

Integrated Controllers **MICREX-SX** Series  
**Programmable Controllers**





# MICREX-SX Series

Control, operation and Supervisory Integrated Controllers

# SPH



## Realizes High-Speed Advanced Machine Control

I/O control with a program capacity of up to 256K steps and up to 8192 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, FL-net, 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.

## SPH2000 Integrates Control and Information/Communication

**SXXERO**

Enhanced data processing function, mass memory storage, and built-in Ethernet functionality allow the operations monitoring for production systems and devices, permit the recording of history and errors, and carry out traditional FA control and other functions so that this controller can be applied to IT-based remote monitoring, maintenance support and preventive maintenance. Also, in reply to the request for growing higher reliability, CPU and power supply redundancy has been enabled.

Realization of high speed / the machine control to be heightened

An opening point

Realization of the general programming support

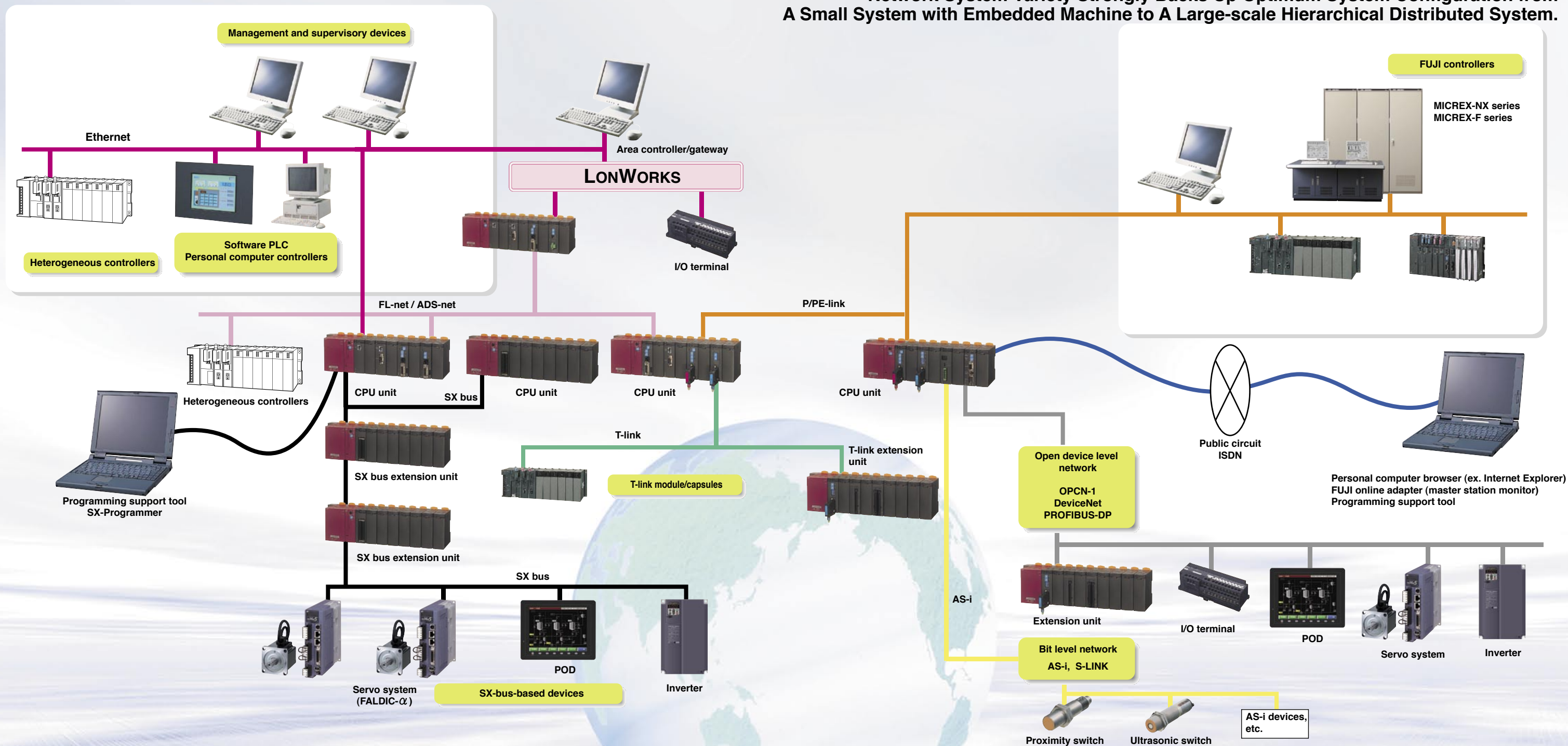
SPH2000 which plans control and fusion of information / the communication

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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.



### 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

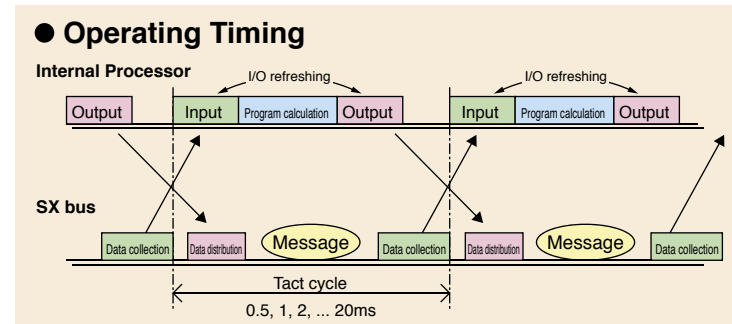
- Program scan time of 1ms is implemented by increased instruction processing speed.
- Real number operation and high-precision positioning control have been put to practical use by dramatically improved floating-point operation speed.

	SPH300	SPH200	SPH2000
Basic instruction LD	20ns	70ns	30ns
MOV	40ns	140ns	40ns
Floating-point operation instruction	80ns	56000 to 85000ns	> 270ns

\* 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, in increments of 0.5ms steps.



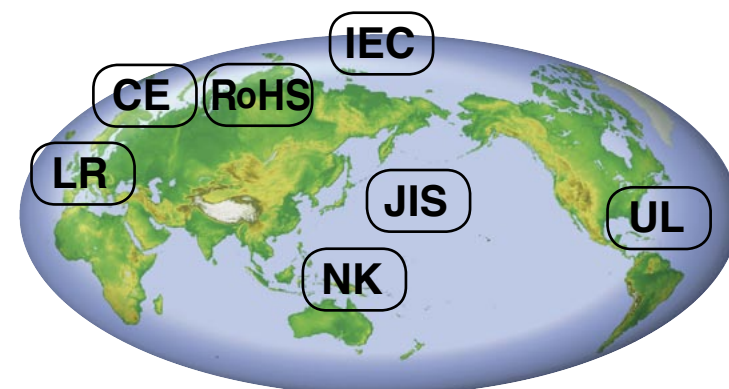
### Controller Conforms to International Standard

#### 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).

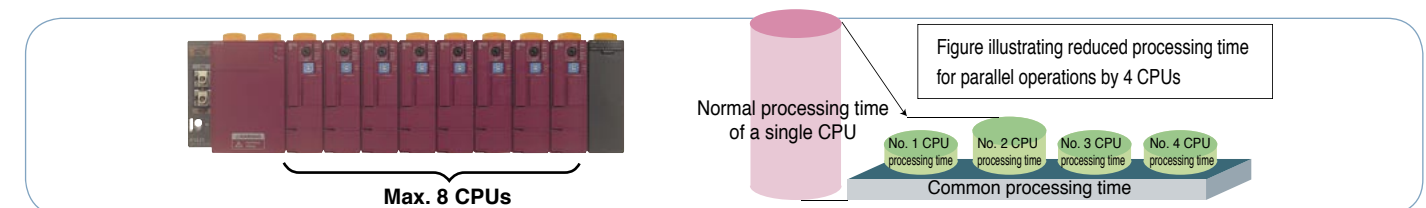


### Multi-CPU System Applicable to Up to 8 CPUs (SPH300/SPH2000)

#### Parallel processing with up to 8 CPUs

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.



### Redundant System Assuring System Safety and Reliability (SPH300)

#### 1-to-1 warm-standby feature

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.



#### N-to-1 backup feature

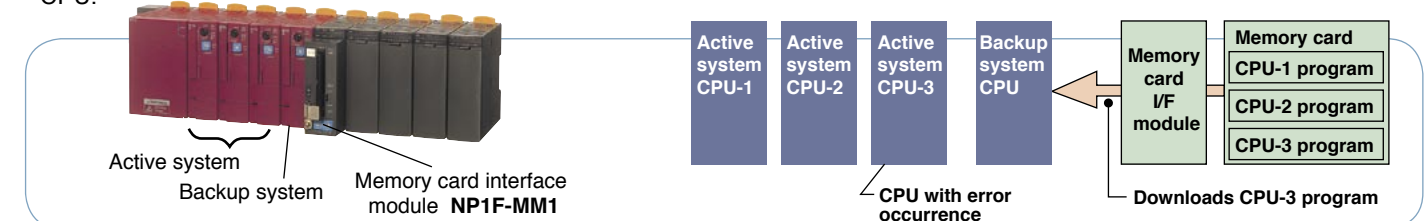
This redundancy configuration enables reduction of the number of CPUs to one, though, when a CPU fails, data retained in the active system and that in the standby system are not equalized.

- Data retained by the active system is not taken over. The backup system CPU performs initial start.



- 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.



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.

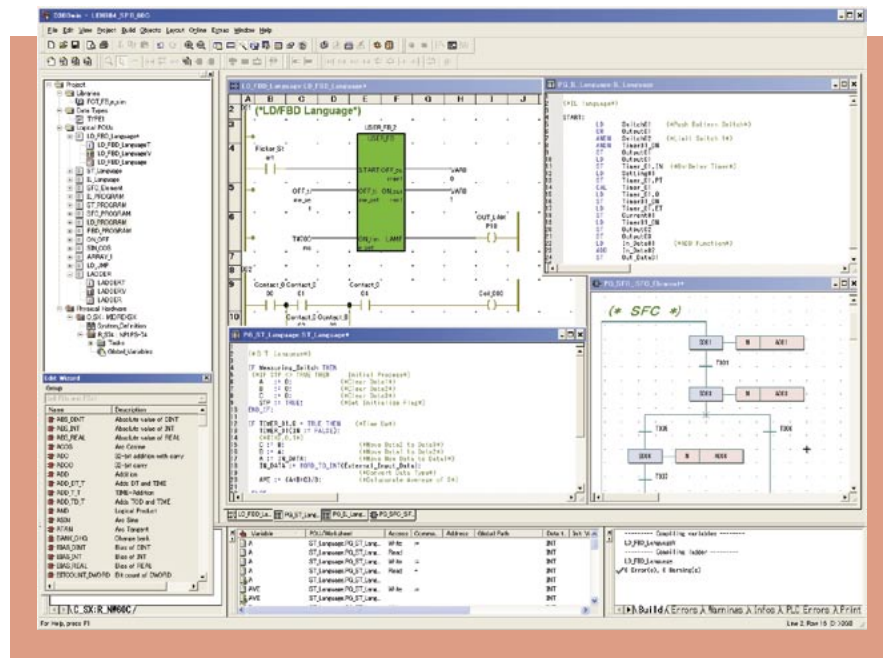
## Two Types of Programming Support Tools in Accordance with Development Style

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



#### 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.

#### 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).

#### Simulation function

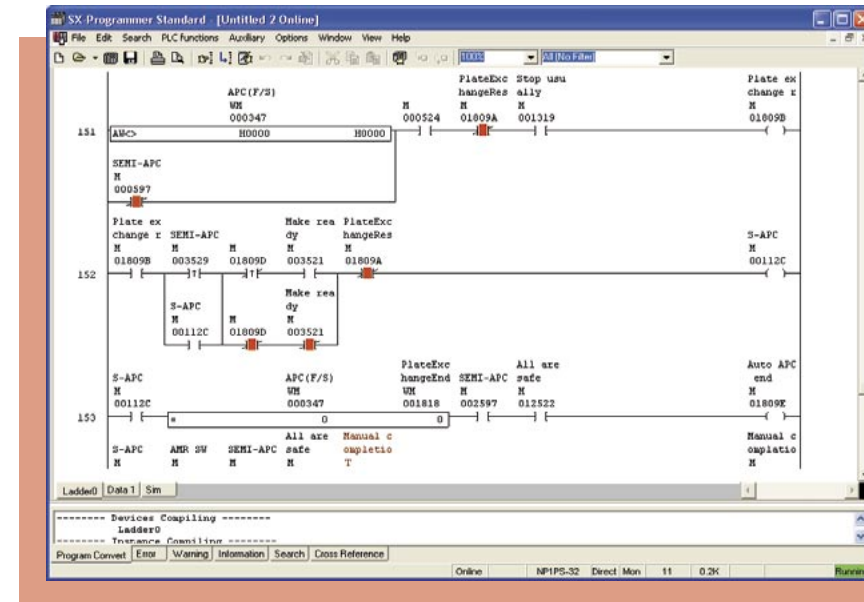
- The simulation function allows the user to conduct test runs of programs using the Expert (D300win) built-in PLC function in place of a real machine.

#### 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

- Supports not only Ladder, but also ST and FBD.
- The programming language can be selected depending on the control content.

#### Rich program development environment

- Addressing is used in all programming and all programs can be changed online.
- Supports structured design and components using FB (function block).
- Comments edited and created by the spreadsheet software (EXCEL) can directly be copied as program comments.

#### Resume function

- When started up, automatically displays previously edited or monitored position.
- In online mode, displays previously monitored position and starts monitoring.
- In offline mode, displays previously edited position and shifts to Edit mode.

#### Failure diagnostic/Debug function

- Failure diagnosis is easy because you can analyze failure information while checking the configuration information.
- Provides powerful debugging functions, including stepwise execution, condition monitoring, sampling trace and failure diagnosis.



## 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 loop/LE-net loop2 modules. (A total two 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 informations, 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
<ul style="list-style-type: none"> <li>OPCN-1 master module (NP1L-JP1)</li> <li>OPCN-1 slave module (NP1L-JS1)</li> <li>DeviceNet master module (NP1L-DN1)</li> <li>DeviceNet slave module (NP1L-DS1)</li> <li>PROFIBUS-DP master module (NP1L-PD1)</li> <li>PROFIBUS-DP slave module (NP1L-PS1)</li> <li>T-link master module (NP1L-TL1)</li> <li>T-link slave module (NP1L-TS1)</li> <li>Remote terminal master/slave module (NP1L-RM1)</li> </ul>	<ul style="list-style-type: none"> <li>Web module (NP1L-WE1)</li> <li>Ethernet module (NP1L-ET1/ET2)</li> <li>FL-net module (NP1L-FL2/FL3)</li> <li>ADS-net module (NP1L-AD1)</li> <li>P-link module (NP1L-PL1)</li> <li>PE-link module (NP1L-PE1)</li> </ul>	<ul style="list-style-type: none"> <li>LE-net module (NP1L-LE1)</li> <li>LE-net loop module (NP1L-LL1)</li> <li>LE-net loop2 module (NP1L-LL2)</li> <li>General-purpose communication module (NP1L-RS1/RS2/RS3/RS4/RS5)</li> <li>Memory card I/F module (NP1L-MM1)</li> </ul>
		<ul style="list-style-type: none"> <li>All modules other than those of Type A and B</li> <li>* The AS-i master module is also included in category C.</li> </ul>

#### No. of connectable base boards/units

Unit for supplying SX bus transmission power	Unit for receiving SX bus transmission power
<ul style="list-style-type: none"> <li>Base board (power ON)</li> <li>SX bus optical converter (external 24V connected)</li> <li>SX bus electrical repeater (external 24V connected)</li> </ul>	<ul style="list-style-type: none"> <li>I/O terminal</li> <li>SX bus optical converter (external 24V not connected)</li> <li>MONITOUCH series (POD)</li> <li>PCI-bus-based high performance CPU board (built in personal computer)</li> <li>AC servo FALDIC-<math>\alpha</math>/ALPHA5 series</li> <li>Base board (power OFF) equivalent to 3 units above</li> </ul>

\* 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.

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KD03-041A

# Programmable Controllers

## **MICREX-SX** series SPH

### General Specifications

#### ■ 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 <sup>2</sup> two hours for each of three axes, total six hours.	
	Shock	Acceleration peak: 147m/s <sup>2</sup> three times for each of three axes	
Electrical service condition	Electrostatic discharge	Contact discharge: ± 6kV Aerial discharge: ± 8kV	IEC 61000-4-2
	Radiated, radio-frequency, electromagnetic field	80 to 1000MHz (10V/m)	IEC 61000-4-3
	EFT/B (Electrical fast transient/burst)	± 2kV (excluding the communication line)	IEC 61000-4-4
	Lightning impulse surge	± 4kV common mode, ± 2kV normal mode	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
	Damped oscillatory wave	± 2kV, 1MHz ring waves	IEC 61000-4-12
	Square wave	± 1.5kV rise time 1ns, pulse width 1μs 50Hz	
Construction		Panel-mounting type	IP30
Cooling		Self-cooling	



# Programmable Controllers

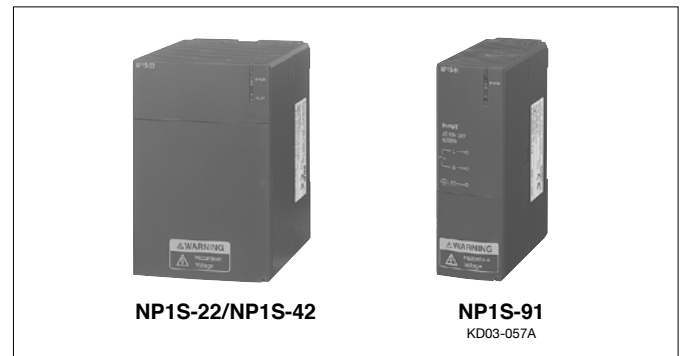
## MICREX-SX series SPH

### Power Supply Module

#### 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.



##### ■ 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°C not repeated)	150Ao-p or less    2ms or less	25Ao-p or less (Ta=25°C not repeated)	22.5Ao-p or less (Ta=25°C 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	2900Vrms AC, 1 second, between power input terminals and ground	560Vrms AC, 1 second, between power input terminals and ground	1800Vrms 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. 330g	Approx. 360g	Approx. 180g	

CPU Module: NP1P□ - □□

■ Features

- Ultra high-speed processing  
The CPU module carries out ultra high-speed processing as below;  
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)  
Up to 8 CPUs can be configured, effective for high-speed control by load distribution.
- Redundancy (SPH300)  
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 of the USB and user ROM versions with separate formats are offered (**NP1PS-32R/74R/117R/245R, NP1PM-48R/48E/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.
- CPU built into Ethernet  
In SPH2000, CPU built into Ethernet is prepared by another model (**NP1PM-48E/256E**).



