-PT**, **NP1AXH6G-PT**,
Thermocouple input module **NP1AXH4-TC**, **NP1AXH8G-TC**,
Analog I/O module **NP1AXH8□-MR**, **NP1AXH8□G-MR**,
NP1AYH8□-MR, **NP1AYH8□G-MR**, **NP1AYH4□-MR**C **NP1AWH6□-MR**),
Distributor module **NP1AXH4DG-MR**,
Flow meter F/AD conversion module **NP1F-PI4**
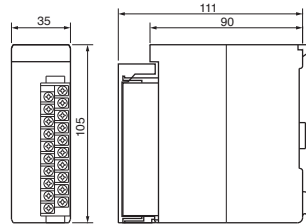
(7) Communication module

1) Web module NP1L-WE2,
Ethernet module **NP1L-ET1**
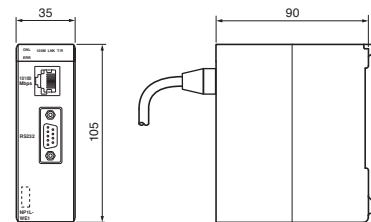
Note: This differs by type, whether or not connectors and switches exist, but outside dimensions are the same for all types.

2) General purpose communication module NP1L-RS1/2/3/4,
PROFIBUS-DP master module **NP1L-PD1**,
PROFIBUS-DP slave module **NP1L-PS1**
PROFIBUS-DP interface module **NP1L-RP1**
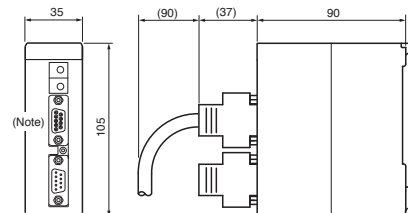
Note: This differs by type, whether or not connectors and switches exist, but outside dimensions are the same for all types.

General purpose communication module **NP1L-RS5**
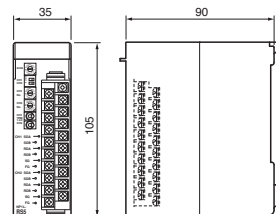
3) T-link master module NP1L-TL1,
T-link slave module **NP1L-TS1**,
T-link interface module **NP1L-RT1**,
P-link module **NP1L-PL1**, PE-link module **NP1L-PE1**,
OPCN-1 master module **NP1L-JP1**,
OPCN-1 slave module **NP1L-JS1**,
OPCN-1 interface module **NP1L-RJ1**
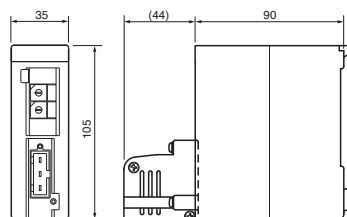
Note: This differs by type, whether or not connectors and switches exist, but outside dimensions are the same for all types.

4) AS-i master module **NP1L-AS2**
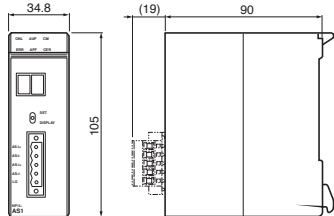
5) FL-net (OPCN-2) module **NP1L-FL3**
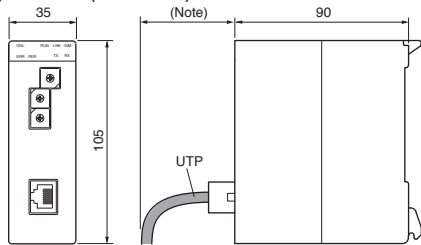
Note: For AUI and UTP cables, you need to take connector dimensions and cable bend into consideration. (For bend radius, check the specification for the cable you use.)

6) DeviceNet master module **NP1L-DN1**, DeviceNet slave module **NP1L-DS1**, DeviceNet interface module **NP1L-RD1**
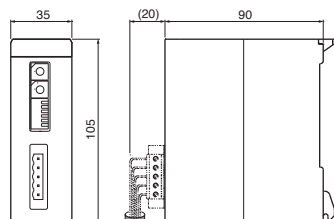
7) LONWORKS interface module **NP1L-LW1**
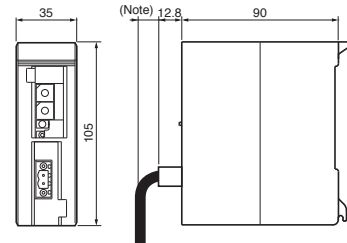
8) S-LINK master module **NP1L-SL1**
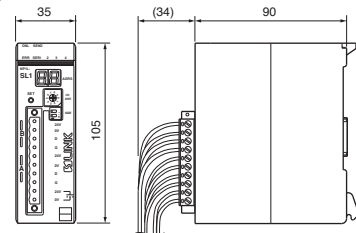
9) LE-net module **NP1L-LE1**
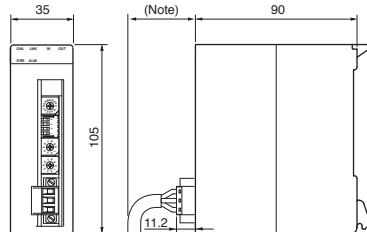
Note: Consider the bend of the cable you use.