■ Performance specifications

		SPH200		SPH300				SPH300				SPH300EX	SPH2000								
Type		NP1PH-08	NP1PH-16	NP1PS-32	NP1PS-32R	NP1PS-74	NP1PS-74R			NP1PS-117	NP1PS-117R	NP1PS-245R	NP1PS-74D	NP1PM-48R	NP1PM-48E	NP1PM-256E	NP1PM-256H	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				Sequence instruction	Instruction execution speed		
	Applied instruction	140ns or more/instruction		40ns or more/instruction						40ns or more/instruction				40ns 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		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		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		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		Instance memory for User FB (M)				
	Instance memory for system FB (M)		4096 words	8192 words	16384 words		65536 words				65536 words	65536 words x 2		16384 words	65536 words		Timer	Instance memory for system FB (M)			
		Timer	128 points	256 points	512 points		2048 points				512 points	2048 points x 2		512 points	2048 points						
		Integrating timer	32 points	64 points	128 points		512 points				512 points	512 points x 2		128 points	512 points						
		Counter	64 points	128 points	256 points		1024 points				1024 points	1024 points x 2		256 points	1024 points						
		Edge detection	256 points	512 points	1024 points		4096 points				4096 points	4096 points x 2		1024 points	4096 points						
Others	2048 words	4096 words	8192 words		32768 words				32768 words	32768 words x 2		8192 words	32768 words		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)	ROM for SPH200	ROM for SPH200	–	○	–	○			–	○	○	○	○	○	○	○	User ROM card (CF)	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) <b>NP1PS-32/32R</b> : 5 years, <b>NP1PS-74/74R</b> : 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) <b>NP1PS-117/117R</b> : Approx. 1.3 yeas, <b>NP1PS-245R</b> : Approx. 0.7 years, <b>NP1PS-74D</b> : Approx. 0.65 years, <b>NP1PM-48R/48E/256E/256H</b> : 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 ( <b>NP1PS-32/NP1PS-74</b> ) Approx. 220g ( <b>NP1PS-32R/NP1PS-74R</b> )						Approx. 200g ( <b>NP1PS-117</b> ) Approx. 220g ( <b>NP1PS-117R/NP1PS-245R</b> )		Approx. 410g	Approx. 200g				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 ○: 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**).

\* 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-74/74R:** approx. 3.5 years, **NP1PS-117/117R:** 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**.)



# Programmable Controllers

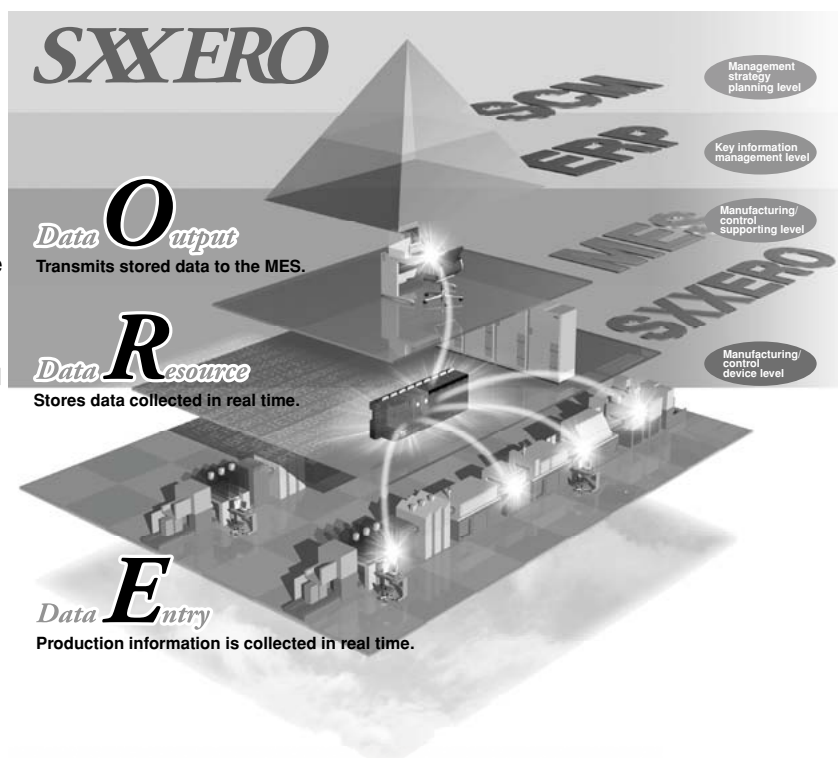
## MICREX-SX series SPH

### 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.

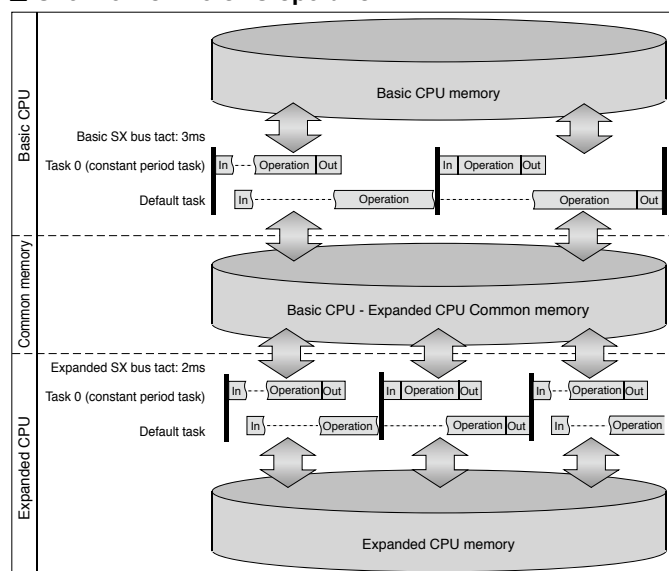


#### SPH300EX

##### ■ Features

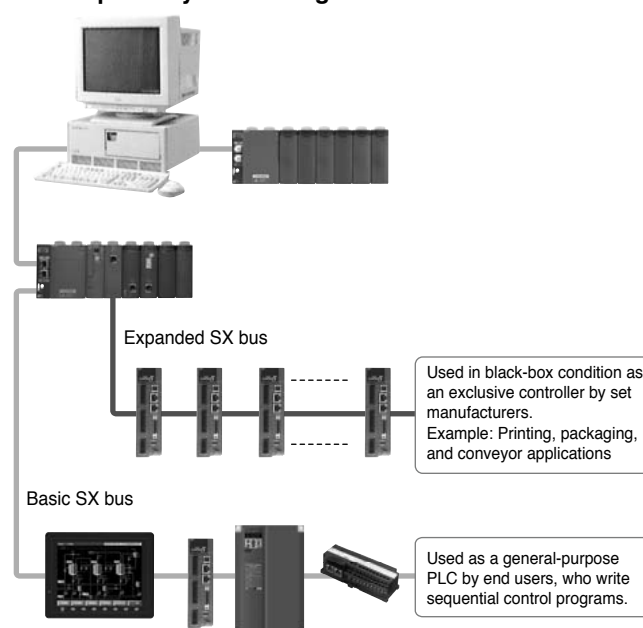
- Features dual control CPUs as standard equipment  
The basic CPU for ordinary sequential processing is used together with an expanded CPU for high-speed processing, to disperse the work load.
- Application to multi-axis servo systems  
The CPU and expanded CPU operate asynchronously, allowing the expanded 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



#### SPH2000 Redundant System

Models to be used: NP1PM-256H

##### ■ Features

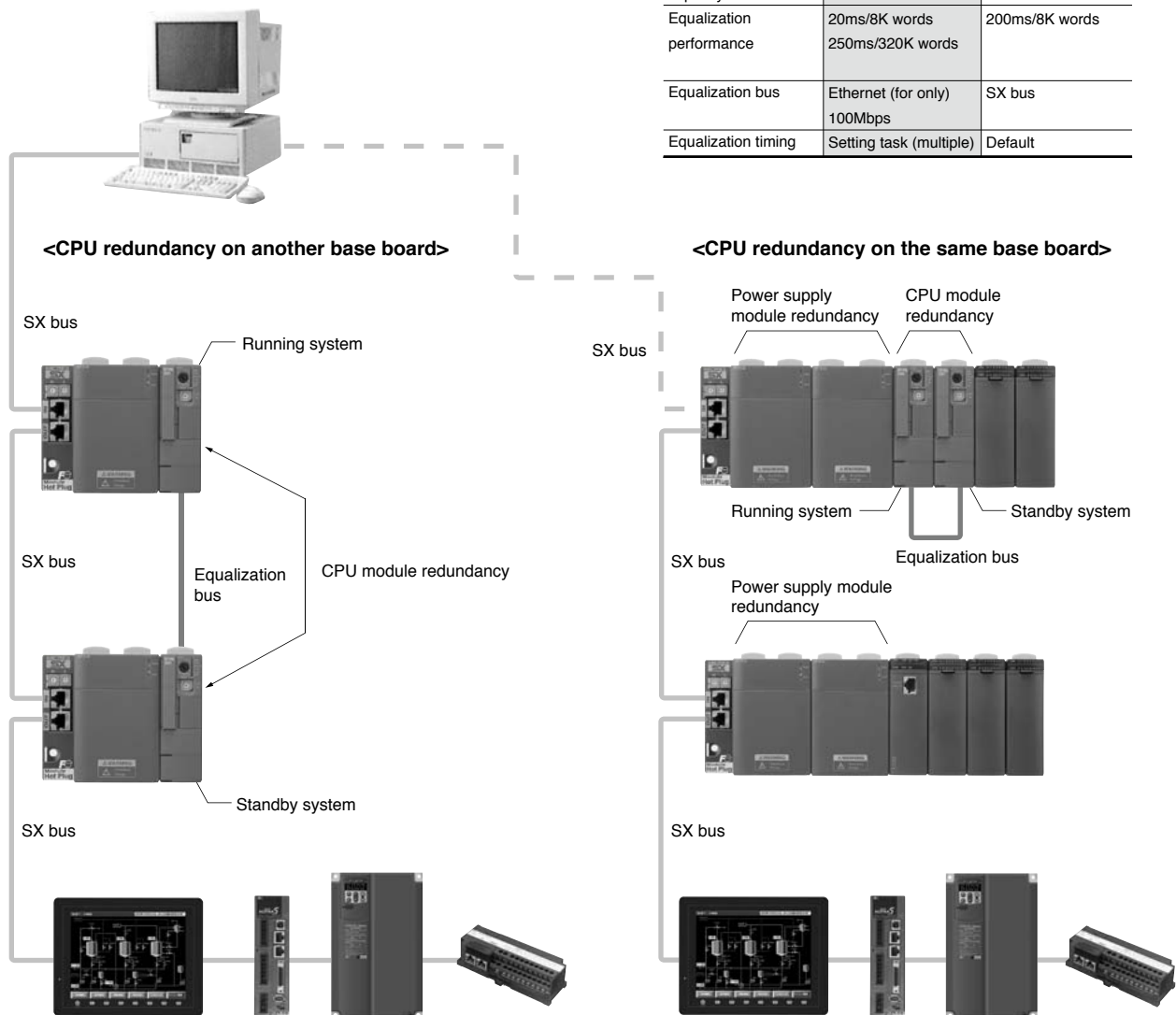
- Mass equalization data  
Up to 320K words of data can be equalized.
- High-speed transmission through dedicated equalization bus  
100Mbps dedicated equalization bus transmits the equalization data.  
Also, as a connection cable, a commercially available LAN cable (shielded category 5, cross connect 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-CPU's 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



##### <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.



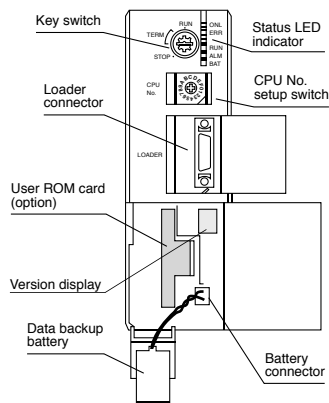
# Programmable Controllers

## MICREX-SX series SPH

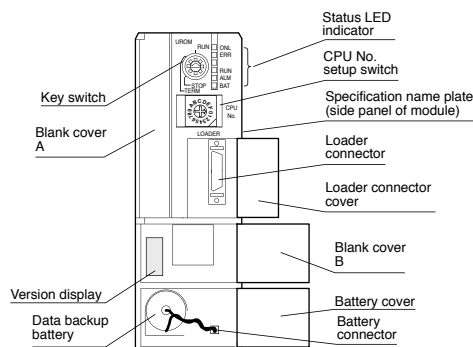
### CPU Module

#### ■ Outer view

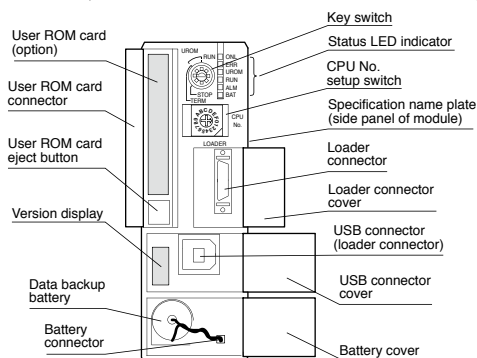
##### • SPH200 (NP1PH-08/NP1PH-16)



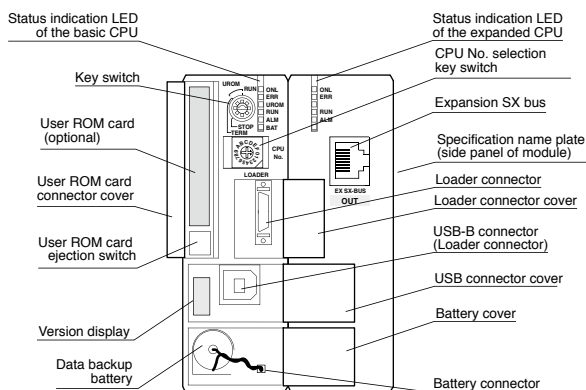
##### • SPH300 (NP1PS-32/NP1PS-74/NP1PS117)



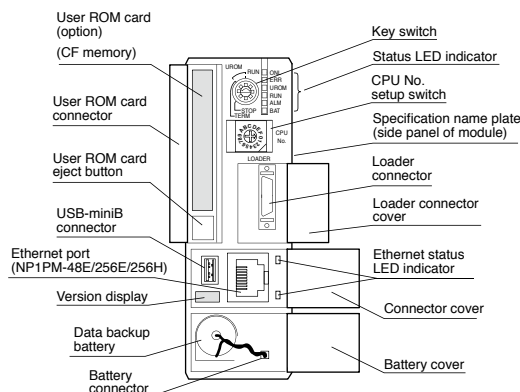
##### • SPH300 (NP1PS-32R/NP1PS-74R/NP1PS-117R/NP1PS-245R)



##### • SPH300EX (NP1PS-74D)

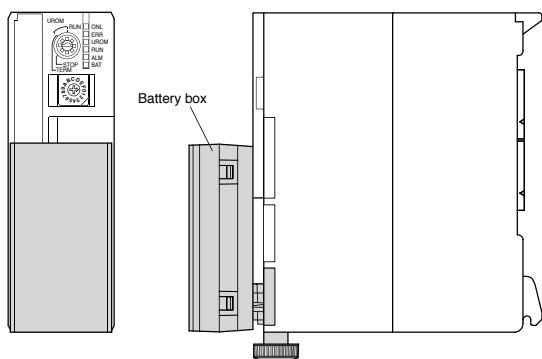


##### • SPH2000 (NP1PM-48R/NP1PM-48E/NP1PM-256E/NP1PM-256H)

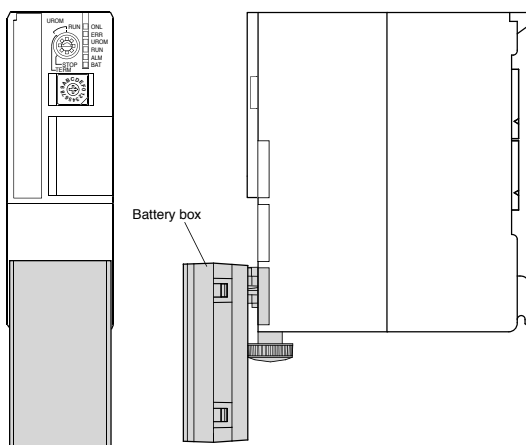


##### • Mounting of the battery box (optional)

###### Up mounting



###### Low mounting



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), and SPH2000 (NP1PM-48R/NP1PM-48E/ NP1PM-256E/NP1PM-256H).

# Programmable Controllers

## MICREX-SX series SPH

### Base Board

#### 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.

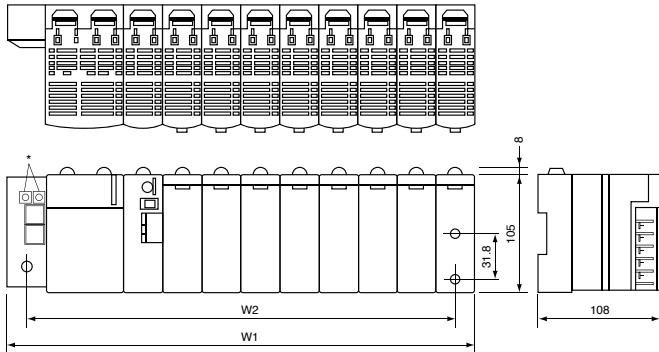
Make sure to always mount power supply module at the left side of the base board.

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



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

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.



Programmable Controllers

**MICREX-SX** series SPH

Standard I/O Module

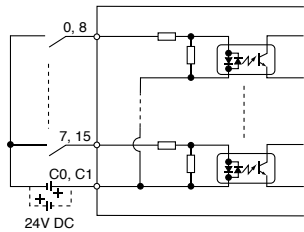
Digital Input Module: NP1X □

■ Performance specifications

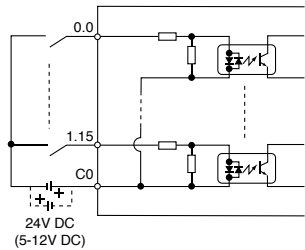
Type	Input	No. of input points	Rated voltage	Rated current	Operating voltage		Input delay time		Isolation method	Status indication	No. of points /common	External wire connection	Internal current consumption (24V DC)	Mass
					OFF to ON	ON to OFF	OFF to ON	ON to OFF						
NP1X1606-W	DC input, sink/ source	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.	Approx.			8 (x 1)	Terminal block	35mA or less	Approx. 130g
NP1X1610		16					10ms	10ms					16 (x 1)	40mA or less
NP1X0811		8	200 to 240V AC		160 to 264V	0 to 40V					8 (x 1)	35mA or less	Approx. 130g	

■ Internal circuit diagram

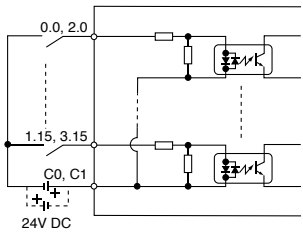
NP1X1606-W, NP1X1607-W



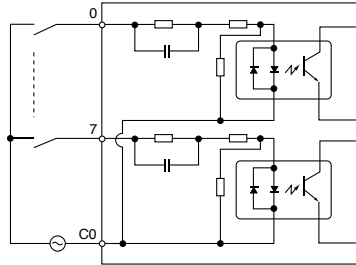
NP1X3206-W, NP1X3202-W



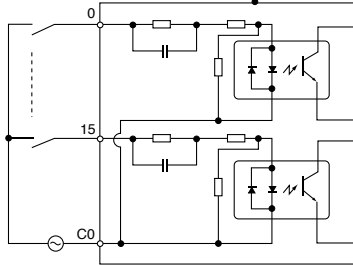
NP1X6406-W



NP1X0810, NP1X0811



NP1X1610

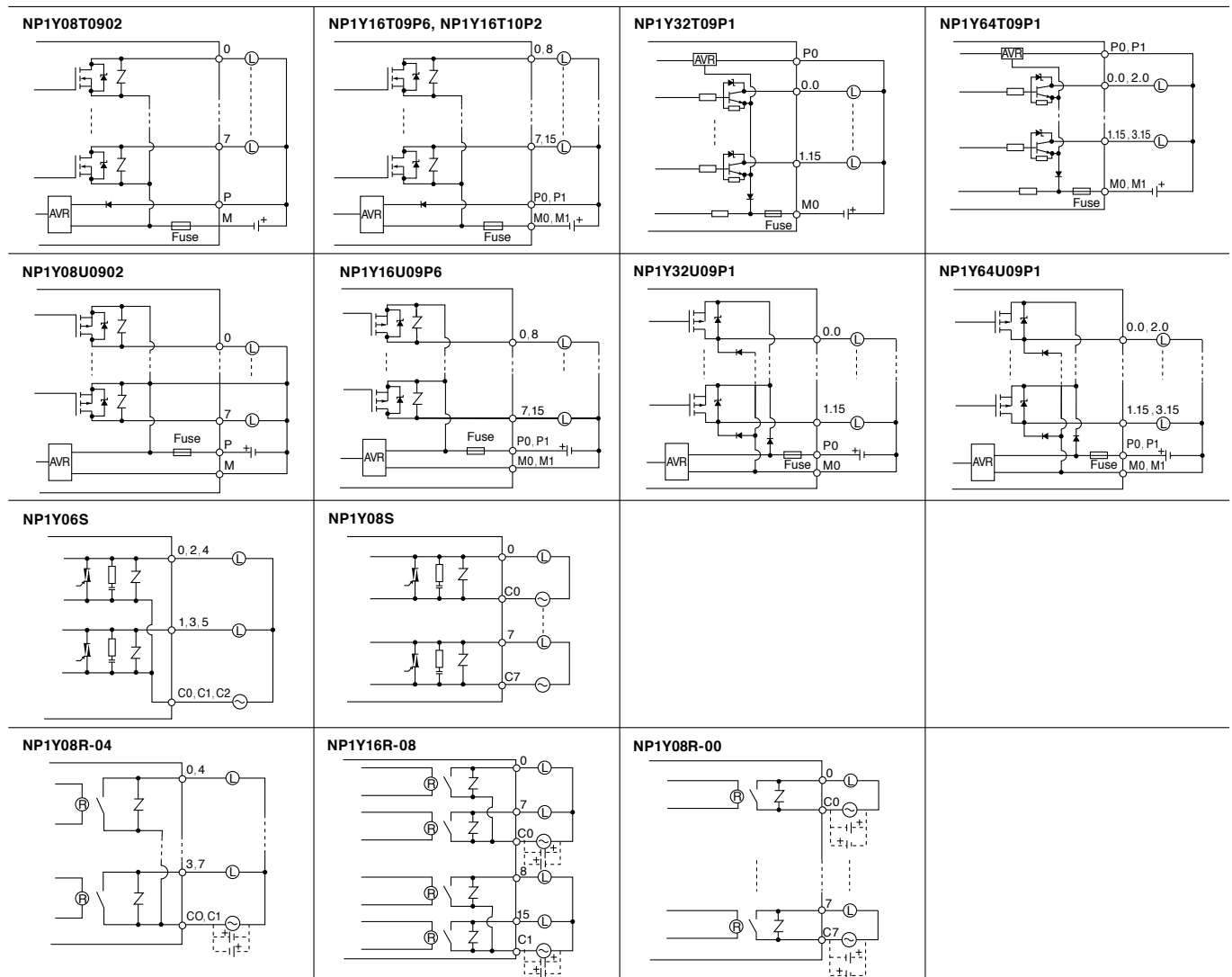


## Digital Output Module: NP1Y □

### ■ Performance specifications

Type	Output	No. of output points	Rated voltage	Max. load current		Response time		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	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	DC	0.6A	4A					8 (x 2)			42mA or less	Approx. 160g
NP1Y16T10P2		32	48V DC	0.2A	1.6A					42mA or less			Approx. 160g	
NP1Y32T09P1		12 to 24V DC	0.12A	3.2A	32 (x 1)					Zener diode	Connector	45mA or less	Approx. 130g	
NP1Y64T09P1			64	0.12A	3.2A							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						
NP1Y06S		SSR output		6	100 to 240V AC	2.2A	4.4A	10ms or less	10ms or less	All points are independent	2 (x 3)	CR absorber and varistor	Terminal block	60mA or less
NP1Y08S	8			2.2A				80mA or less	Approx. 200g					
NP1Y08R-04	Relay output	8	110V DC/ 240V AC	30V DC/ 264V AC: 2.2A	30V DC/ 264V AC: 4A	Approx. 10ms	Approx. 10ms	Relay		4 (x 2)	Varistor		80mA or less	Approx. 150g
NP1Y16R-08		16			30V DC/ 264V AC: 8A					8 (x 2)			176mA or less	Approx. 190g
NP1Y08R-00		8		-									All points are independent	100mA or less

### ■ Internal circuit diagram



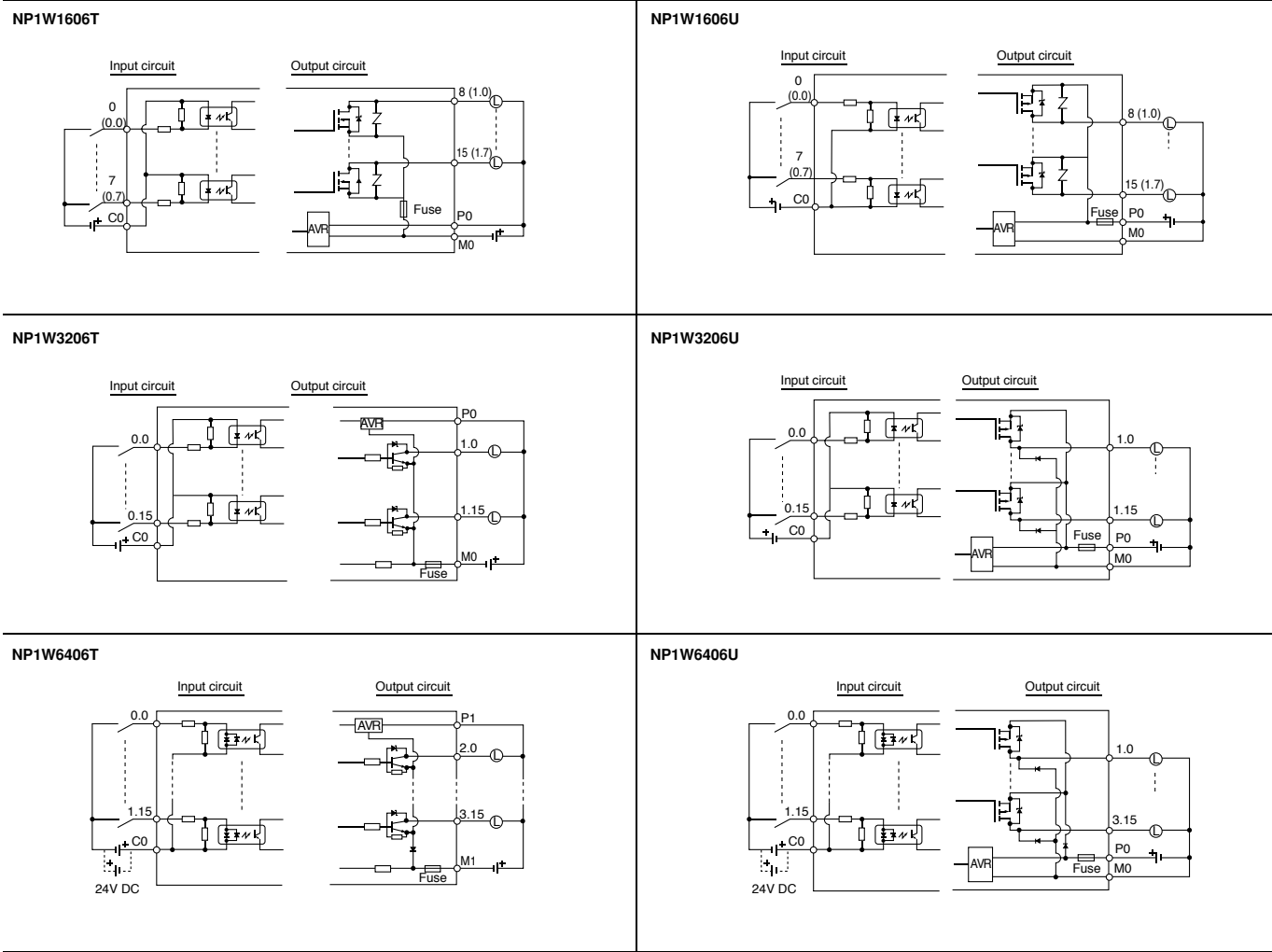
Programmable Controllers  
**MICREX-SX** series SPH  
Standard I/O Module

Digital Input/Output Module: NP1W □

■ Performance specifications

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

■ Internal circuit diagram





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

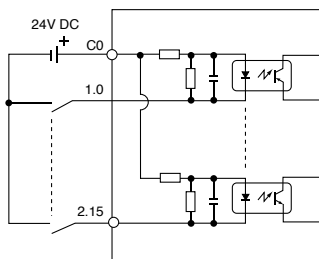
- Digital input module with pulse catch input
- Pulse catch input of minimum 20μs or normal input
- Pulse counter input function of maximum 20kHz, 4 ch. (two-phase)

#### 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

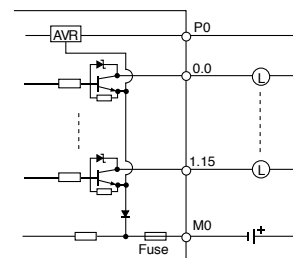
Type	Output	No. of output points	Rated voltage	Max. load current		Response time		Isolation method	Status indication	No. of points /common	Surge protection	External wire connection	Internal current consumption (24V DC)	Mass
				Per point	Common	OFF to ON	ON to OFF							
NP1Y32T09P1-A	Transistor output, 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



# Programmable Controllers

## MICREX-SX series SPH

### Standard I/O Module

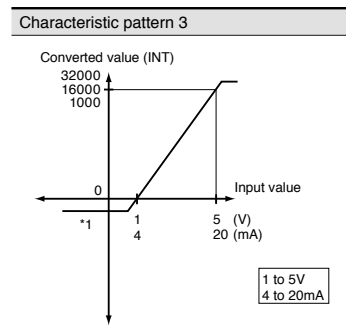
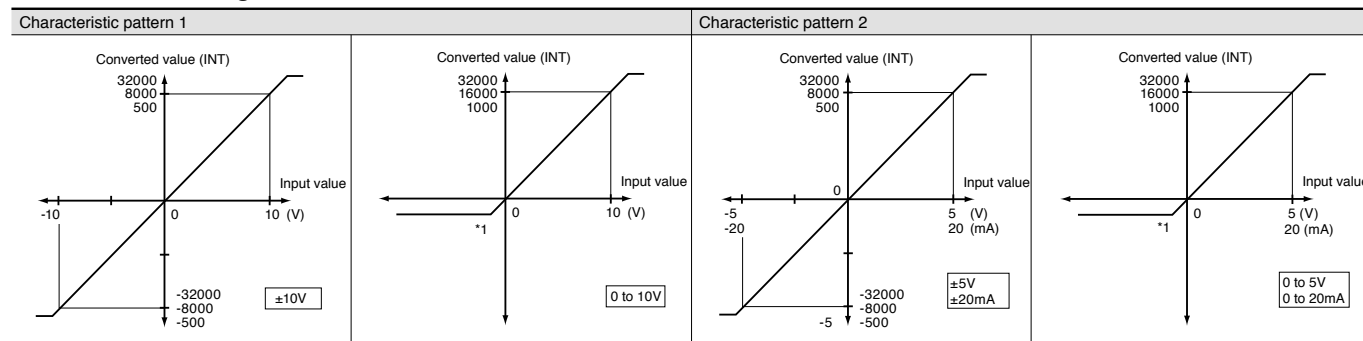
#### Analog Input Module: NP1AX ☐

#### ■ 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℃) ±1.0% or less (0 to 55℃)	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℃) ±1.0% or less (0 to 50℃)	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℃) ±1.0% or less (0 to 50℃)	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℃) ±0.2% or less (0 to 55℃) ±0.3% (0 to 55℃, 1-5V Range)	2.5ms or less / 8 ch	8 words + 4 words			200mA or less	Approx. 240g
NP1AXH8I-MR			DC0 to 20mA DC4 to 20mA DC-20 to +20mA	-8000 to +8000								
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℃) *1 ±0.239% or less (10 to 55℃)	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



\*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			

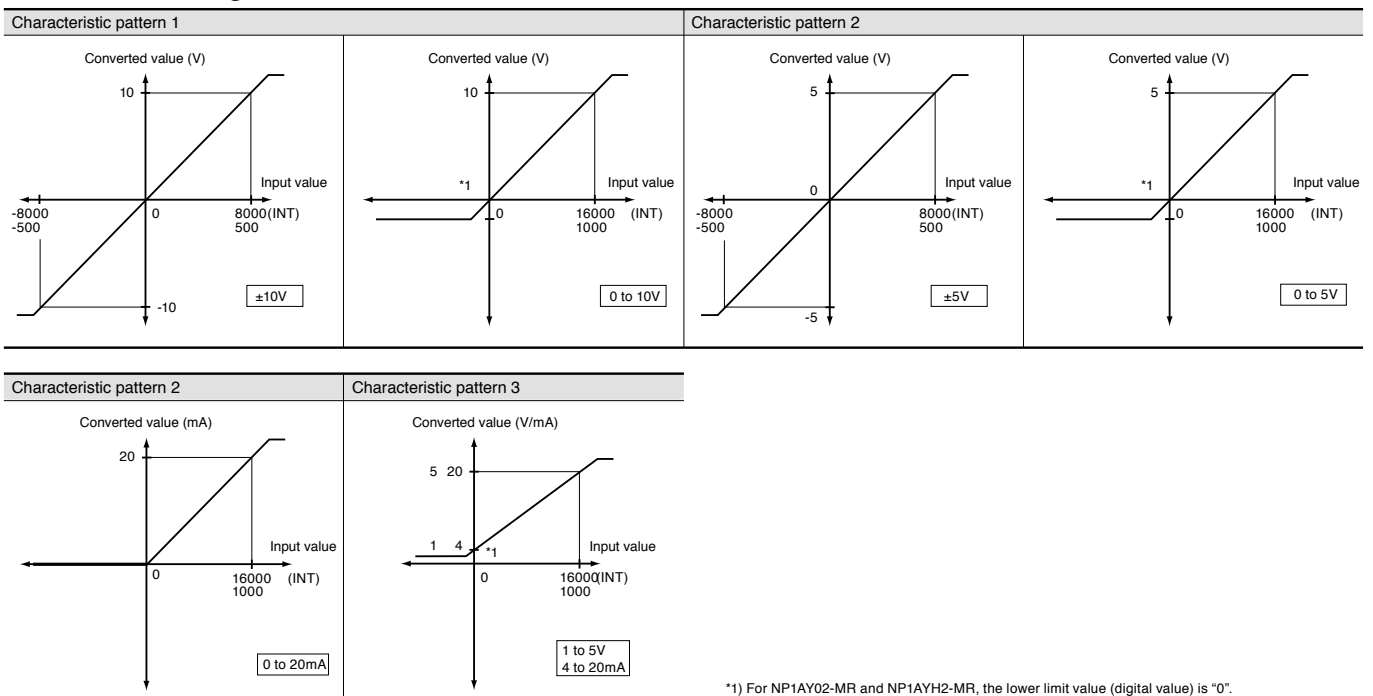
## Analog Output Module: NP1AY

### 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					
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	Insulation		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					
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)						
NP1AYH8V-MR			8 ch	DC0 to 5V DC0 to 10V DC1 to 5V DC-10 to +10V		-8000 to +8000 or 0 to 16000						
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



\*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



# Programmable Controllers

## MICREX-SX series SPH

### Standard I/O Module

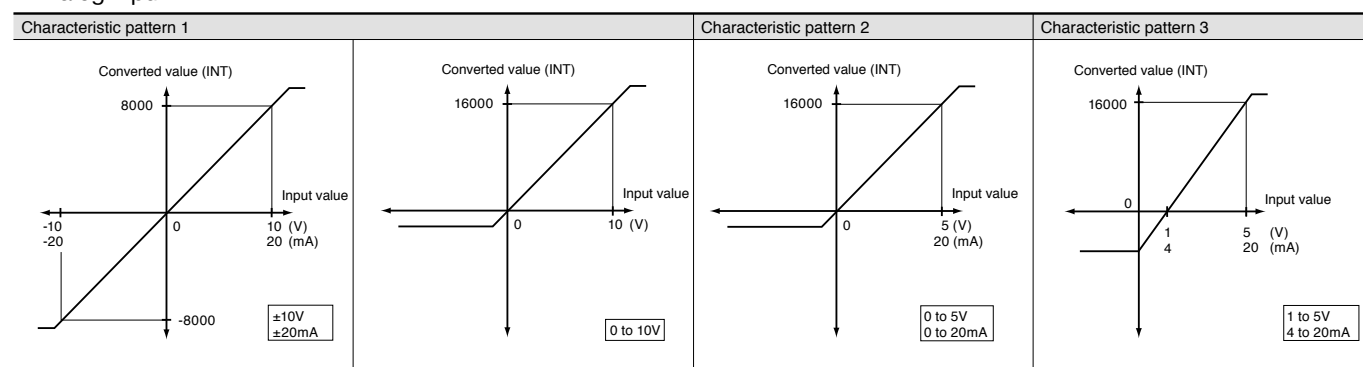
#### Analog Input /Output Module: NP1AWH6-MR

#### ■ Performance specifications

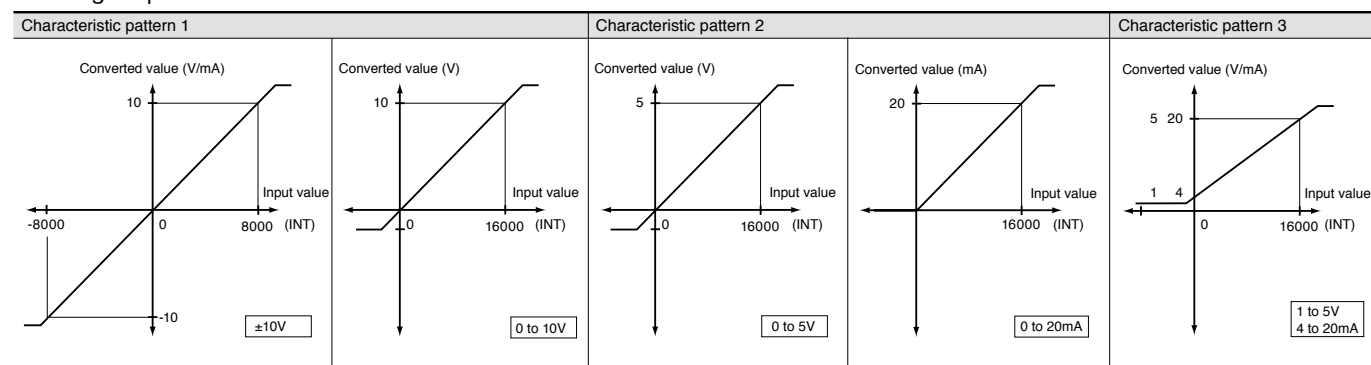
Type	Input	No. of channels	Signal range	Digital input output value	Digital resolution	Total accuracy	Converting speed	Occupied word (input + output)	Insulation between channels	External wire connection	Internal current consumption (24V DC)	Mass
NP1AWH6-MR	Multi-range input/output	4 ch	Voltage input: 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