10) LE-net loop 2 module **NP1L-LL2**
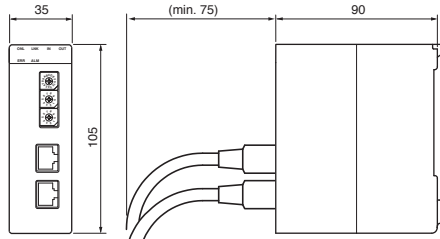
11) Remote terminal master/slave module **NP1L-RM1**
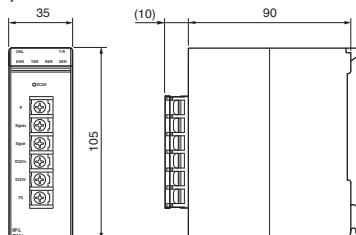
12) SX bus optical link module **NP1L-OL1**
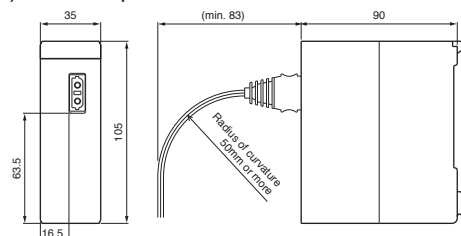
13) SX bus optical link converter

NP2L-OE1
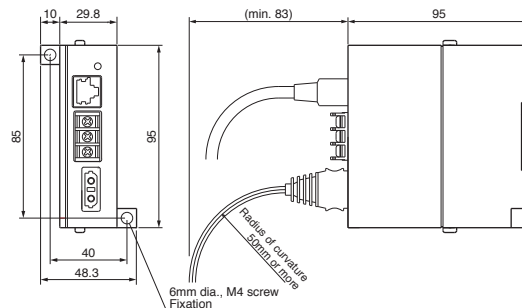
NP2L-OE2
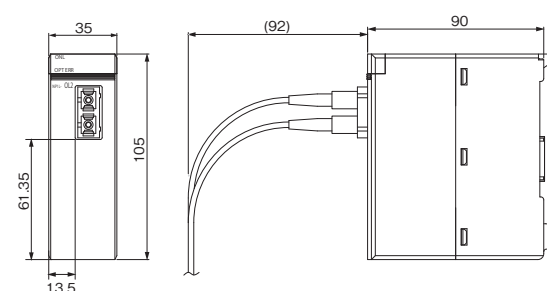
14) SX bus electrical repeater **NP2L-RP1**
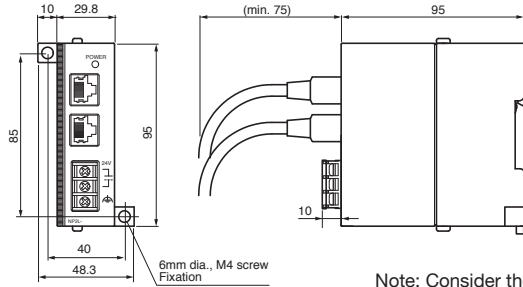
Note: Consider the bend of the cable you use.

15) T-link Optical Converter **FNC160A-C20**
P/PE-link Optical Converter **FNC360A-C20**

(8) Positioning control module / Unit
1) High-speed counter modle **NP1F-HC2**, **NP1F-HC2MR**, **NP1F-HC2MR1**,
Multi channel high-speed counter module **NP1F-HC8**

2) Positioning control module **NP1F-MA2**, **NP1F-MP2**, **NP1F-HP2**
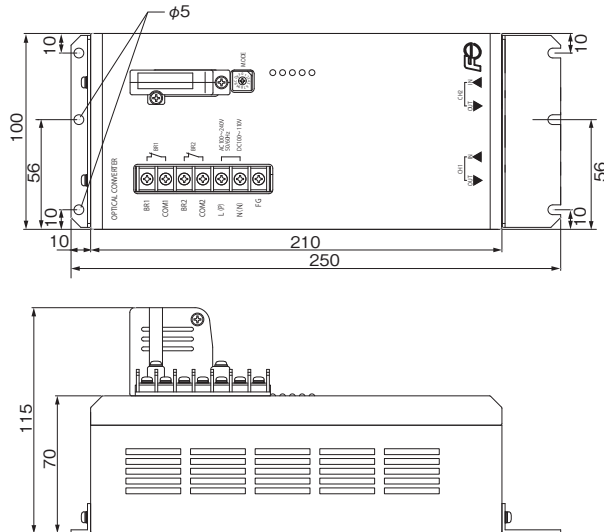
(9) Function module / Unit
1) Memory card interface module **NP1F-MM1**
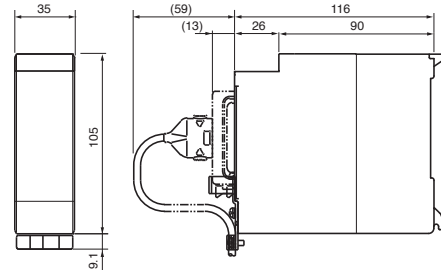
2) Dummy module **NP1F-DMY**
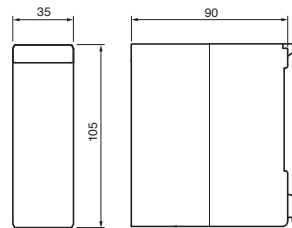
3) Multi-use communication module **NP1F-MU1**

4) SX bus T-branch unit **NP8B-TB**
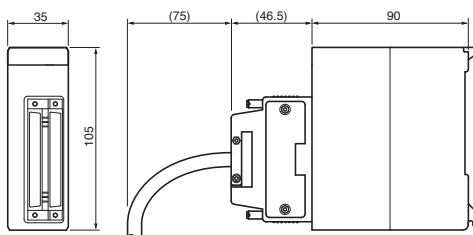
(10) Opution
1) Battery box **NP8P-BTS**
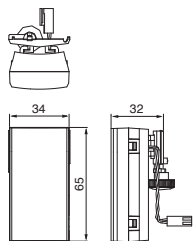
• Dimension at lower installation
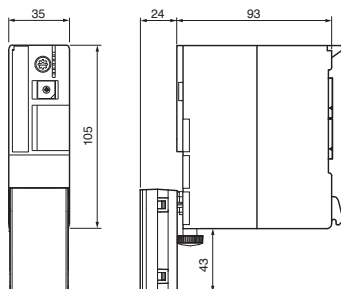
• Dimension at upper installation
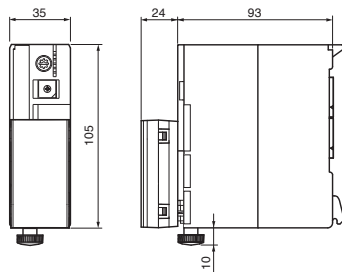
(11) I/O Terminal
1) NR1 series **NR1 □**
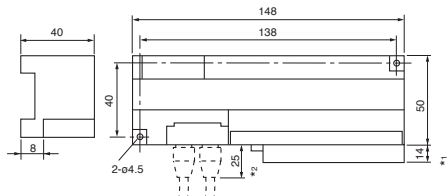
*1) When the extension terminal block is mounted.
*2) When the SX bus-adapted unit is connected.