##### • Analog output



#### ■ 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	<b>NP1AXH4-PT</b>	<b>NP1AXH6G-PT</b>
Measurement accuracy * 2	±0.3% (ambient temperature 18 to 28°C) * 1 ±0.7% (ambient temperature 0 to 55°C)	±0.05 to ±0.07% (ambient temperature 18 to 28°C) ±0.239% (ambient temperature 0 to 55°C)
Allowable input wiring resistance	10Ω or less	20Ω or less
Sampling interval	500ms/4 ch	45ms/6 ch
Input filtering time	Hardware (time constant): 50ms Software filter: 1s (variable from 1 to 100s by program)	Hardware (time constant): 30ms 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

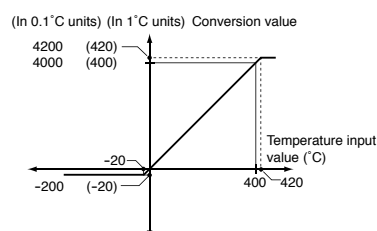
Type of resistance thermometer element	Celsius (°C) Measuring temperature range	Fahrenheit (°F) Measuring temperature range	Resolution of data
PT	0 to 200	32 to 392	1
	-20 to 80	-4 to 176	
	0 to 100	32 to 212	
	0 to 400	32 to 752	
	-200 to 200	-328 to 392	
	-200 to 600	-328 to 1112	0.1
	0.0 to 200.0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

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

### Characteristic diagram

#### NP1AXH4-PT

In case of PT0.0 to 400.0°C

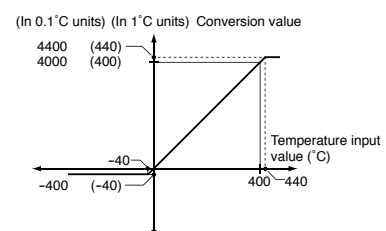


#### NP1AXH6G-PT

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	0.1
	-200 to 850	-328 to 1562	
	0.0 to 200.0	32.0 to 392.0	
	-20.0 to 80.0	-4.0 to 176.0	
	0.0 to 100.0	32.0 to 212.0	
JPt	0.0 to 400.0	32.0 to 752.0	1
	-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	
	0.0 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	

#### NP1AXH6G-PT

In case of PT0.0 to 400.0°C



# Programmable Controllers

## 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) 500ms/4 ch	±1°C (ambient temperature 18 to 28°C) 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	0.1
	0.0 to 700.0	32.0 to 1292.0	
J	0 to 500	32 to 932	1
	0 to 800	32 to 1472	0.1
	0.0 to 400.0	32.0 to 752.0	
	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	0.1
	0.0 to 600.0	32.0 to 1112.0	
L	0 to 400	32 to 752	1
	0 to 900	32 to 1652	0.1
	0.0 to 400.0	32.0 to 752.0	
	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	0.1
	-100.0 to 1370.0	-148.0 to 2498.0	
	-100.0 to 500.0	-148.0 to 932.0	
	-100.0 to 230.0	-148.0 to 446.0	0.05
	0.00 to 300.0	-	
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	0.1
	-200 to 1100	-328 to 2012	
	-100.0 to 500.0	-148.0 to 932.0	
	-100.0 to 800.0	-148.0 to 1472.0	0.04
	-100.0 to 1100.0	-148.0 to 2012.0	
T	-80.00 to 180.00	-	0.1
	-260 to 400	-436 to 752	
N	-150.0 to 200.0	-238.0 to 392.0	1
U	-200 to 1300	-328 to 2372	1
	-150 to 550	-238 to 1022	1
L	0.0 to 550.0	32.0 to 1022.0	0.1
	-150 to 400	-238 to 752	1
	-150 to 850	-238 to 1562	0.1
	0.0 to 400.0	32.0 to 752.0	
PL II	0.0 to 850.0	32.0 to 1562.0	1
	0 to 1300	32 to 2372	1
W5Re, W26Re	0.0 to 1300.0	32.0 to 2372.0	0.1
	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

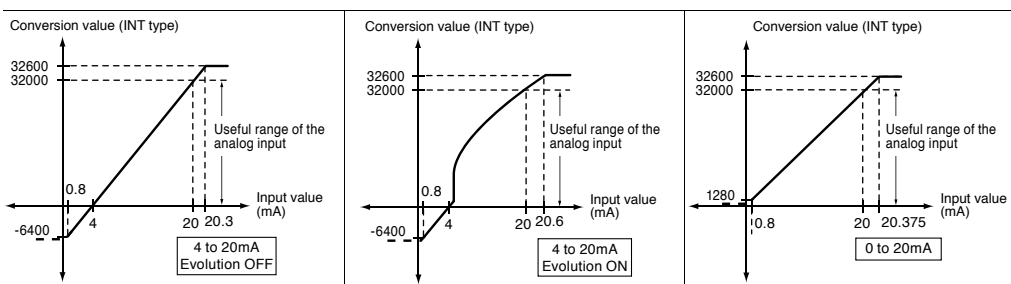
Item	Specification
Specification	<b>NP1AXH4DG-MR</b>
No. of input channels	4 channels
Analog input range	4 to 20mA, 0 to 20mA
Input impedance	250Ω
Maximum permissible input	30mA
Input filter Approx.	200μs or less (hardware: primary delay time constant)
Resolution	16-bit
Digital conversion value	0 to 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	40 minutes or more
* 1	
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.

Programmable Controllers

MICREX-SX series SPH

Standard I/O Module

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
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.

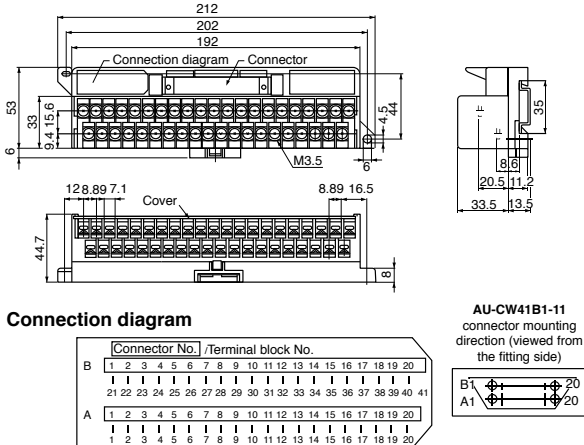
\*1 As soldered type connectors, Fuji Electric model (NP8V-CN) is provided (Attached cover: FCN-360C040-B).  
Note) For more retail, refer to each user's manuals.

Recommended relay terminal blocks (Made by Fuji Electric FA Components & Systemes Co., Ltd.)

- Type, model, and product code
- Unit

Model	No. of terminal block pins	No. of connector pins	Rating (connector)	Performance	Product code
AU-CW41B1-11	41	40	Insulation voltage: 60V (AC, DC) Conductive current: 1A (40°C)	Insulation resistance: 100M or more Withstand voltage: 500V, 1 minute Allowable ambient temperature: -5 to +40°C Allowable ambient humidity: 45 to 85%RH Flame resistance: UL94-V1	LP1W-41BA5

Dimensions, mm (AU-CW41B1-11 type)



Connection diagram

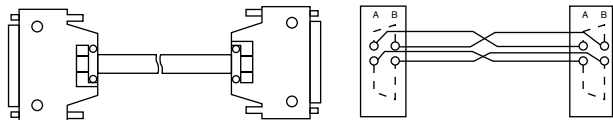
Connection cable

Applicable terminal block model	No. of pins	Cable type	Connection cable model	Product code
AU-CW41B1-11	40	Multi-core cable	AUX011-40 □	LP911-40 □
		Flat cable	AUX021-40 □	LP921-40 □

\* □ indicates the length of the multi-core cable and flat cable.  
1: 1m (standard), 2: 2m, 3: 3m

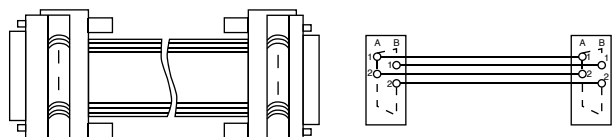
- Recommended cables
- Cable with connectors

AUX011-40 □ type



Flat cable with connectors

AUX021-40 □ type

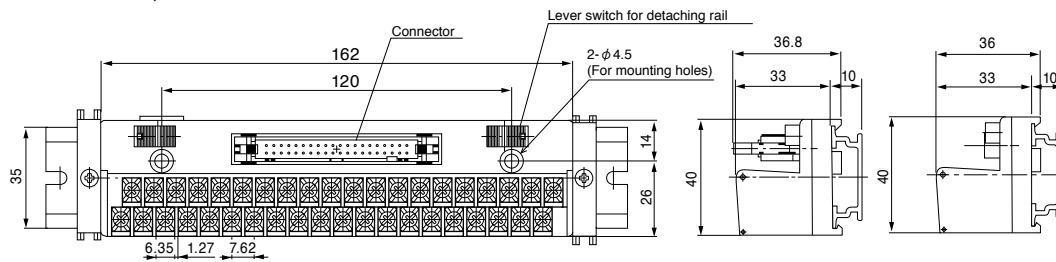


■ Recommended relay terminal blocks (Made by Fuji Electric Technica Co., Ltd.)

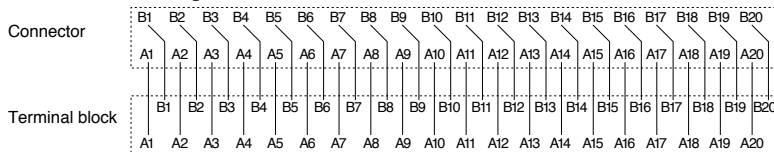
• Specifications

Types (Product code)	Terminal block	Connector		Performance
		Number of poles	Rating	
<b>LP5W-40H1</b>	40 M3 screw Supported by screws Standard tightening torque: 1.2N·m Compliant cable: Up to 1.25mm <sup>2</sup>	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



• Connection diagram



• 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).



# Programmable Controllers

## MICREX-SX series SPH

### Standard I/O Module

#### 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.

#### ■ 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/s <sup>2</sup>
	Durability	200 m/s <sup>2</sup> 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

#### ■ Rating

Opening section, connector side (per RB105 1 point)

Item	Load	RS16 (output)				RS16E (input)	
		Resistance load (cosφ =1, L/R=0ms)	Inductive load (cosφ =0.4, L/R=7ms)			Resistance load (cosφ =1, L/R=0ms)	Inductive load (cosφ =0.4, L/R=7ms)
Rated load, rated voltage/current		220V AC 2A	220V AC 2A			24V DC 1A	24V DC 1A
Rated conducting current		2A *1				1A *2	
Contact resistance		30mΩ or less				30mΩ or less	
Voltage/current applicable to min. applicable load (P standard reference value)		0.1V 0.1mA				0.1V 0.1mA	
Mechanical lifetime		20 mil. times				—	
Electrical lifetime		0.2 mil. times	0.3 mil. times	0.1 mil. times	0.06 mil. times		

\* 1 The relay (RB105) is a 5A rated conducting current product. However, the main unit rated conducting current is restricted to 2A due to the structural characteristics of the terminal relay.

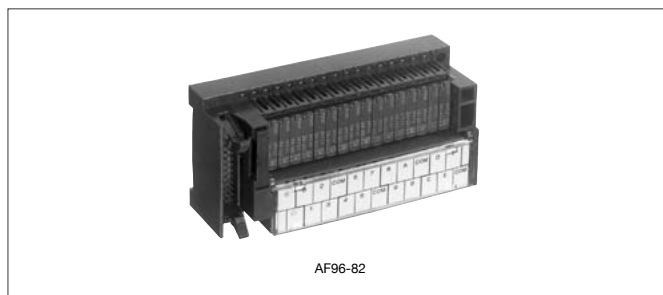
\* 2 The relay (RB105) is a 5A rated conducting current product. However, the main unit rated conducting current is restricted to 1A due to the structural characteristics of the terminal relay.

Operating coil I/O specification (per RB105 1 point)

(at 20°C)

Rated voltage	Rated current	Coil resistance 10%	Operating voltage	Recovery voltage	Max. allowable voltage	Power consumption	
						Per 1 point	Per 16 points
5V DC	40mA	125	70% or less of rated voltage	10% or more of rated voltage	110% of rated voltage	0.2W	3.2W
24V DC	8.3mA	2,880	70% or less of rated voltage	10% or more of rated voltage	110% of rated voltage	0.2W	3.2W

Note: Current supplied to LED is approximately 1mA. To calculate the power supply capacity, add the current value.

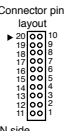


- Terminal cover is installed as standard allowing device No. indication.
- With the built-in relay remover.
- Used for both DIN rail installation and rear-side screw mounting.

#### ■ 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)

● **RS16E-DE04** (input, applicable to NPN)



Technical drawing of the HIF3CA-20PA-2.54DSA terminal block, showing front, side, and mounting views with dimensions.

**Front View Dimensions:**

- Overall width: 110
- Overall height: 52
- Bottom flange height: 4.7
- Terminal pitch: 2.54
- Terminal width: 3.0
- Terminal height: 1.5
- Terminal spacing: 2.54
- Terminal type: M3 x 22
- Connector Hirose HIF3CA-20PA-2.54DSA

**Side View Dimensions:**

- Overall height: 50 (for rail height 15), 42.5 (for rail height 7.5)
- Terminal pitch: 39
- Terminal height: 37
- Terminal spacing: 33
- 35mm width DIN rail

**Mounting View Dimensions:**

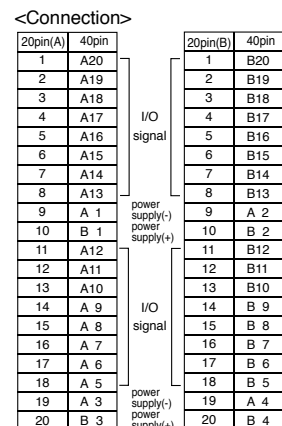
- Panel hole dimension (for panel mounting): 111 (min. installation pitch)
- Mounting hole diameter: 2-  $\phi 4.2$  (M3 to M4 screw hole for screw mounting)
- Mounting hole spacing: 91
- Mounting hole offset: 4.2
- Mounting hole offset: 14.8
- Mounting hole offset: 43.5

Units: mm

- Model, and ordering code

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

- Outline, and connection



# Programmable Controllers

## MICREX-SX series SPH

### Communication Module

#### Computer-level Communication Module

##### Web Module: NP1L-WE2 [English version]

#### ■ Features

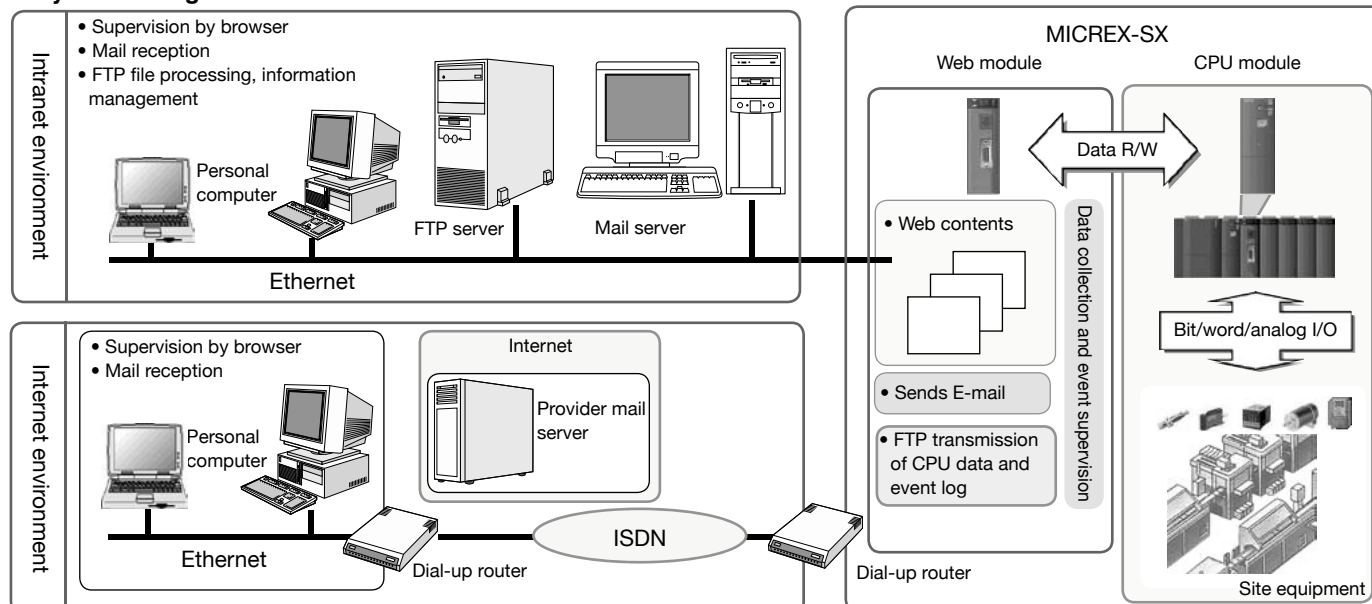
Through the Internet and Intranet, this module realizes equipment supervision by Web browser, E-mail sending at failure occurrence, and remote control and remote maintenance (monitoring/program modification) by the programming support tool.

#### ■ 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.

- 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



#### ■ 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

### Ethernet Interface Module: NP1L-ET1

#### ■ Features

- Supports the 10BASE5 interface as well as 10BASE-T/100BASE-TX interface.
- Supports three different communication modes.
- General-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)

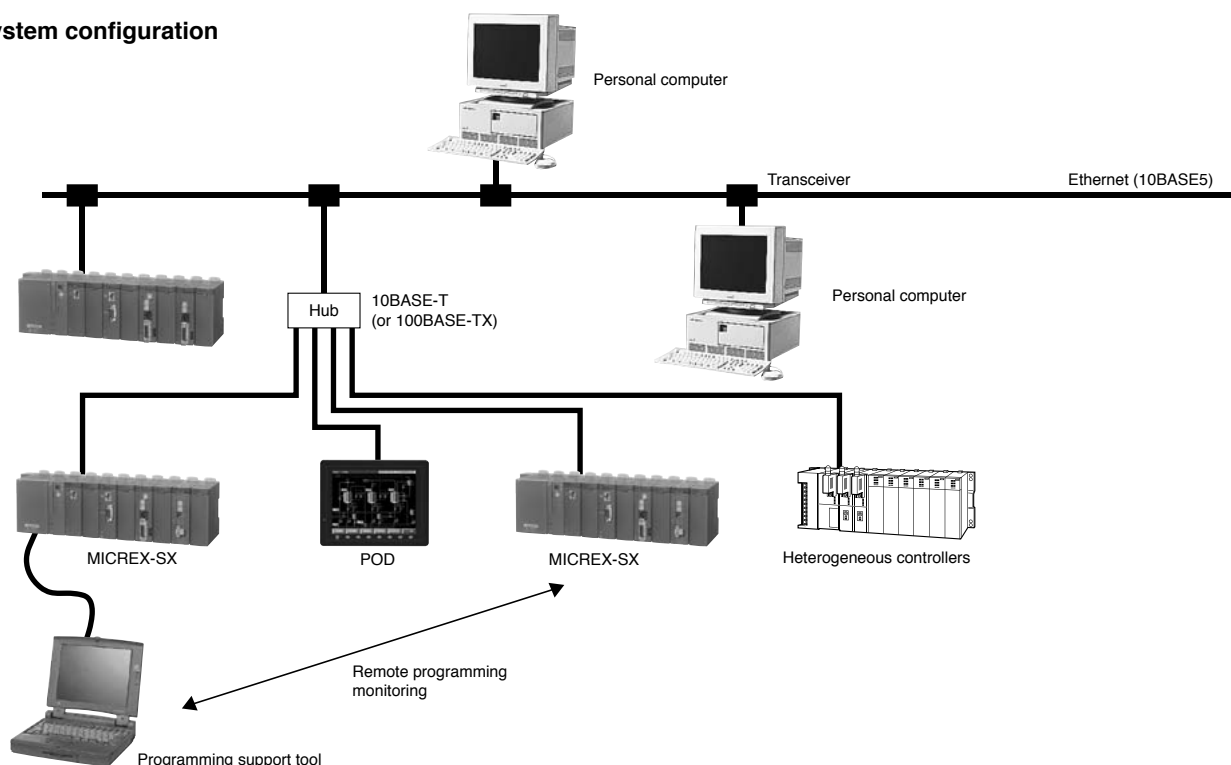


#### ■ Performance specifications

Item		Specification	
Type		NP1L-ET1	NP1L-ET2
Communication function	Application communication mode	General-purpose communication	
	Loader command automatic reception mode	Fixed buffer communication	
		Automatic transmission communication	
Interface		10BASE-T/100BASE-TX Automatic selection by the auto negotiation function	10BASE5
Media control		IEEE 802.3/IEEE 802.3u	IEEE 802.3
Transmission rate		10Mbps/100Mbps	10Mbps
Transmission medium		Twist pair cable (UTP)	AUI cable
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





# 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/SPB) side.

The SPB is available on the SX mode.