<Terminal dimensions>
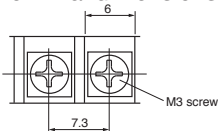
2) NR2 series **NR2 □**

<Terminal dimensions>
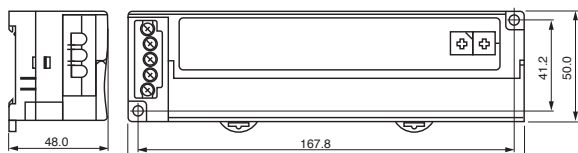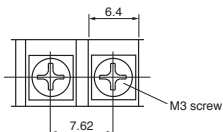
(12) PCI-bus-based board
1) SPH300 CPU board **NP3PS-SX1PCS □ □**
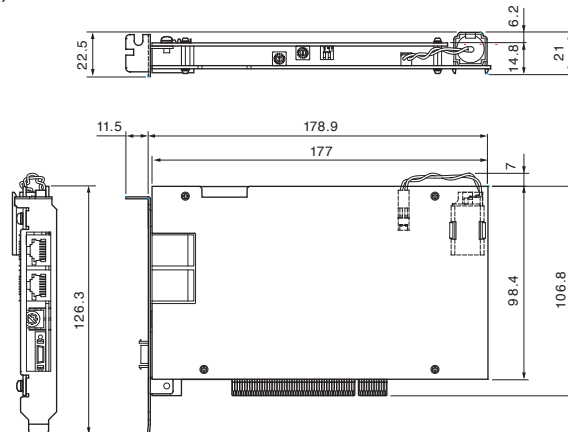
2) LE-net loop2 board **NP3L-LL2PCS**
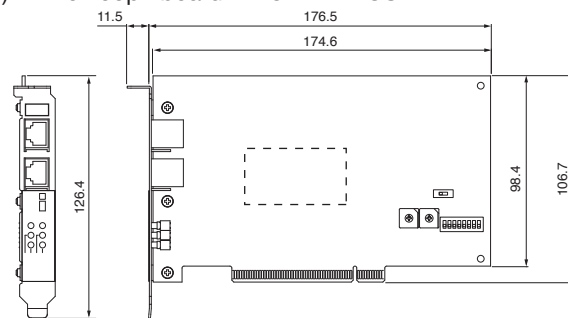
3) FL-net (OPCN-2) board **NP3L-FL3PCS**
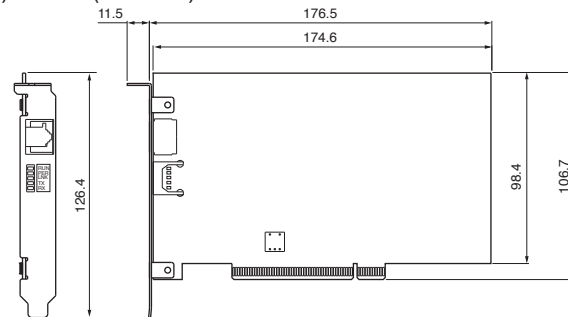
(13) Handy monitor **NW0H-S3ES**
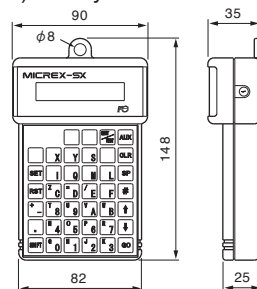
■ Types/Ordering codes

Names		Types (Ordering codes)	Specifications, Names			CE *2	UL cUL	LR *3	NK
						Standards			
CPU module	SPH200	NP1PH-08	SPH200 Program memory capacity 8K steps Max. No. of I/O points 8192 points	Accessories: Data backup battery (Built-in)	Basic instruction execution speeds	○	○	○	○
		NP1PH-16	SPH200 Program memory capacity 16K steps Max. No. of I/O points 8192 points	SX bus terminating plug 2 pieces	70ns or more	○	○	○	○
	SPH300	NP1PS-32	SPH300 Program memory capacity 32K steps Max. No. of I/O points 8192 points	CPU mode selection key switch Screwdriver (for the CPU setting)	Basic instruction execution speeds	○	○	○	○
		NP1PS-32R	SPH300 Program memory capacity 32K steps User ROM/USB adapted, Max. No. of I/O points 8192 points		20ns or more	○	○	○	○
		NP1PS-74R	SPH300 Program memory capacity 74K steps User ROM/USB adapted, Max. No. of I/O points 8192 points			○	○	○	○
		NP1PS-117R	SPH300 Program memory capacity 117K steps User ROM/USB adapted, Max. No. of I/O points 8192 points			○	○	○	○
		NP1PS-245R	SPH300 Program memory capacity 245K steps User ROM/USB adapted, Max. No. of I/O points 8192 points			○	○	○	○
	SPH300EX	NP1PS-74D	SPH300EX Program memory capacity 74K steps x 2 User ROM/USB adapted, Max. No. of I/O points 8192 points x 2			○	○		
	SPH2000	NP1PM-48R	SPH2000 Program memory capacity 48K steps User ROM/USB adapted, Max. No. of I/O points 8192 points		Basic instruction execution speeds	○	○	○	○
		NP1PM-48E	SPH2000 Program memory capacity 48K steps User ROM/USB/Ethernet adapted, Max. No. of I/O points 8192 points		30ns or more	○	○	○	○
		NP1PM-256E	SPH2000 Program memory capacity 256K steps User ROM/USB/Ethernet adapted, Max. No. of I/O points 8192 points			○	○	○	○
		NP1PM-256H	SPH2000 Program memory capacity 256K steps, Redundantly function adapted, User ROM/USB adapted, Max. No. of I/O points 8192 points			○	○	○	○
	SPH3000	NP1PU-048E	SPH3000 Program memory capacity 48K steps User ROM/USB/Ethernet adapted, Max. No. of I/O points 8192 points		Basic instruction execution speeds				
		NP1PU-256E	SPH3000 Program memory capacity 256K steps User ROM/USB/Ethernet adapted, Max. No. of I/O points 8192 points		9ns or more				
Power supply module		NP1S-22	100/240V AC Input power supply, output capacity 35W, Accessories: Connector for ALM contact, Voltage selection jumper plate			○	○*5	○	○
		NP1S-91	100 to 120V AC Input power supply 15W (1 slot)			○	○*6		
		NP1S-81	200 to 240V AC Input power supply 15W (1 slot)			○	○*7		
		NP1S-42	24V DC Input power supply, output capacity 35W, Accessories: Connector for ALM contact			○	○	○	○
Base board		NP1BS-03	For 3 slots Processor buses 2 slots			○	○	○	○
		NP1BS-06	For 6 slots Processor buses 3 slots	Accessories:		○	○	○	○
		NP1BS-08	For 8 slots Processor buses 3 slots	Base board mounting bracket		○	○	○	○
		NP1BS-11	For 11 slots Processor buses 3 slots			○	○	○	○
		NP1BS-13	For 13 slots Processor buses 3 slots			○	○	○	○
		NP1BP-13	For 13 slots Processor buses 10 slots (High speed type)			○	○	○	○
		NP1BS-08S	Base with station number setup function For 8 slots Processor buses 3 slots			○	○		
		NP1BS-11S	Base with station number setup function For 11 slots Processor buses 3 slots			○	○		
		NP1BS-13S	Base with station number setup function For 13 slots Processor buses 3 slots			○	○		
		NP1BP-13S	Base with station number setup function For 13 slots Processor buses 10 slots			○	○		
		NP1BS-08D	Hot plug base with station number setup function For 8 slots Processor buses 3 slots			○	○	○	○
		NP1BS-13D	Hot plug base with station number setup function For 11 slots Processor buses 3 slots			○	○	○	○
		NP1BS-13D	Hot plug base with station number setup function For 13 slots Processor buses 3 slots			○	○	○	○
		NP1BP-13D	Hight performance hot plug base, with station number setup function For 13 slots Processor buses 10 slots			○	○	○	○
SX bus expansion cable *4		NP1C-P3	300mm cable			—	○	○	○
		NP1C-P6	600mm cable			—	○	○	○
		NP1C-P8	800mm cable			—	○	○	○
		NP1C-02	2000mm cable			—	○	○	○
		NP1C-05	5000mm cable			—	○	○	○
		NP1C-10	10000mm cable			—	○	○	○
		NP1C-15	15000mm cable			—			
		NP1C-25	25000mm cable			—	○	○	○
SX bus T-branch unit		NP8B-TB	SX bus T-branch connecting unit, Accessories: SX bus terminating plug 1 piece			○	○	○	○
Digital input module *1		NP1X1606-W	24V DC, 16 points, 7mA 1 to 100ms variable	Screw terminal		○	○	○	○
		NP1X3206-W	24V DC, 32 points, 4mA 1 to 100ms variable, Optional Connector	Connector		○	○	○	○
		NP1X3202-W	5V/12V DC, 32 points, 3mA/9mA 1 to 100ms variable, Optional Connector	Connector		○	○	○	○
		NP1X3206-A	24V DC, 32 points, 4mA 0 to 100ms variable, Pulse catch 20kHz, Optional Connector	Connector		○	○		
		NP1X6406-W	24V DC, 64 points, 4mA 1 to 100ms variable, Optional Connector	Connector		○	○	○	○
		NP1X1607-W	48V DC, 16 points, 5mA 1 to 100ms variable	Screw terminal		○	○		
		NP1X0810	100/120V AC, 8 points, 10mA 10ms	Screw terminal		○	○	○	○
		NP1X1610	100/120V AC, 16 points, 10mA 10ms	Screw terminal		○	○	○	○
		NP1X0811	200/240V AC, 8 points, 10mA 10ms	Screw terminal		○	○	○	○
		NP1X1611-RI	200/240V AC, 16 points, 7mA 10ms	Screw terminal					

Standards	○	Certificated	—	Exceptions

*1 Connectors (solder type) for digital input, output, I/O-mixed, and positioning modules are separately available (**NP8V-CN**).
*2 Conformance to CE marking is confirmed on individual SX Series models. When exporting the final product with the SX Series built in to the EU, be sure to verify the standard conformance corresponding to the final product.
*3 For vibration countermeasures, the modules must be fixed in units of base board. For further information, contact your Fuji sales representative.
*4 The SX bus cable corresponds to the arbitrariness length. Please contact our sales section.
*5 The model NPS-22 A is UL-certified (cUL certification is not obtained).
*6 The model NP1S-91 A is UL Recognition-certified (cUL certification is not obtained).
*7 The model NP1S-81 A is UL Recognition-certified (cUL certification is not obtained).
Note: Some products supporting RoHS may not yet be in stock. Please contact and confirm with the sales division before placing your order.