- Bidirectional communication between the master station (personal computer) and slave station (SPH/SPB SX mode)
- 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

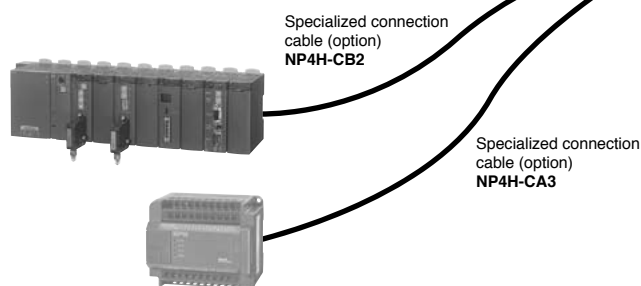
###### • General specifications

Item	Specification
Physical environment	Operating ambient temperature
	0 to $\pm 55^{\circ}\text{C}$ (without condensation)
	Storage temperature
	$-20$ to $\pm 70^{\circ}\text{C}$ (without condensation)
	Relative humidity
	20 to 90%RH (without condensation)
	Contamination
Mechanical operating condition	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)
	Resistance to vibration
	One amplitude: 0.15mm, constant acceleration: $9.8\text{m/s}^2$ , 2 hours for each direction, 6 hours total
Electrical operating condition	Resistance to shock
	Peak acceleration: $294\text{m/s}^2$ , 3 times for each direction
	Resistance to noise
	Noise simulator method, rise time of 1ns, pulse width of 1 $\mu\text{s}$ , 1kV
	Resistance to electrostatic discharge
	Contact discharge method: $\pm 6\text{kV}$ , air discharge method: $\pm 8\text{kV}$
	Resistance to radiation electromagnetic field
Cooling system	10V/m (80 to 1000MHz)
	Natural cooling
	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
Mass	24V: 60mA or less (SPH) / 288mA or less (SPB)
	12V: 120mA or less
	Approx. 320g
	Calendar accuracy
	$\pm 90$ seconds/month ( $25^{\circ}\text{C}$ , conduction)
	Battery type/operating life
	Lithium primary battery 3.6V
Battery type/operating life	NP8P-BT / 5 years (ambient temperature of $25^{\circ}\text{C}$ )

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



##### ■ Initial setup loader (Model: FOA-LOADER2-CD) <Japanese version>

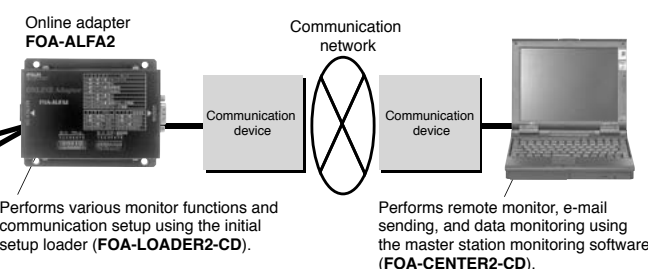
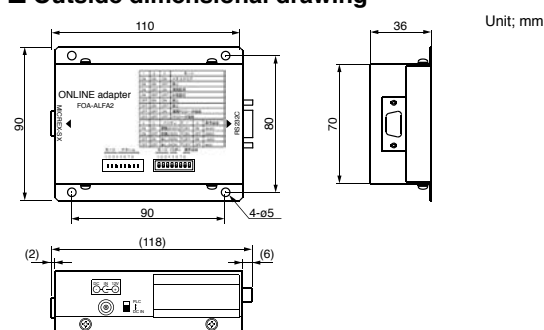
- Creates initial setup data (each function setup). Sets the failure monitor, data accumulation, integrated time monitor functions and registers AT commands for communication.
- Writes the initial setup data to the online adapter.
- Reads the initial setup data from the online adapter.



##### • Functional specifications

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

##### ■ Outside dimensional drawing



##### ■ 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.

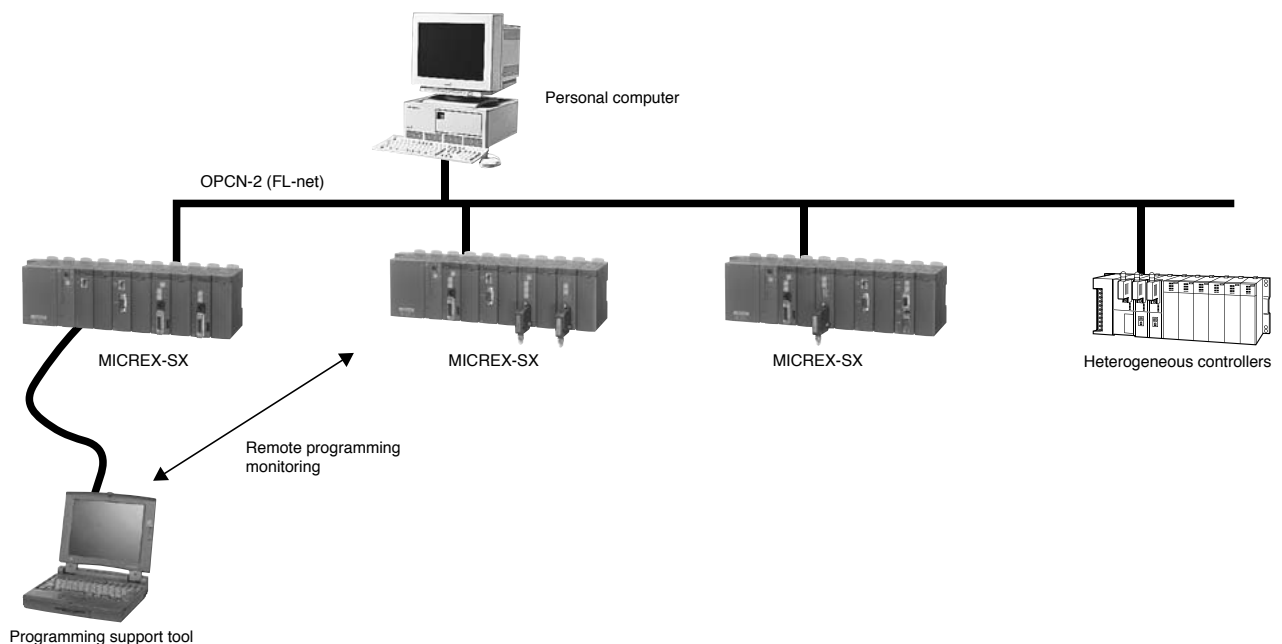


■ **Performance specifications**

Item	Specification
Type	<b>NP1L-FL3</b>
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	<ul style="list-style-type: none"> <li>• Cyclic broadcast transmission method    Data size: Max. 8.5 Kwords</li> <li>• Message transmission method    Data size: Max. 512 words</li> </ul>
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**



# Programmable Controllers

## MICREX-SX series SPH

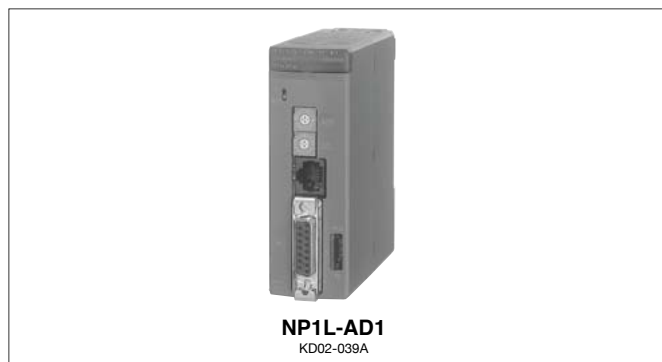
### Communication Module

#### ADS-net Module: NP1L-AD1

##### ■ Features

- Supports the Autonomous Decentralized Protocol (R3.0) \* <sup>1</sup> and is provided with the following functions:
  - Multicast communication function
  - Existence signal transmit function
  - Trouble information transmit function
- Supports the test support function.
- Supports input and output of I/O transactions and up to 16 TCDs.
- Supports the 10BASE-T (TPI) and 10BASE5 (AUI) interfaces.
- Supports the subnet mask function.

\* <sup>1</sup> The Autonomous Decentralized Protocol is a protocol decided by FA Open Systems Promotion Forum (FAOP) of Manufacturing Science and Technology Center (MSTC, Japan), and the protocol is being discussed in ISO.



##### ■ Performance specifications

Item	Specification (overview)
Communication function	<ul style="list-style-type: none"> <li>• Multicast communication (function class: Base-1) * <sup>1</sup></li> <li>• Existence signal transmission (function class: Base-2) * <sup>2</sup></li> <li>• Trouble information transmission (function class: Base-3) * <sup>2</sup></li> </ul>
Message size	Up to 1024 bytes (user data section)
Message buffer size	Selected from 256/512/1024 bytes.
No. of data fields registered	1 data field
No. of multicast groups registered	Up to 8 groups
No. of output transaction codes	Up to 16 TCD
No. of input transaction codes	Up to 16 TCD
Test node setup	Possible
Interface selector switch	Selected by the switch on the front panel of the module.
Interface	10BASE-T or 10BASE5
Media control	IEEE 802.3
Transmission rate	10Mbps
Max. segment length	10BASE-T: 100m, 10BASE5: 500m (2500m max. with repeaters)
Max. number of nodes	10BASE-T: 1 unit/segment, 10BASE5: 100 units/segment
Protocol	UDP/IP, autonomous distribution protocol (R3.0)
External power supply	12V DC, 500mA * <sup>2</sup>
Internal current consumption	24V DC, 140mA or less
Mass	Approx. 220g

\* <sup>1</sup> 10BASE-T and 10BASE5 cannot be used at the same time.

\* <sup>2</sup> When 10BASE5 is used, an external power supply (12V DC) is required.

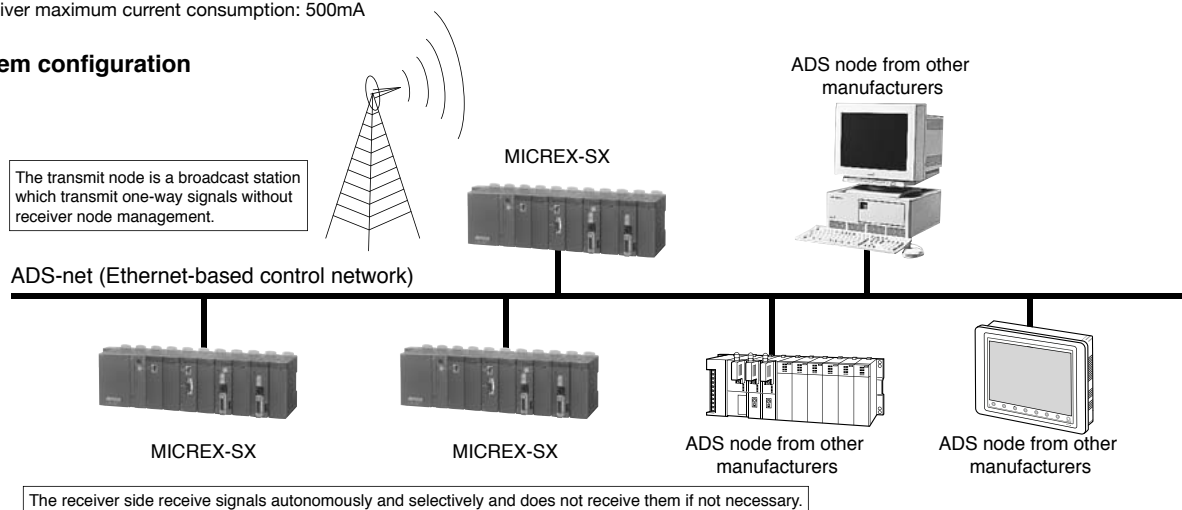
Use an external power supply (12V DC) which satisfies the specifications of the transceiver and transceiver cable (AUI cable).

##### [Reference]

IEEE 802.3 defines the following specifications of the transceiver and transceiver cable (AUI cable):

- Transceiver I/O terminal voltage: 12V DC-6% to 15V DC+5%
- Transceiver cable DC resistance: 40 Ω/km or less, maximum total length 50m
- Transceiver maximum current consumption: 500mA

##### ■ System configuration



### LONWORKS Network Interface Module: NP1L-LW1

#### ■ Features

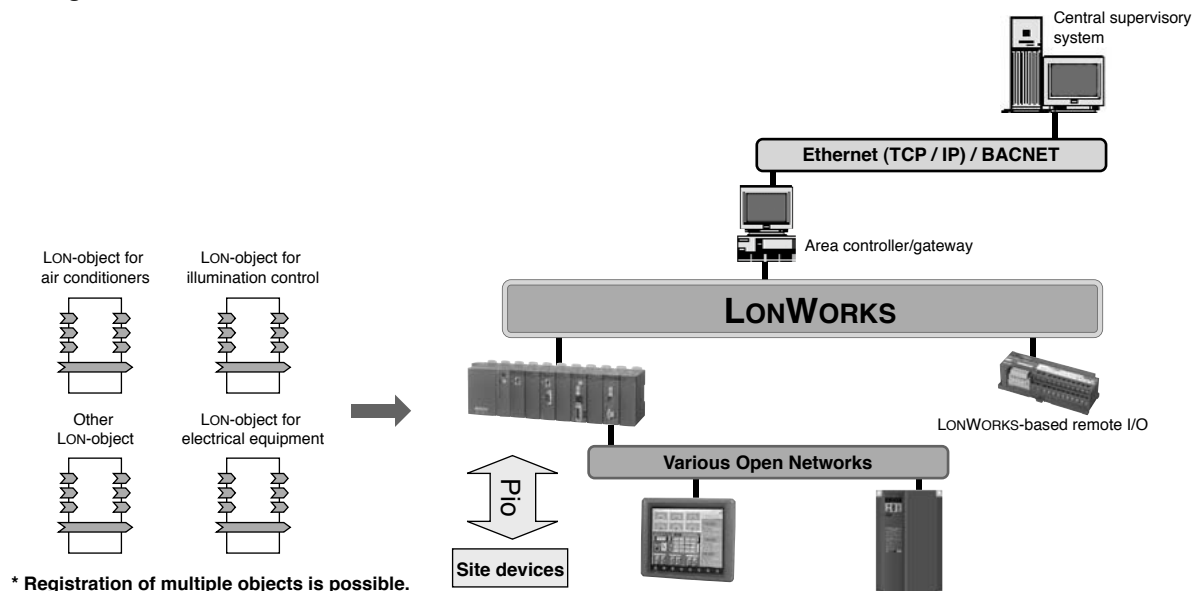
- Uses the communication extension FB compatible with the LONWORKS network, making it easier to transfer and receive MICREX-SX application data to/from other LONWORKS nodes.
- Max. number of NVs: 300, Number of CPs: Up to 200 intelligent nodes can be configured.
- Up to two units can be mounted in one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



#### ■ 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 NVs variable binding
No. of domain table entries	Fixed to 2	
Internal current consumption	24V DC, 140mA or less	
Mass	Approx. 200g	

#### ■ System configuration



### LONWORKS Network Interface Module Support Tool: NP4N-LNDF [Japanese Version]

#### ■ SLDEF (Model: NP4N-LNDF)

- 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.