Ordering Information

Names	Types (Ordering codes)	Specifications, Names		Standards CE *2	UL cUL	LR *3	NK
Digital output module *1	NP1Y08T0902	Tr sink, 12 to 24V DC, 8 points, 2.4A/point, 4A/common	Screw terminal	○	○	○	○
	NP1Y16T09P6	Tr sink, 12 to 24V DC, 16 points, 0.6A/point, 4A/common	Screw terminal	○	○	○	○
	NP1Y32T09P1-A	Tr sink, 24V DC, 32 points, 0.12A/point, 3.2A/common, Pulse train output 20kHz x 4ch (Built-in), Optional Connector	Connector	○	○		
	NP1Y32T09P1	Tr sink, 12 to 24V DC, 32 points, 0.12A/point, 3.2A/common, Optional Connector	Connector	○	○	○	○
	NP1Y64T09P1	Tr sink, 12 to 24V DC, 64 points, 0.12A/point, 3.2A/common, Optional Connector	Connector	○	○	○	○
	NP1Y16T10P2	Tr sink, 48V DC, 16 points, 0.2A/point, 1.6A/common	Screw terminal	○	○		
	NP1Y08U0902	Tr source, 12 to 24V DC, 8 points, 2.4A/point, 4A/common	Screw terminal	○	○	○	○
	NP1Y16U09P6	Tr source, 12 to 24V DC, 16 points, 0.6A/point, 4A/common	Screw terminal	○	○	○	○
	NP1Y32U09P1	Tr source, 12 to 24V DC, 32 points, 0.12A/point, 3.2A/common, Optional Connector	Connector	○	○	○	○
	NP1Y64U09P1	Tr source, 12 to 24V DC, 64 points, 0.12A/point, 3.2A/common, Optional Connector	Connector	○	○	○	○
	NP1Y08S	SSR, 100 to 240V AC, 8 points: all points are independent, 2.2A/points	Screw terminal			○	○
	NP1Y08R-04	Ry, 110V DC, 240V AC, 8 points, 30V DC/ 264V AC: 2.2A/point, 4A/common	Screw terminal	○	○	○	○
	NP1Y16R-08	Ry, 110V DC, 240V AC, 16 points, 30V DC/ 264V AC: 2.2A/point, 8A/common	Screw terminal	○	○	○	○
	NP1Y08R-00	Ry, 110V DC, 240V AC, 8 points, 30V DC/ 264V AC: 2.2A/point, independent	Screw terminal			○	○
Digital I/O mixed module *1	NP1W1606T	24V DC 8 points source input, 12 to 24V DC 8 points Tr sink output	Screw terminal	○	○	○	○
	NP1W1606U	24V DC 8 points sink input, 12 to 24V DC 8 points Tr source output	Screw terminal	○	○	○	○
	NP1W3206T	24V DC 16 points source input, 12 to 24V DC Tr sink 16 points output, Optional Connector	Connector	○	○	○	○
	NP1W3206U	24V DC 16 points sink input, 12 to 24V DC Tr source 16 points output, Optional Connector	Connector	○	○	○	○
	NP1W6406T	24V DC 32 points source input, 12 to 24V DC Tr sink 32 points output, Optional Connector	Connector	○	○	○	○
	NP1W6406U	24V DC 32 points interactive input, 12 to 24V DC Tr source 32 points output, Optional Connector	Connector	○	○		
Analog input module	NP1AX04-MR	Standard type multi-range input 4ch, resolution: 10 bits	Screw terminal	○	○	○	○
	NP1AXH4-MR	High speed type multi-range input 4ch, resolution: 14 bits	Screw terminal	○	○	○	○
	NP1AX08V-MR	Standard type multi-range input 8ch, resolution: 10 bits (voltage type)	Screw terminal	○	○	○	○
	NP1AX08I-MR	Standard type multi-range input 8ch, resolution: 10 bits (current type)	Screw terminal	○	○	○	○
	NP1AXH8V-MR	High speed type multi-range input 8ch, resolution: 14 bits (voltage type)	Screw terminal	○	○	○	○
	NP1AXH8I-MR	High speed type multi-range input 8ch, resolution: 14 bits (current type)	Screw terminal	○	○	○	○
	NP1AXH8VG-MR	High speed type multi-range input 8ch, between channels insulated, resolution: 16 bits (voltage type)	Screw terminal	○	○	○	○
	NP1AXH8IG-MR	High speed type multi-range input 8ch, between channels insulated, resolution: 16 bits (current type)	Screw terminal	○	○	○	○
	NP1AXH4-PT	Resistance thermometer element input (Pt100Ω/JPt100Ω) 4ch, accuracy: ± 0.3% (ambient temperature: 18 to 28°C), ± 0.7% (ambient temperature: 0 to 55°C)	Screw terminal	○	○	○	○
	NP1AXH6G-PT	High accuracy resistance thermometer element input (Pt100Ω/JPt100Ω) 6ch, accuracy: ± 0.05 to ± 0.07% (ambient temperature: 18 to 28°C), ± 0.239% (ambient temperature: 0 to 55°C)	Screw terminal	○	○	○	○
	NP1AXH4-TC	Thermo-couple input module 4ch, resolution: 14 bits accuracy: ± 0.3% (ambient temperature: 18 to 28°C), ± 0.7% (ambient temperature: 0 to 55°C)	Screw terminal	○	○	○	○
	NP1AXH8G-TC	High accuracy thermo-couple input module 8ch, accuracy: ± 0.05 to ± 0.26% (ambient temperature: 18 to 28°C), ± 0.3 to ± 0.6% (ambient temperature: 0 to 55°C)	Screw terminal	○	○	○	○
	NP1AXH4DG-MR	Distributor module, 4ch, between channels high dielectric strength insulated, resolution: 16 bits accuracy: ± 0.1% of F.S.R. (ambient temperature: 25°C)	Screw terminal				
Analog output module	NP1AY02-MR	Standard type multi-range output 2ch, resolution: 10 bits	Screw terminal	○	○	○	○
	NP1AYH2-MR	High speed type multi-range output 2ch, resolution: 14 bits	Screw terminal	○	○	○	○
	NP1AYH4V-MR	High speed type multi-range output 4ch, resolution: 14 bits (voltage type)	Screw terminal	○	○	○	○
	NP1AYH4I-MR	High speed type multi-range output 4ch, resolution: 14 bits (current type)	Screw terminal	○	○	○	○
	NP1AYH4VG-MR	High speed type multi-range output 4ch, between channels insulated, resolution: 14 bits (voltage type)	Screw terminal	○	○	○	○
	NP1AYH4IG-MR	High speed type multi-range output 4ch, between channels insulated, resolution: 14 bits (current type)	Screw terminal	○	○	○	○
	NP1AYH8V-MR	High speed type multi-range output 8ch, resolution: 14 bits (voltage type)	Screw terminal	○	○	○	○
	NP1AYH8I-MR	High speed type multi-range output 8ch, resolution: 14 bits (current type)	Screw terminal	○	○	○	○
Analog I/O module	NP1AWH6-MR	High speed type multi-range input/output, input 4ch, output 2ch, resolution: 14 bits	Screw terminal	○	○		
Communication module	NP1L-WE2	Web module 10BASE-T/100BASE-TX Web server function (English version)		○	○		
	NP1L-ET1	Ethernet interface module 10BASE-T/100BASE-TX		○	○		
	NP1L-FL3	FL-net module Ver. 2.0 (10/100Mbps)		○	○		
	NP1L-LW1	LonWorks interface module (78kbps) Accessories: Connector for cable connected			○		
	NP1L-PL1	P-link module Accessories: P/PE-link connector			○		
	NP1L-PE1	PE-link module Accessories: P/PE-link connector			○		
	NP1L-LE1	LE-net module		○	○	○	○
	NP1L-LL2	LE-net loop2 module		○	○	○	○