Programmable Controllers

**MICREX-SX series SPH**

**Communication Module**

**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.

■ Performance specifications

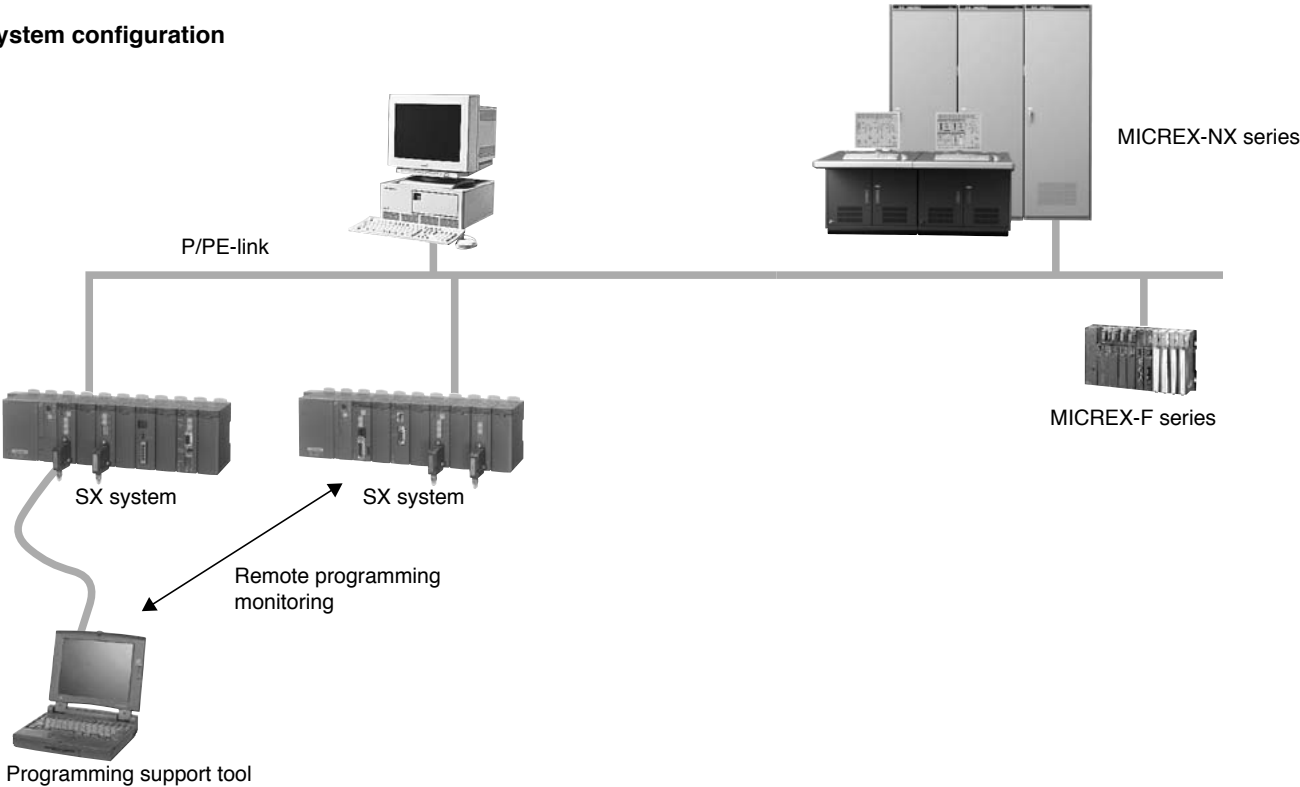
Item	Specification	
Type	<b>NP1L-PL1</b> (P-link)	<b>NP1L-PE1</b> (PE-link)
No. of SX bus connetable modules	Max.2 /configuration	
No. of P/PE links	Max. 16	Max. 64
Transmission line format	Bus configuration (multi-drop)	
Transmission line	Coaxial cable Total length: Max.250m	Coaxial cable Total length: 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)	



■ P/PE-link connection equipment

Classification	Series	Type	Link	Remarks
PLC	MICREX-F70S	<b>NC1H-PL1</b>	P-link	
	MICREX-F120S to 150S	<b>FPC220P</b>	P-link	
		<b>FPC420P</b>	PE-link	
FA personal computer	FMV Series Fujitsu	<b>CNVAD120-01</b>	P-link	
		<b>CNVAD190-01</b>	PE-link	

■ System configuration



**LE-net Module: NP1L-LE1**  
**LE-net Loop Module: NP1L-LL1**  
**LE-net Loop 2 Module: NP1L-LL2**

#### ■ Features

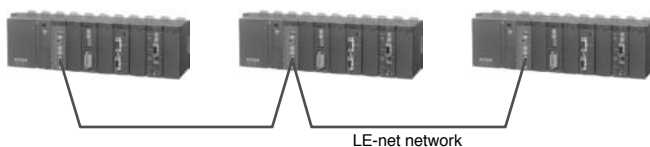
- Up to eight LE-net modules mountable on each configuration. (For SPH200, up to two modules)
- LE-net is an original network of Fuji Electric. It is a low-priced link module between processors to conduct communication with other nodes connected to the LE-net.
- Using the LE-net, broadcast communication 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. 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

#### ■ Performance specifications

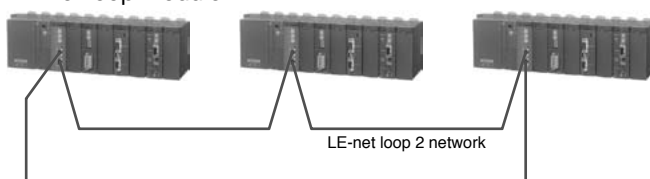
Item	LE-net module	Loop module	Loop 2 module
Type	NP1L-LE1	NP1L-LL1	NP1L-LL2
Connection node quantity	Up to 64 units		
Node number setting range	0 to 63		
Connection distance/ communication speed	800m/62.5kbps, 500m/125kbps, 250m/250kbps, 100m/500kbps, 40m/1Mbps		
Transmission line	Shielded twisted pair cable (T link cable recommended)		
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		
No. of connectable support units	Up to two units simultaneously, including those connected directly or remotely		
Hardware redundancy	—	—	O

#### ■ System configuration

##### • LE-net module

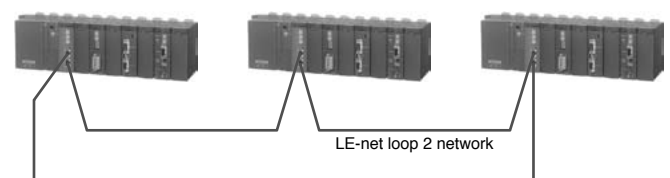


##### • LE-net loop module



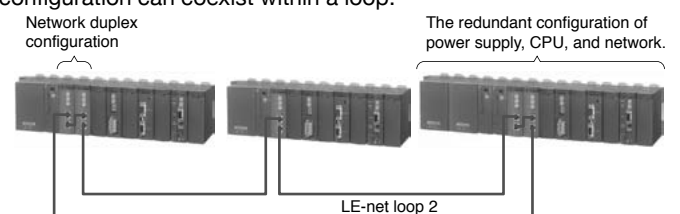
##### • LE-net loop 2 module

###### 1) Basic system



###### 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.



FB (provided free of charge). The single configuration and the redundant configuration can coexist within a loop.

Note: Multi-drop networks, loop networks, and 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.

Programmable Controllers  
**MICREX-SX** series SPH  
Communication Module

**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.

■ **Performance specifications**

- Communication 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

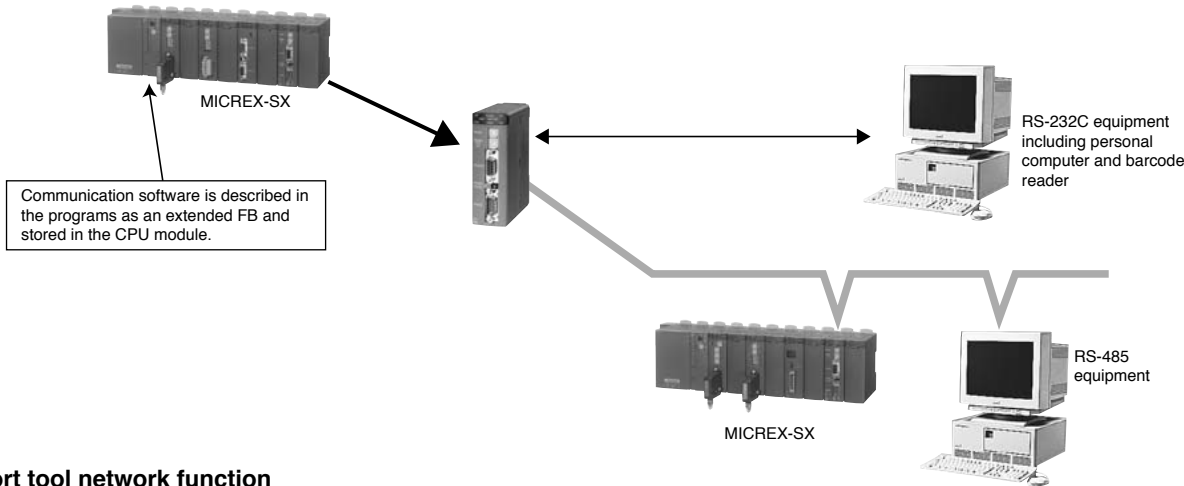


- Communication port specifications

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

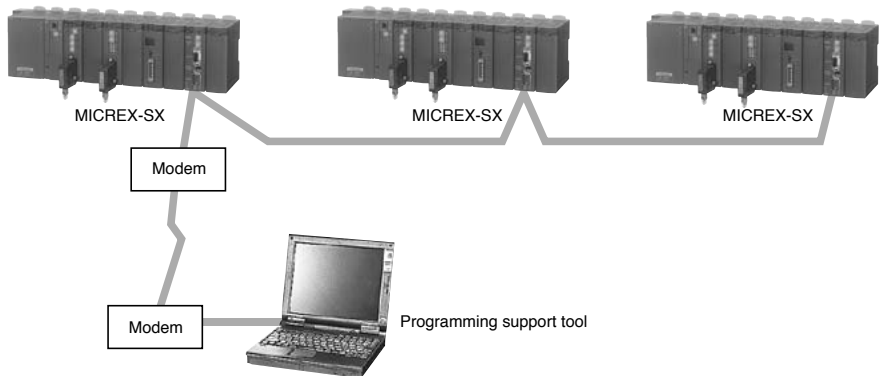
\* 1: The use of the non-procedure FB allows full-duplex communication on applications.  
\* 2: For transmission rates 300, 600, 76800, and 115200 bps, use FBs corresponding to the transmission rate.

■ **System configuration**



■ **Support tool network function**

Use of general-purpose communication modules enables supporting multiple systems with one unit of personal computer loader or remotely supporting th



### 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-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.

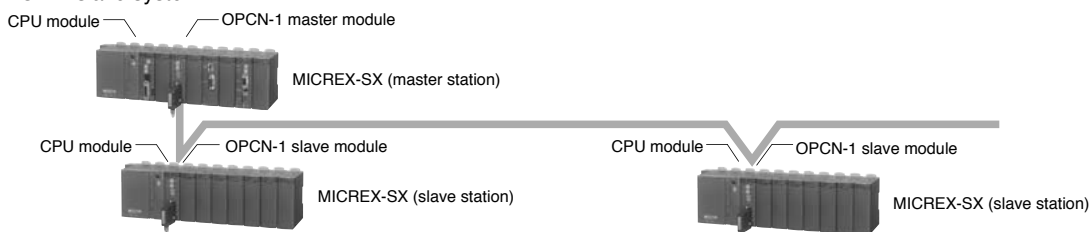
#### ■ Communication specifications

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	<ul style="list-style-type: none"> <li>• Initial setting service</li> <li>• I/O service</li> <li>• Reset service</li> <li>• JEM-TR192 service (data read/write service)</li> </ul>	<ul style="list-style-type: none"> <li>• Initial setting service</li> <li>• I/O service</li> <li>• Reset service</li> <li>• Simultaneous broadcast service</li> </ul>	
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)		

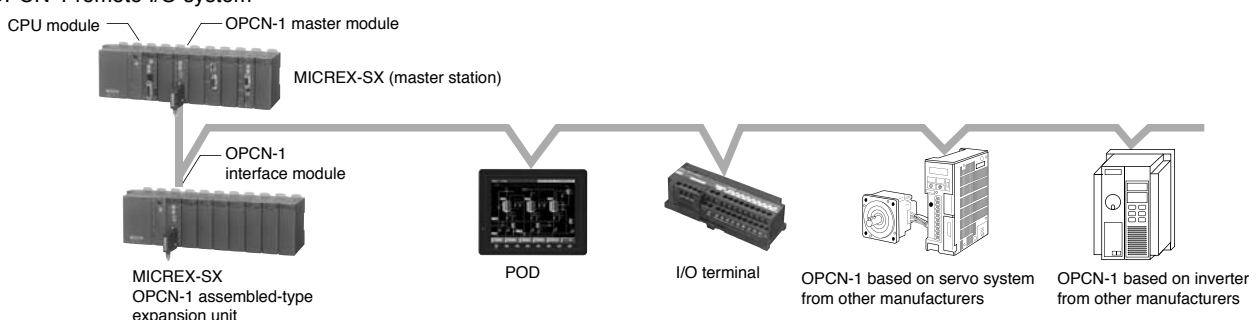
\* 1 The transmission distance applies to T-KPEV-SB 1.25mm<sup>2</sup> from Furukawa Electric Co. Note that the distance may vary with the cable characteristics.

#### ■ System configuration

##### ● OPCN-1 slave system



##### ● OPCN-1 remote I/O system



Programmable Controllers

**MICREX-SX series SPH**

**Communication Module**

**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)



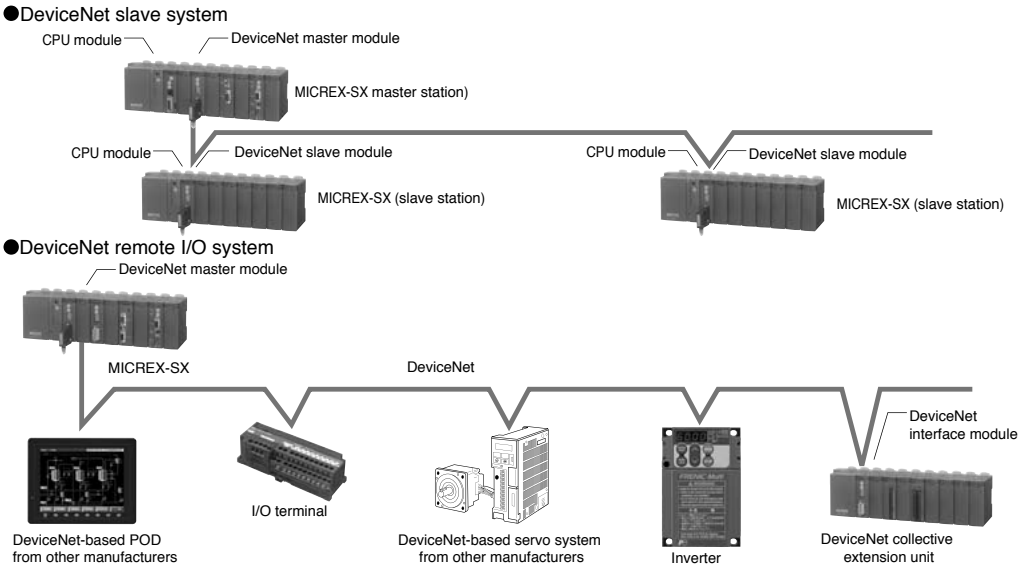
**NP1L-RD1**

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

■ Communication specifications

Item	Specification		
Type	NP1L-DN1	NP1L-RD1	NP1L-DS1
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





# Programmable Controllers

## 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.

#### ■ Communication specifications

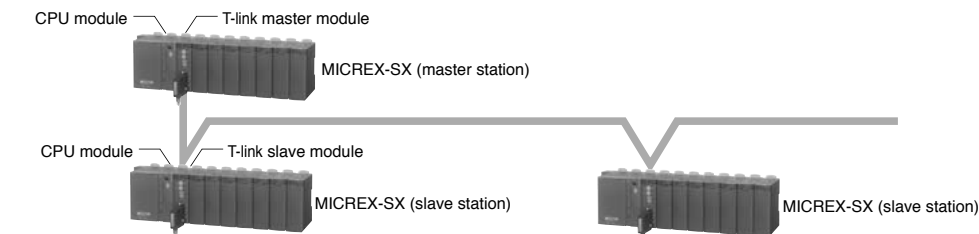
Item	Specification		
Type	<b>NP1L-TL1</b>	<b>NP1L-TS1</b>	<b>NP1L-RT1</b>
No. of SX bus connectable modules	Max. 8 /configuration		—
No. of connectable T-link slaves	32 /master module * 2	—	
Transmission line format	Bus configuration (multi-drop)		
Transmission line (Max. total length) * 1	Bus transmission line: Shielded twisted pair cable Total length: Max. 1000m Optical transmission line: SI/GI quarts cable, multicomponent 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<sup>2</sup> cable manufactured by Furukawa Electric Co. However, note that the distance may occasionally vary due to the cable characteristics.

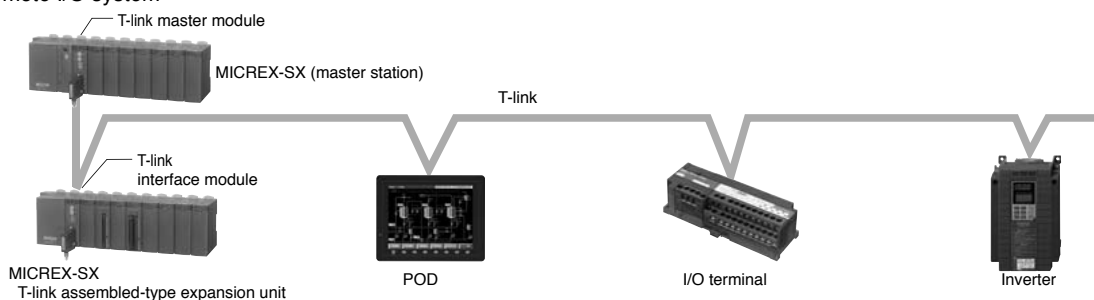
\* 2 Up to 64 units can be connected as slaves when using the T link electric repeater.

#### ■ System configuration

##### ● T-link slave system



##### ● T-link remote I/O system



##### NP1L-RT1

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

#### ■ Optional

Category	Series name		Remarks
Option	MICREX-F	Optical converter	<b>FNC120A-A10</b> Simplified type
			<b>FNC130A-C10</b> Advanced type
		Electrical repeater	<b>FRC200A-C10</b>

Programmable Controllers

**MICREX-SX series SPH**

**Communication Module**

**PROFIBUS-DP Master Module: NP1L-PD1**  
**PROFIBUS-DP Slave Module: NP1L-PS1**

■ 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-PS1**

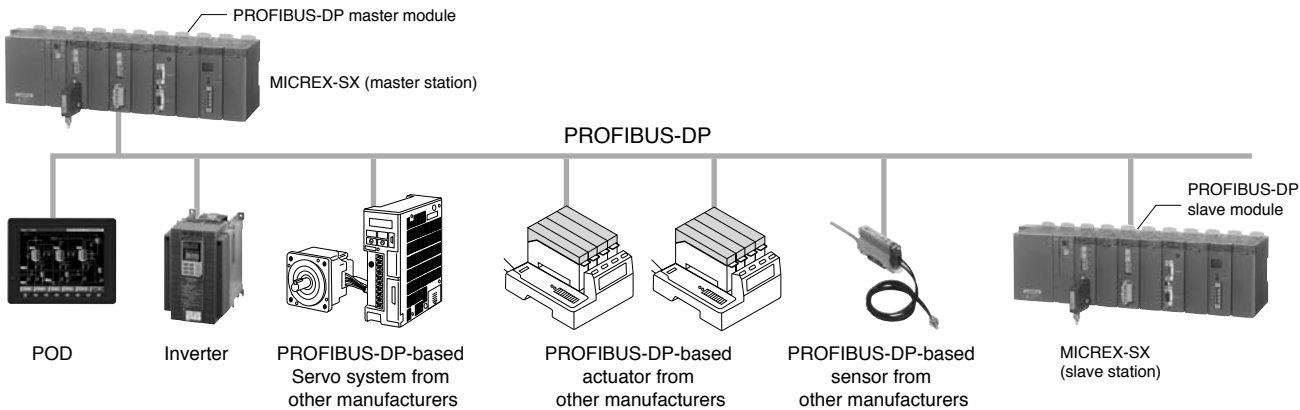
- A data link of input/output data can be established between CPUs via PROFIBUS-DP.
- A maximum of 128 words can be controlled as an input/output total of I/O points.

■ Performance specifications

Item	Specification	
Type	<b>NP1L-PD1</b>	<b>NP1L-PS1</b>
Applicable standards	IEC 66158, EN 50170, DIN 19245	
Communication function	PROFIBUS-DP master (DPM1) function	PROFIBUS-DP slave function
No. of slave station connections	Up to 32 units (up to 126 units with repeaters)	-
Station No. (station address) setup range	0 to 125	0 to 99
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
Cable	PROFIBUS-DP cable (Shielded twist pair cable)	
No. of I/O points	Normal mode: Max. 2048 points (128 words)      *1 Extension mode or I/O Extension mode: Max. 8160 points (510 words)	In total I/O: Max. 128 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



■ 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

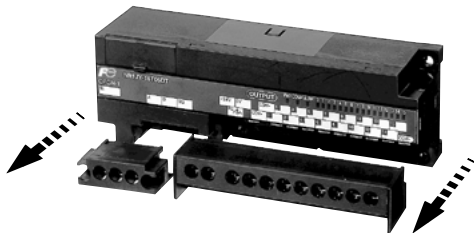
## I/O Terminal : NR1 □ Series : NR2 □ Series

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.

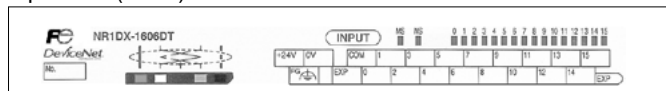
NR1 series



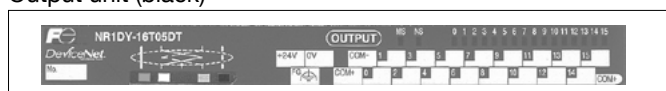
NR2 series



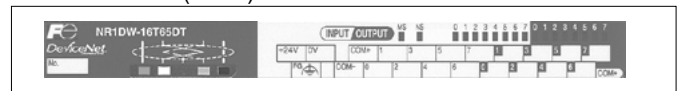
- Preventing mis-wiring  
Uses different colors for the surface sheets of the main unit: input (white), output (black), and I/O mixture (zebra). Applicable networks are also displayed, enabling determination of the unit type at a glance.
- NR1 series  
Input unit (white)



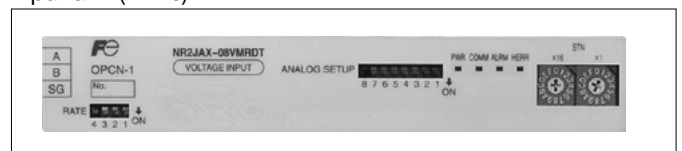
Output unit (black)



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)



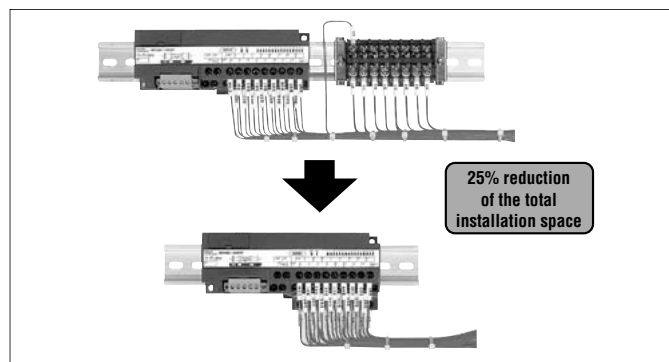
- Contributing to panel design standardization  
The unit frame is unified to a compact size of 148x50x40 (WxHxD: mm), allowing design standardization without worrying about external view modifications by I/O specifications and network specifications. Network modifications can be dealt only with unit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

# Programmable Controllers

## MICREX-SX series SPH

### Communication Module

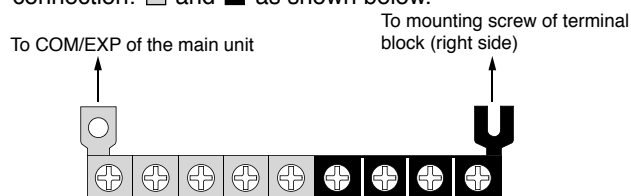
- 25% reduction of total installation space  
“Common extension terminal block” which extends the number of common terminals with one-touch operation is optionally available.  
The use of “common extension terminal block” eliminates the necessity of the separate relay terminal block for common extension,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



#### ■ 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.



#### ■ Models

##### NR1 □ series

Product name	Model (= Product code)	Specification
OPCN-1	NR1□X-1606DT	24V DC, 16-point bi-directional input, removable terminal block
SX bus	NR1□Y-08R07DT	240V AC/110V DC, 8-point Ry output, removable terminal block
T-link	NR1□T-16T05DT	24V DC, 16-point Tr sink output, removable terminal block
DeviceNet *1	NR1□W-16T65DT	24V DC, 8-point source input, 12-24V DC, 8-point Tr sink output, removable terminal block
	NR1SF-HP4DT	Pulse train output comand, 250kHz, 4-axis (2 points / 1-axis)
LonWORKS	NR1LX-1606DT	24V DC, 16-point bi-directional input (4 points can be used as pulse inputs), removable terminal block
	NR1LY-08R07DT	240V AC/110V DC, 8-point Ry output, removable terminal block
	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	<div>Operating ambient temperature</div> <div>Storage temperature</div> <div>Relative humidity</div> <div>Dust</div> <div>Contamination</div> <div>Corrosion resistance</div> <div>Operating altitude/air pressure</div>
Mechanical operating condition	<div>Resistance to vibration</div> <div>Resistance to shock</div>
Electrical operating condition	<div>Electrostatic discharge</div> <div>Radiative radio frequency electromagnetic field</div> <div>Fast transient burst wave</div> <div>Conductive radio frequency interference</div> <div>Square wave noise</div>
Installation and wiring conditions	<div>Structure</div> <div>Screw fastening torque</div> <div>Cooling system</div>

\* Acquisition of UL508 is scheduled for the NR2 series.

# Programmable Controllers

## MICREX-SX series SPH

### Communication Module

#### • Power supply specifications

Item	Specification		
Unit type	NR1□□	NR2D□(digital I/O)	NR2JA□(analog I/O)
Power supply method	External power supply		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, (LonWorks-based product: 20.4 to 27.6V DC)	11 to 25V DC	20.4 to 26.4V DC
Dropout tolerance	1ms (at 21.6V), LonWorks-based product (at 20.4V)	1ms (at 20.4V)	1ms (at 20.4V)
Inrush current	5A, 1ms or less (LonWorks-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	NR1□X-1606DT: 1.4W or less	NR2DX-3206DT: 2.5W or less
	SX bus	NR1□Y-08R07DT: 3W or less	NR2DY-32T05DT: 2.5W or less
	T-link	NR1□X-16T05DT: 1.4W or less	NR2DW-32T65DT: 2.5W or less
	DeviceNet	NR1□X-16T65DT: 1.4W or less	NR2DY-16R07DT: 4.5W or less
		NR1SF-HP4DT: 3.5W or less	
	LonWorks	NR1LX-1606DT: 1.6W or less	NR2JAX-08VMRDT: 4.8W or less
		NR1LY-08R07DT: 3W or less	NR2JAX-08IMRDT: 4.8W or less
		NR1LW-11R80DT: 1.6W 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	OPCN-1, DeviceNet: 3ms/3ms
ON/OFF filtering time	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)	



# Programmable Controllers

## MICREX-SX series SPH

### Communication Module

#### (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	3ms/3ms
ON/OFF filtering time	
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 communication terminals
Insulation resistance	10MΩ or more with a 500V DC megger Between output terminals and communication terminals

# Programmable Controllers

## MICREX-SX series SPH

### Communication Module

#### (5) Analog I/O specification

##### • Analog voltage input type

Item	Specification
Type	<b>NR2JAX-08VMDT</b>
No. of input points	8 points
Analog input range	0 to 5V      1 to 5V      0 to 10V      -10 to +10V
Input impedance	1M $\Omega$
Max. input voltage	$\pm 15V$
Input filter	Approx. 100 $\mu s$ 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	$\pm 0.1\%$ of F.S.R (Ta=23°C $\pm 5^\circ C$ ) $\pm 0.3\%$ 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	10M $\Omega$ 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	<b>NR2JAX-08IMRDT</b>
No. of input points	8 points
Analog input range	$\pm 20mA$ 0 to 20mA      4 to 20mA
Input impedance	250 $\Omega$
Max. input voltage	$\pm 30mA$
Input filter	Approx. 100 $\mu s$ or less (Hardware: Primary delay time constant)
Resolution	2.5 $\mu A$
Digital value (INT type)	$\pm 8000$ 0 to 8000
Measurement accuracy	$\pm 0.1\%$ of F.S.R (Ta=23°C $\pm 5^\circ C$ ) $\pm 0.4\%$ 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	10M $\Omega$ 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

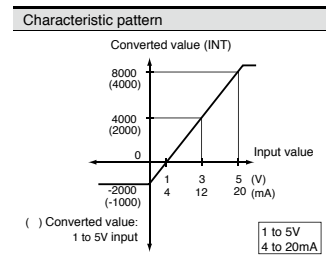
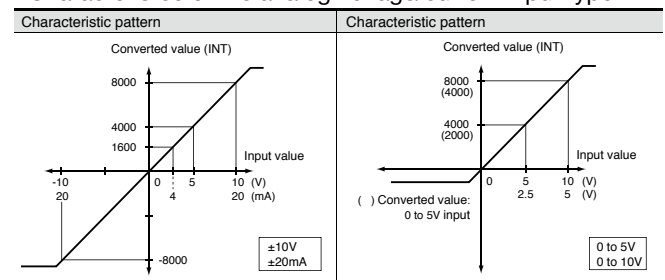
##### • Analog voltage output type

Item	Specification
Type	<b>NR2JAY-04VMDT</b>
No. of input points	4 points
Analog output range	0 to 5V      1 to 5V      0 to 10V      -10 to +10V
Load impedance	1k $\Omega$ or more      1k $\Omega$ or more      2k $\Omega$ or more      2k $\Omega$ 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	$\pm 0.1\%$ of F.S.R (Ta=23°C $\pm 5^\circ C$ ) $\pm 0.3\%$ 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	10M $\Omega$ 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

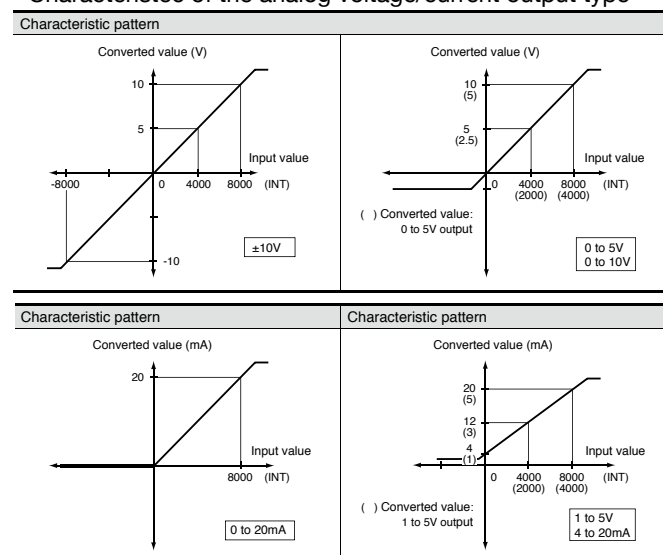
##### • Analog current output type

Item	Specification
Type	<b>NR2JAY-04IMRDT</b>
No. of input points	4 points
Analog output range	0 to 20mA      4 to 20mA
Load impedance	500 $\Omega$ or less
Resolution	2.5 $\mu A$
Digital value (INT type)	0 to 8000
Measurement accuracy	$\pm 0.2\%$ of F.S.R (Ta=23°C $\pm 5^\circ C$ ) $\pm 0.4\%$ 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)	300 $\mu A$ -p or less
Output ripple	100 $\mu A$ -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	10M $\Omega$ 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

##### • Characteristic of the analog voltage/current input type



##### • Characteristic of the analog voltage/current output type



# Programmable Controllers

## MICREX-SX series SPH

### Communication Module

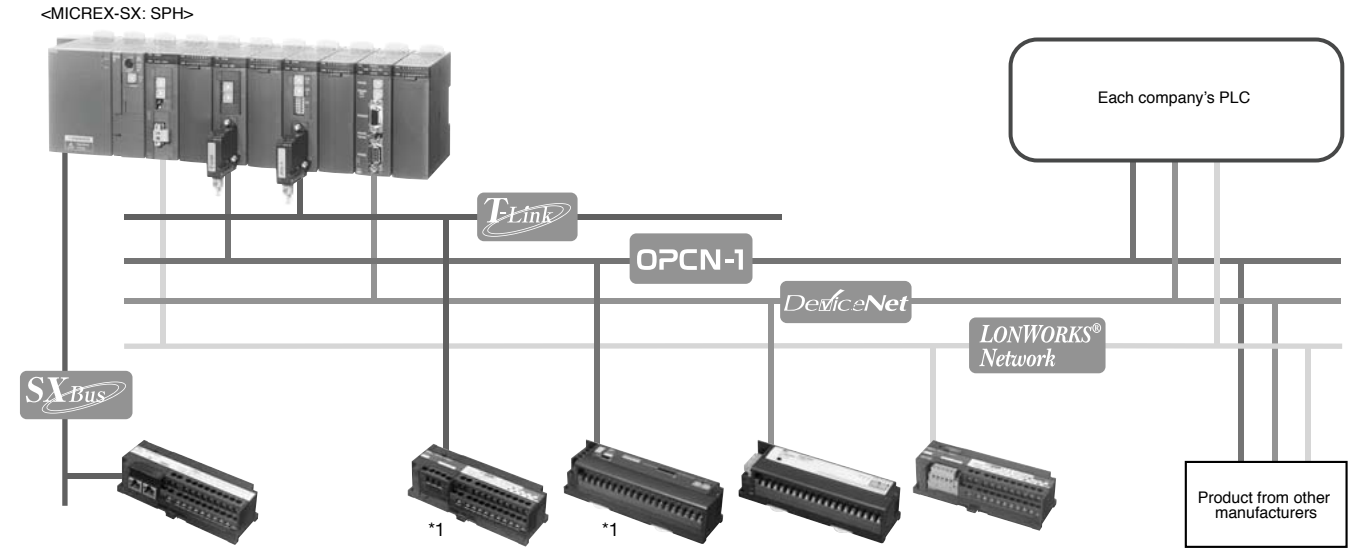
• Communication specifications

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



\*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

#### ■ Features

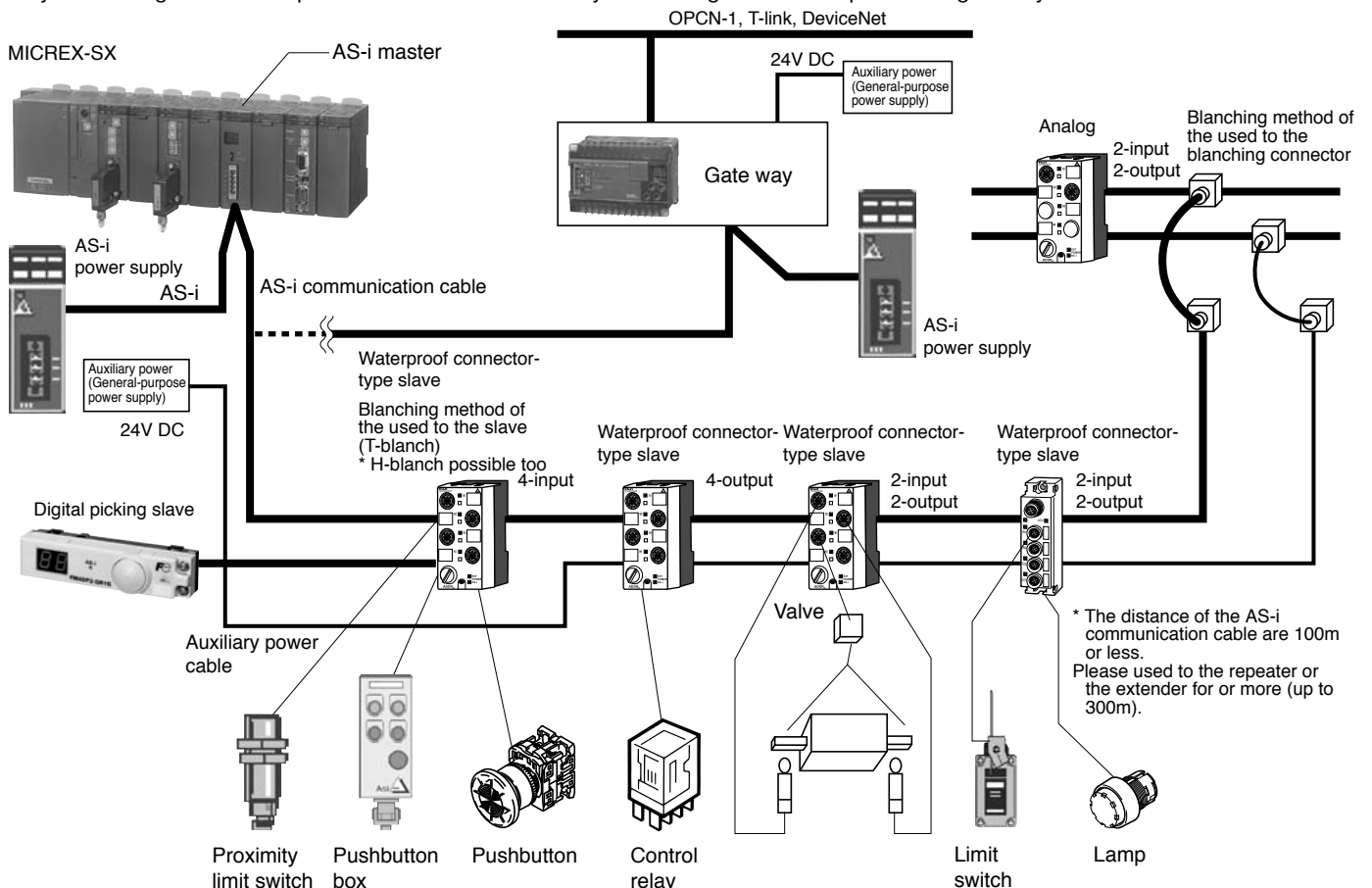
- The **NP1L-AS2** is based on the AS-i communication protocol Version 2.1.
- Up to 12 units can be connected in a single system configuration.
- Can be connected to diverse types of actuators and sensors conforming to the AS-i Standards.
- Line length: Total 100m
- Up to 62 slave stations can be connected 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



# Programmable Controllers **MICREX-SX** series SPH Communication Module

## S-LINK Master Module: NP1L-SL1

### Features

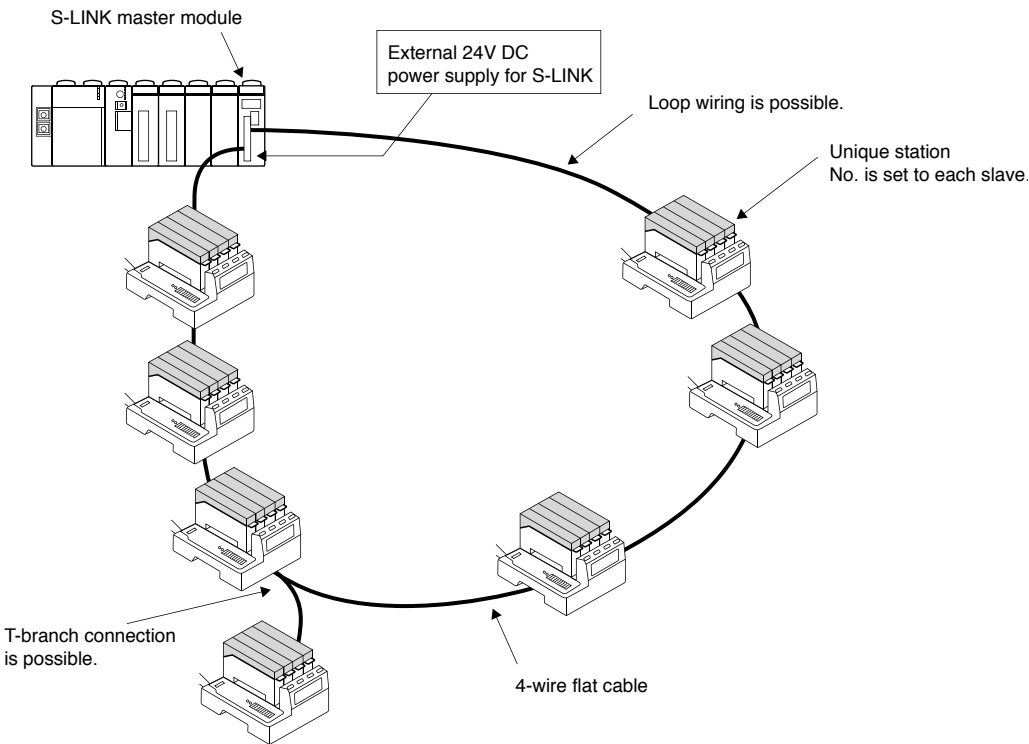
- Connected to the S-LINK (bit) level serial transmission provided by SUNX.
- 128-point I/O control can be performed for each master station. There is no limitation on the number of master connections.