Standards	○	Certificated	—	Exceptions

*1 Connectors (solder type) for digital input, output, I/O-mixed, and positioning modules are separately available (**NP8V-CN**).
*2 Conformance to CE marking is confirmed on individual SX Series models. When exporting the final product with the SX Series built in to the EU, be sure to verify the standard conformance corresponding to the final product.
*3 For vibration countermeasures, the modules must be fixed in units of base board. For further information, contact your Fuji sales representative.
Note: Some products supporting RoHS may not yet be in stock. Please contact and confirm with the sales division before placing your order.

Names	Types (Ordering codes)	Specifications, Names	Standards CE *2	UL cUL	LR *3	NK
Communication module	NP1L-RS1	General purpose communication module RS-232C (connector), RS-485 (connector) each 1ch	○	○	○	○
	NP1L-RS2	General purpose communication module RS-232C (connector) 1ch	○	○	○	○
	NP1L-RS3	General purpose communication module RS-232C (connector) 2ch	○	○		
	NP1L-RS4	General purpose communication module RS-485 (connector) 1ch	○	○	○	○
	NP1L-RS5	General purpose communication module RS-485 (screw terminal) 2ch	○	○	○	○
	NP1L-JP1	OPCN-1 master module Accessories: OPCN-1 connector, Terminating resistor 2 pieces	○	○	○	○
	NP1L-JS1	OPCN-1 slave module Accessories: OPCN-1 connector	○	○		
	NP1L-RJ1	OPCN-1 interface module Accessories: OPCN-1 connector, SX bus terminating plug 2 pieces	○	○	○	○
	NP1L-DN1	DeviceNet master module Accessories: Screw connector (for cable splicing)	○	○		
	NP1L-DS1	DeviceNet slave module 1ch Accessories: Screw connector (for cable splicing)	○	○		
	NP1L-RD1	DeviceNet interface module Accessories: Screw connector (for cable splicing), SX bus terminating plug 2 pieces	○	○		
	NP1L-TL1	T-link master module Accessories: T-link connector, T-link terminating resistor 2 pieces	○	○	○	○
	NP1L-RT1	T-link interface module Accessories: T-link connector, SX bus terminating plug 2 pieces	○	○	○	○
	NP1L-TS1	T-link slave module Accessories: T-link connector	○	○	○	○
	NP1L-PD1	PROFIBUS-DP master module Communication standard (IEC 66158, EN 50171, DIN 19245)	○	○		
	NP1L-PS1	PROFIBUS-DP slave module Communication standard (IEC 66158, EN 50171, DIN 19245)	○	○		
	NP1L-RP1	PROFIBUS-DP interface module Communication standard (IEC 66158, EN 50171, DIN 19245)				
	NP1L-AS2	AS-i master module Ver. 2.1 Accessories: Screw connector (for cable splicing)	○	○		
	NP1L-SL1	S-LINK master module 1ch Accessories: Screw connector (for cable splicing)				
	NP1L-RM1	Remote terminal master/slave module Accessories: Screw connector (for cable splicing) Functionate to the master/slave station of remote terminal RM20/RM21 series				
	NP1L-OL1	SX bus optical link module Accessories: SX bus terminating plug	○	○		
	NP1L-OL2	SX bus optical link module Accessories: SX bus terminating plug				
	NP2L-OE1	SX bus electrical - optical converter Accessories: SX bus terminating plug	○	○		
	NP2L-RP1	SX bus electrical - electrical repeater Accessories: SX bus terminating plug	○	○		
	FNC160A-C20	T-link Optical Converter				
	FNC360A-C20	P/PE-link Optical Converter				
Positioning module *1	NP1F-HC2	High speed counter module 500kHz x 2ch Input signal voltage: 5V DC Accessories: Optional Connector	○	○		
	NP1F-HC2MR	High speed counter module 200kHz x 2ch Input signal voltage: 5/12/24 DC Accessories: Optional Connector	○	○		
	NP1F-HC2MR1	High speed counter module 50kHz x 2ch Input signal voltage: 5/12/24 DC Accessories: Optional Connector	○	○		
	NP1F-HC8	Multi-channel high speed counter module 50kHz x 8ch Accessories: Optional Connector	○	○		
	NP1F-HP2	Pulse train output positioning control module Pulse train command 250kHz x 2ch Accessories: Optional Connector	○	○		
	NP1F-MP2	Pulse train positioning control combined module Output pulse: 250kHz x 2ch, Feedback pulse: 500kHz, Accessories: Optional Connector	○	○		
	NP1F-MA2	Analog command positioning control combined module Feedback pulse: 500kHz x 2ch, Accessories: Optional Connector	○	○		
Function module	NP1F-MM1	Memory card interface module Memory card interface 1ch, Accessories: Memory card mounting bracket, Dummy card	○	○		
	NP1F-DMY	Dummy module	○	○	○	○
	NP1F-MU1	Multi-use communication module RS-232C x 1ch, RS-485 x 1ch Communication by the arbitrary protocol	○	○		
	NP1F-PI4	Flowmeter F/AD conversion module 10kHz x 4ch, between channels insulated				
Extended FB software package	NP4N-IPAC	SX instrumentaion package (Japanese version)	—	—	—	—
	NP4N-ITGR	Fuji Integrated support tool (@E.Integrator)	—	—	—	—
Personal computer loader *4	NP4H-SEDBV3	Programming support tool based on IEC 61131-3 Expert (D300win) software package Version 3	—	—	—	—
	NP4H-SWN	Programming support tool based on IEC 61131-3 Standard	—	—	—	—
Handy monitor	NW0H-S3ES	SPH applicable English type, Accessories: Loader cable (length: 1m)				
Loader connecting cable	NP4H-CB2	Programming support tool connection cable for AT compatible personal computer (Necessary to the signal converter: NW0H-CNV)	—	—	—	—
	NW0H-CNV	Programming support tool for AT compatible personal computer. Signal converter for CPU module connecting (It used to with combined the loader connecting cable (NP4H-CB2, Optional).	○	—	—	—
ROM cassette	NP8PMF-16	User ROM cassette for the SPH200, Capacity: 16MB	—	—	—	—
	NP8PCF-256	User ROM card compact flash memory for the SPH300, Capacity: 256MB	—	—	—	—
	NP8PSD-002	User ROM card SD memory card for the SPH3000, Capacity: 2GB	—	—	—	—
Online adapter and Relational software	FOA-ALFA2	Online adapter (Necessary for the NP4H-CB2 on connection to personal computer)				
	FOA-LOADER2-CD	Initial setting loader software for the online adapter (Japanese version)	—	—	—	—
	FOA-CENTER2-CD	Master station monitoring software for the online adapter (Japanese version)	—	—	—	—

Standards	○ Certificated	Exceptions

*1 Connectors (solder type) for digital input, output, I/O-mixed, and positioning modules are separately available (NP8V-CN).
*2 Conformance to CE marking is confirmed on individual SX Series models. When exporting the final product with the SX Series built in to the EU, be sure to verify the standard conformance corresponding to the final product.
*3 For vibration countermeasures, the modules must be fixed in units of base board. For further information, contact your Fuji sales representative.
*4 The OS is not included.
Note: Some products supporting RoHS may not yet be in stock. Please contact and confirm with the sales division before placing your order.

Names			Types (Ordering codes)	Specifications, Names	Standards			
					CE *2	UL / cUL	LR	NK
Auxiliaries			**NP8P-BT**	Data backup battery (Battery type: Lithium primary battery)	—	—	—	—
			NP8P-BT1	Data backup for high-capacity battery (Battery type: Lithium primary battery)	—	—	—	—
			NP8P-BTS	Data backup for high-capacity battery box (**NP8P-BT1** + storage box)	—	—	—	—
			NP8B-BP	SX bus terminating plug (1 piece)	—	—	—	—
			NP8B-ST	Base board mounting stud (DIN rail type(2 pieces))	—	—	—	—
			NP8V-CN	I/O, positioning control module connector (solder type)	—	—	—	—
			NP8P-KY	CPU mode selection key switch	—	—	—	—
			FTC120T	T link / OPCN-1 connector	—	—	—	—
			FTC120P	P/PE link connector	—	—	—	—
			FRT120A100	T link / OPCN-1 terminating resistor	—	—	—	—
			FRT220A75	P/PE link terminating resistor	—	—	—	—
I/O terminals	NR1 type	OPCN-1	**NR1JX-1606DT**	No polarity, input 24V DC, 16 points, detachable terminals	O	O		
			NR1JY-08R07DT	Ry output 240V AC / 110V DC, 8 points, detachable terminals	O	O		
			NR1JY-16T05DT	Tr sink output 24V DC, 16 points, detachable terminals	O	O		
			NR1JW-16T65DT	Source input 24V DC, 8 points, Tr sink output 24V DC, 8 points, detachable terminals	O	O		
		DeviceNet	**NR1DX-1606DT**	No polarity, input 24V DC, 16 points, detachable terminals	O	O		
			NR1DY-08R07DT	Ry output 240V AC / 110V DC, 8 points, detachable terminals	O	O		
			NR1DY-16T05DT	Tr sink output 24V DC, 16 points, detachable terminals	O	O		
			NR1DW-16T65DT	Source input 24V DC, 8 points, Tr sink output 24V DC, 8 points, detachable terminals	O	O		
		T-LINK	**NR1TX-1606DT**	No polarity, input 24V DC, 16 points, detachable terminals	O	O	O	O
			NR1TY-08R07DT	Ry output 240V AC / 110V DC, 8 points, detachable terminals	O	O	O	O
			NR1TY-16T05DT	Tr sink output 24V DC, 16 points, detachable terminals	O	O	O	O
			NR1TW-16T65DT	Source input 24V DC, 8 points, Tr sink output 24V DC, 8 points, detachable terminals	O	O	O	O
		SX bus	**NR1SX-1606DT**	No polarity, input 24V DC, 16 points, detachable terminals	O	O		
			NR1SY-08R07DT	Ry output 240V AC / 110V DC, 8 points, detachable terminals	O	O		
			NR1SY-16T05DT	Tr sink output 24V DC, 16 points, detachable terminals	O	O		
			NR1SW-16T65DT	Source input 24V DC, 8 points, Tr sink output 24V DC, 8 points, detachable terminals	O	O		
			NR1SF-HP4DT	Pulse train output Pulse train command: 250kHz 4 axes (2 points/1 axes)	O			
		LONWORKS	**NR1LX-1606DT**	No polarity, input 24V DC, 16 points (included the 4 pulse input points), detachable terminals	Accessories: Neuron ID seal			
			NR1LY-08R07DT	Ry output 240V AC / 110V DC, 8 points, detachable terminals				
			NR1LW-11R80DT	Source input 24V DC, 9 points (included the 4 pulse input points), Ry output 240V AC / 110V DC, 2 points, detachable terminals				
		Optional	**NR1XV-CB1**	Common extension bar (9 pins)	—			
	NR2 type	DeviceNet	**NR2DX-3206DT**	No polarity, input 24V DC, 32 points, detachable terminals	O	O		
			NR2DY-32T05DT	Tr sink output 24V DC, 32 points, detachable terminals	O	O		
			NR2DY-16R07DT	Ry output 240V AC / 120V DC, 16 points, detachable terminals	O	O		
			NR2DW-32T65DT	No polarity, input 24V DC, 16 points, Tr sink output 24V DC, 16 points, detachable terminals	O	O		
		OPCN-1	**NR2JAX-08VMRDT**	Multi-range input 8ch, resolution: 13 bits (voltage type), detachable terminals	O			
			NR2JAX-08IMRDT	Multi-range input 8ch, resolution: 13 bits (current type), detachable terminals	O			
			NR2JAY-04VMRDT	Multi-range output 8ch, resolution: 13 bits (voltage type), detachable terminals	O			
			NR2JAY-04IMRDT	Multi-range output 8ch, resolution: 13 bits (current type), detachable terminals	O			
CPU board			**NP3PS-SX1PCS32**	PCI bus based on SPH300 CPU board Program memory capacity: 32K steps	O			
			NP3PS-SX1PCS74	PCI bus based on SPH300 CPU board Program memory capacity: 74K steps	Accessories: Driver (CD version), Data backup battery, SX bus terminating plug 2 pieces CPU mode selection key switch, Name and use seal	O		
Interface board			**NP3L-LL2PCS**	PCI bus based on LE-net loop2 board	Accessories: Driver (CD version)		O	O
			NP3L-FL3PCS	PCI bus based on FL-net board Ver. 2.0 (10/100Mbps based on)	Accessories: Driver (CD version), Name and use seal			

Standards	O	Certificated	—	Exceptions

*2 Conformance to CE marking is confirmed on individual SX Series models. When exporting the final product with the SX Series built in to the EU, be sure to verify the standard conformance corresponding to the final product.
Note: Some products supporting RoHS may not yet be in stock. Please contact and confirm with the sales division before placing your order.

Dear Customers of Fuji Electric Controller,

The warranty of this product is as follows unless the special instructions state otherwise in the quote, contract, catalogue, or specifications at the time of quote or order.

The purpose or area of use may be limited, and a routine checkup may be required depending on the product. Please contact the distributor from which you purchased the product from, or Fuji Electric for further information.

Please conduct prompt incoming inspection of the product upon purchase or delivery. Also, please give enough consideration to management and maintenance of the product prior to accepting the product.

1. Period and coverage of the warranty

1-1 Period

(1) The period of the warranty is effective until the earliest of either a year from the date of purchase or, eighteen (24) months from the date of manufacture printed on the plate.

(2) The above period may not be applicable in case the particular environment, conditions or frequency of use affects the lifetime of the product.

(3) The warranty for the parts repaired by Fuji Electric service department is effective for six months from the date of repair.

1-2 Coverage

(1) If malfunction occurs in the period of warranty due to Fuji Electric, the malfunctioning parts are exchanged or repaired for free at the point of purchase or delivery. However, the warranty does not apply to the following cases.

  1) The malfunction occurs due to inappropriate conditions, environment, handling or usage that is not instructed in a catalogue, instruction book or user's manual.

  2) The malfunction is caused by the factors that do not originate in the purchased or delivered product.

  3) The malfunction is caused by other devices or software design that does not originate in Fuji Electric products.

  4) The malfunction occurs due to an alteration or repair that is not performed by Fuji Electric.

  5) The malfunction occurs because the expendable parts listed in an instruction book or catalogue were not maintained nor exchanged in an appropriate manner.

  6) The malfunction occurs due to factors that were not foreseeable by the practical application of science and technology at the time of purchase or delivery.

  7) The malfunction occurs because the product is used for an unintended purpose.

  8) The malfunction occurs due to a disaster or natural disaster that Fuji Electric is not responsible for.

(2) The warranty is only applicable to the single purchased delivered product.

(3) The warranty covers only the area stated in above (1). Any damage induced by the malfunction of the purchased or delivered product, including the damage or loss to a device or machine and passive damages, is not covered by the warranty.

1-3 Malfunction diagnosis

Malfunction is to be diagnosed temporarily by the purchaser. This diagnosis can be conducted by Fuji Electric or its delegated service provider with due charge upon the request from the purchaser. The charge is to be paid by the purchaser at the rate stipulated in the rate schedule of Fuji Electric.

2. Liability for opportunity loss

Regardless of the time period of the occurrence, Fuji Electric is not liable for the damage caused by the factors Fuji Electric is not responsible for, opportunity loss of the purchaser caused by malfunction of Fuji Electric product, passive damages, damage caused due to special situations regardless of whether it was foreseeable or not, and secondary damage, accident compensation, damage to products that were not manufactured by Fuji Electric, and compensation towards other operations.

3. Period for repair and provision of spare parts after the production is discontinued (maintenance period)

The discontinued models (products) can be repaired for seven years from the date of discontinuation. Also, most spare parts used for repair are provided for seven years from the date of discontinuation. However, some electric parts may not be obtained due to their short life cycle. In this case, repair or provision of the parts may be difficult in the above period. Please contact Fuji Electric or its service providers for further information.

4. Delivered term

Standard products that do not entail application setting or adjustment are regarded as received by the purchaser upon delivery. Fuji Electric is not responsible for local adjustments and test runs.

5. Service

The price of the delivered or purchased products does not include the service fee for the technician. Please contact Fuji Electric or its service providers for further information.

6. Scope of application

Above contents shall be assumed to apply to transactions and use of the country where you purchased the products. Consult the local supplier or Fuji for the detail separately.

⚠ Safety Considerations

- For safe operation, before using the product read the instruction manual or user manual that comes with the product carefully or consult the Fuji sales representative from which you purchased the product.
- Products introduced in this catalogue have not been designed or manufactured for such applications in a system or equipment that will affect human bodies or lives.
- Customers, who want to use the products introduced in this catalogue for special systems or devices such as for atomic-energy control, aerospace use, medical use, passenger vehicle, and traffic control, are requested to consult the Fuji sales division.
- Customers are requested to prepare safety measures when they apply the products introduced in this catalogue to such systems or facilities that will affect human lives or cause severe damage to property if the products become faulty.
- For safe operation, wiring should be conducted only by qualified engineers who have sufficient technical knowledge about electrical work or wiring.

● Appearance and specifications are subject to change without prior notice for the purpose of product improvement.