### 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





## 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.

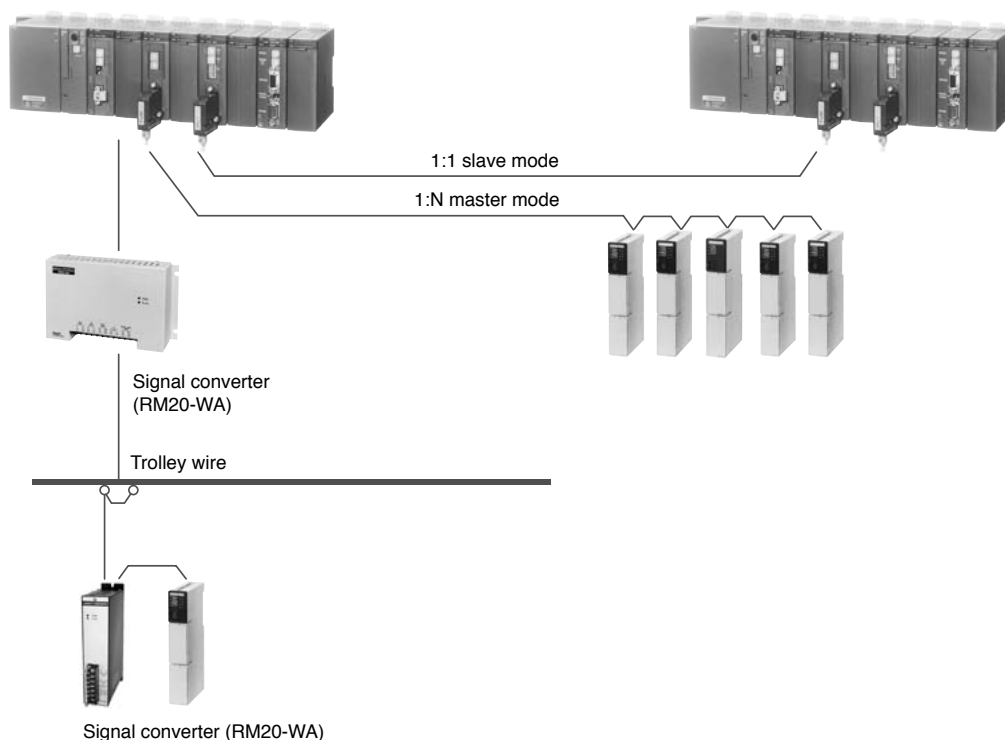


**NP1L-RM1**  
GKDD06-002

### ■ 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 <sup>2</sup> : 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



Programmable Controllers

**MICREX-SX series SPH**

**Communication Module**

**SX Bus Optical Link Module: NP1L-OL1**  
**SX Bus Optical Converter Unit: NP2L-OE1**

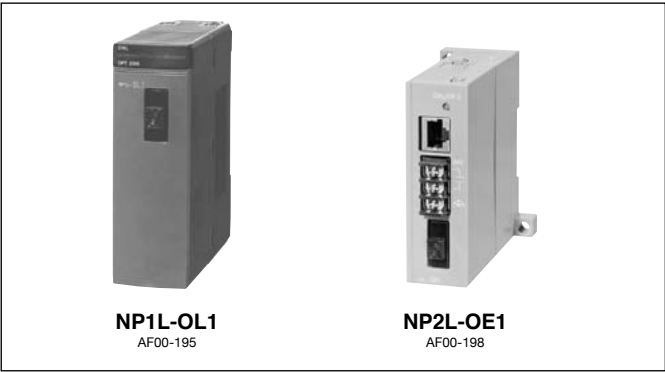
■ **Features**

**NP1L-OL1**

- Mounted on the base board 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).

**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).



■ **Transmission specifications**

Item		Specification	
Type		NP1L-OL1	NP2L-OE1
No. of connectable modules		Max. 64 /configuration (Total No. of NP1L-OL1 and NP2L-OE1)	
Optical fibre	Type	PCF (Polymer clad fiber), GI type	
	Core/Clad diameter	Core: 200μm Clad: 230μm	
	Min. bending radius * 1	50mm	
	Optical connector	Type: F07	
Transmission distance * 1		Between stations: Max. 800m (Total extension distance 25.6km)	
Internal current consumption		24V DC 54mA or less	
Power supply terminal (External power supply)	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. 135g	Approx. 155g

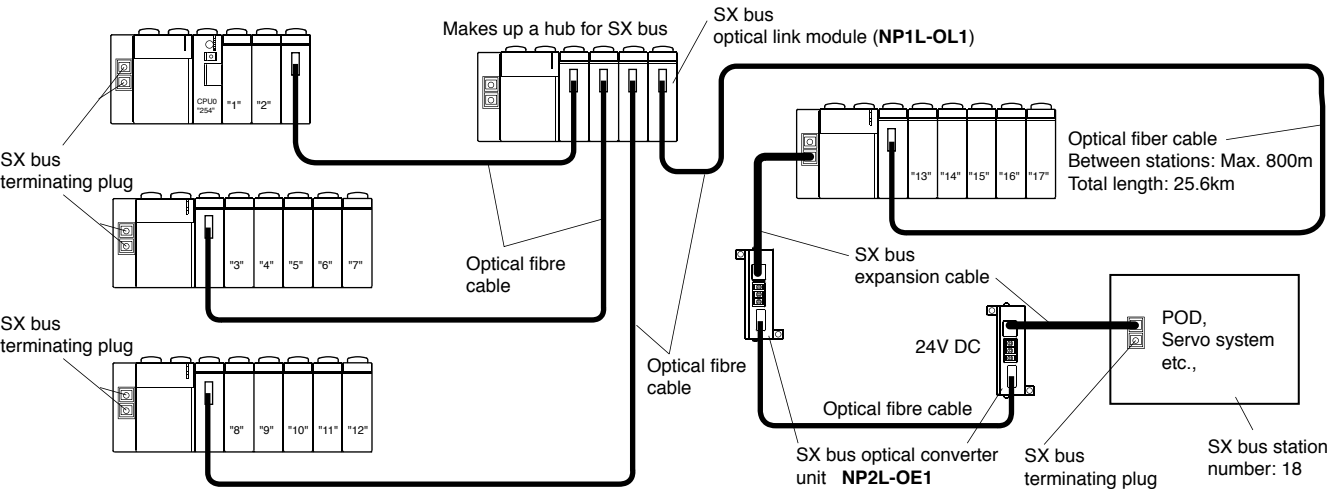
\* 1 Minimum bending radius depends on what type of optical-fibre cable is used. Above table shows the values when the HG-20/08 from Sumitomo Electric Industries, Ltd. is used.

\* 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**



### SX Bus Electric Repeater Unit: NP2L-RP1

#### ■ Features

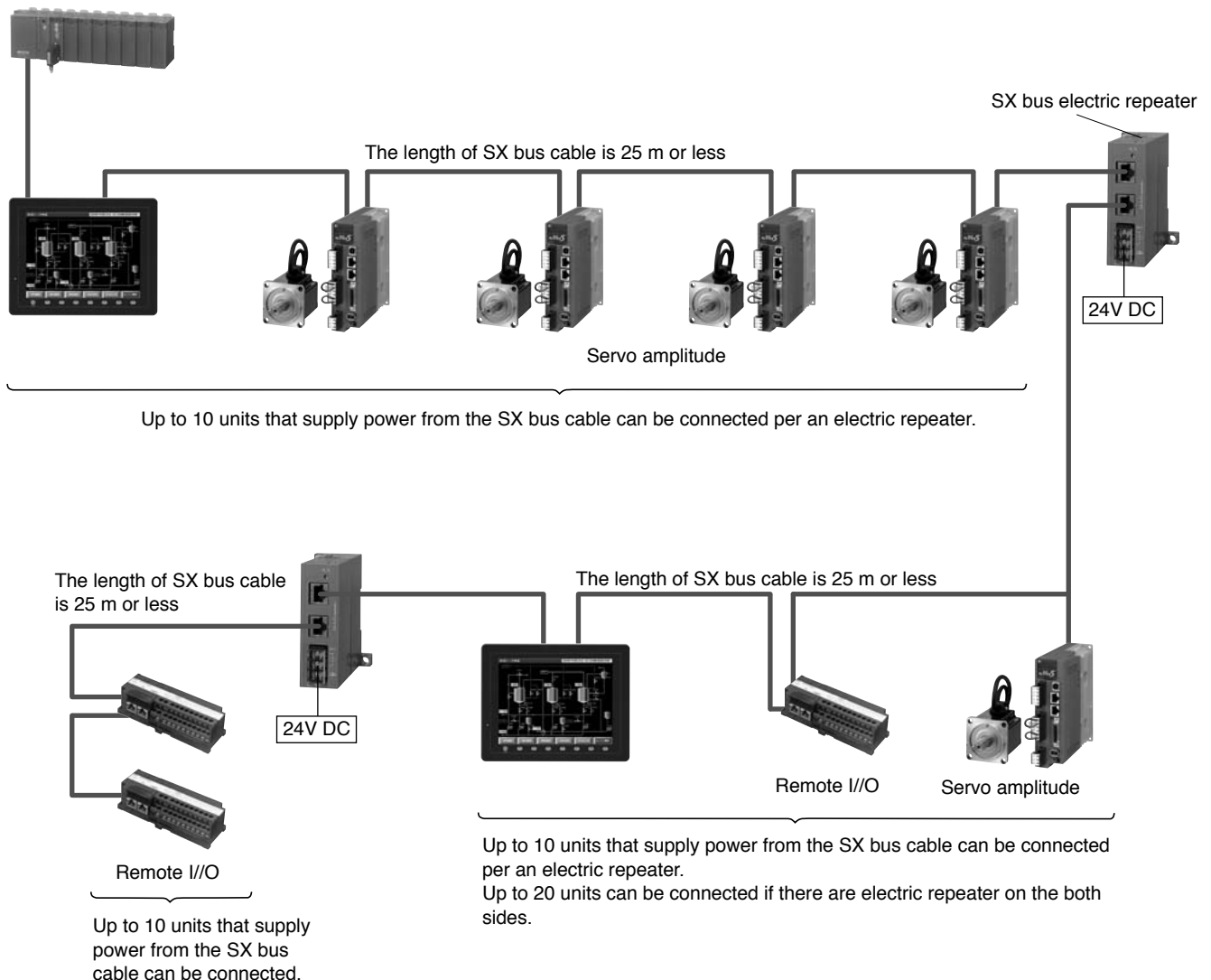
- SX bus connection using another 25m electric cable is enabled by correcting the signal waveforms of the SX bus electric cable.
- Up to three units can be used in one SX system, increasing the total extension length of the SX bus electric cable to a maximum of 100m.



#### ■ 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



# Programmable Controllers

## MICREX-SX series SPH

### Function Module

#### 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.



##### ■ 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.

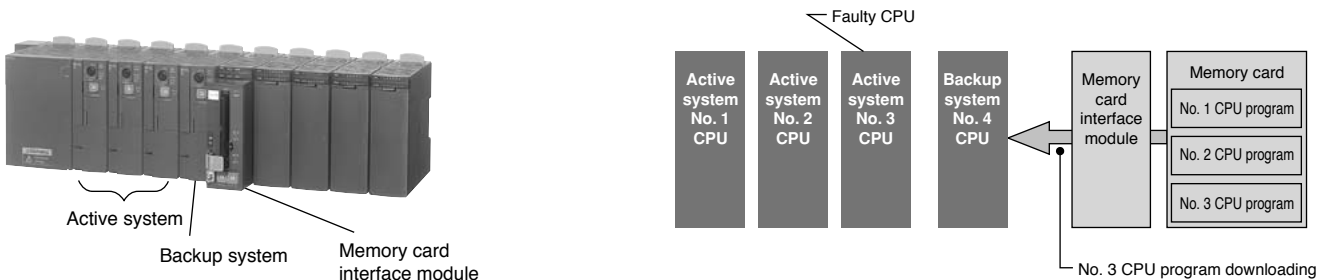
##### ■ Memory card selection reference

Item	Specification (Example)	Application restrictions and conditions	Remarks
Power supply voltage	5 ±0.25V DC	Available if the product is specified for 5V	
Current consumption	90mA or less at 5V DC	<b>NP1F-MM1</b> : 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.	Give priority to the memory card specification range rather than the operating range of this module.
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/512K1024K2048K4096Kbytes): Made by FUJISOKU, LTD.

##### ■ System configuration



### 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).



#### ■ Specifications

Item	Specification
Type	<b>NP1F-DMY</b>
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



# Programmable Controllers **MICREX-SX** series SPH Function Module

## Multiuse Communication Module: NP1F-MU1

- Features

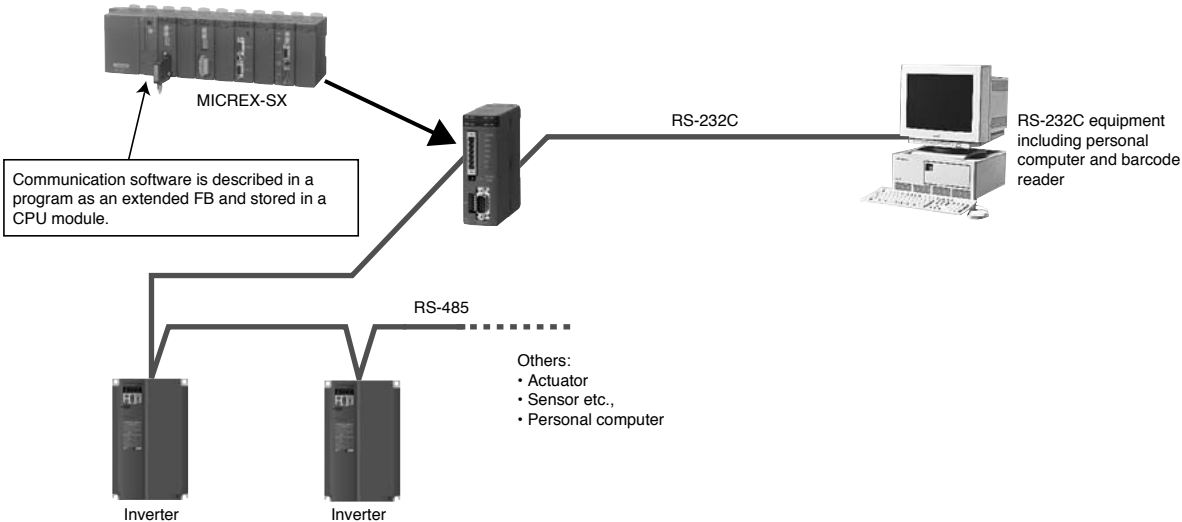
  - High-speed communication (RS-485: max. 460.8 kbps) with actuators and sensors can be implemented.
  - Optimal communication with devices of various manufacturers can be implemented by freely creating a communication protocol. Protocols can be created by modifying the sample FB.
  - Microcomputer circuit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



## Performance specifications

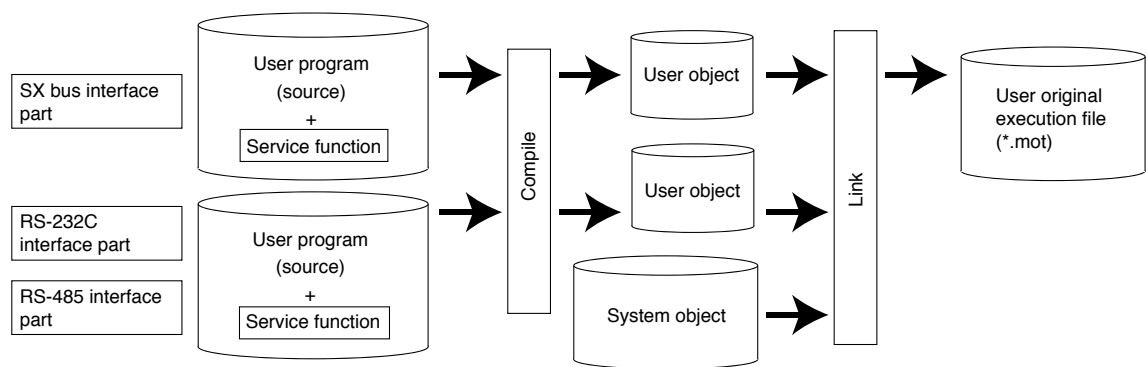
Item	Specification	
Type	<b>NP1F-MU1</b>	
Port	RS-232C	RS-485
No. of ports	1 channel	1 channel
Transmission method	Half-duplex communication method	
Synchronisation method	Start-stop synchronous transmission	
Transmission speed	300/600/1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200bps	300/600/1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200/230,400/460,800bps
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



## 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.



## 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

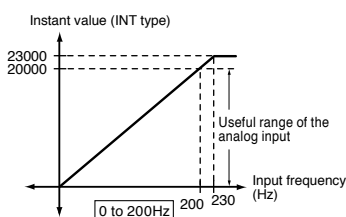
Item		Specification
Item		<b>NP1F-PI4</b>
No. of input channels		4 channels
Connected sensor inputs		No-voltage contact pulse, 2-wired open-collector pulse, 3-wired open-collector pulse, 2-wired voltage pulse, 3-wired voltage pulse, 2-wired current pulse
Input frequency		0 to 10kHz
Input wave form		Nearly 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 Contact 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.



# Programmable Controllers

## MICREX-SX series SPH

### Positioning Control Module

#### 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



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

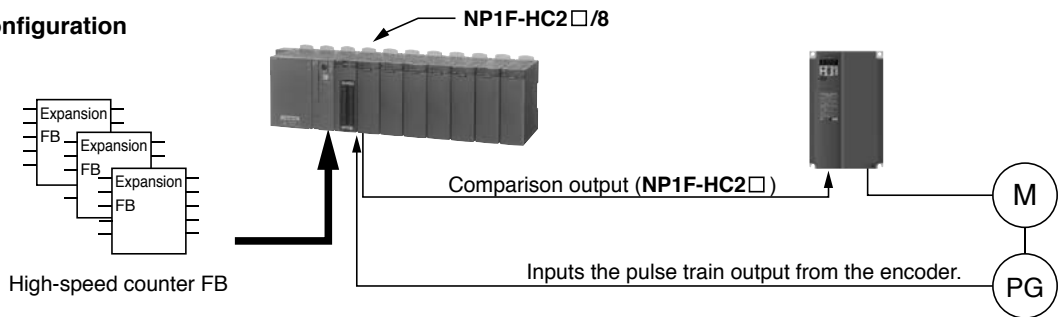
##### ■ Performance specifications

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 <b>NP1F-HC2</b> only)			
	Input voltage	5V DC	5/12/24V DC		5V DC
Counter	Function	Ring counter function, reset function, gate function, comparison function ( <b>NP1F-HC2</b> ), phase Z detection ( <b>NP1F-HC2</b> )			
	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



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

### ■ Features

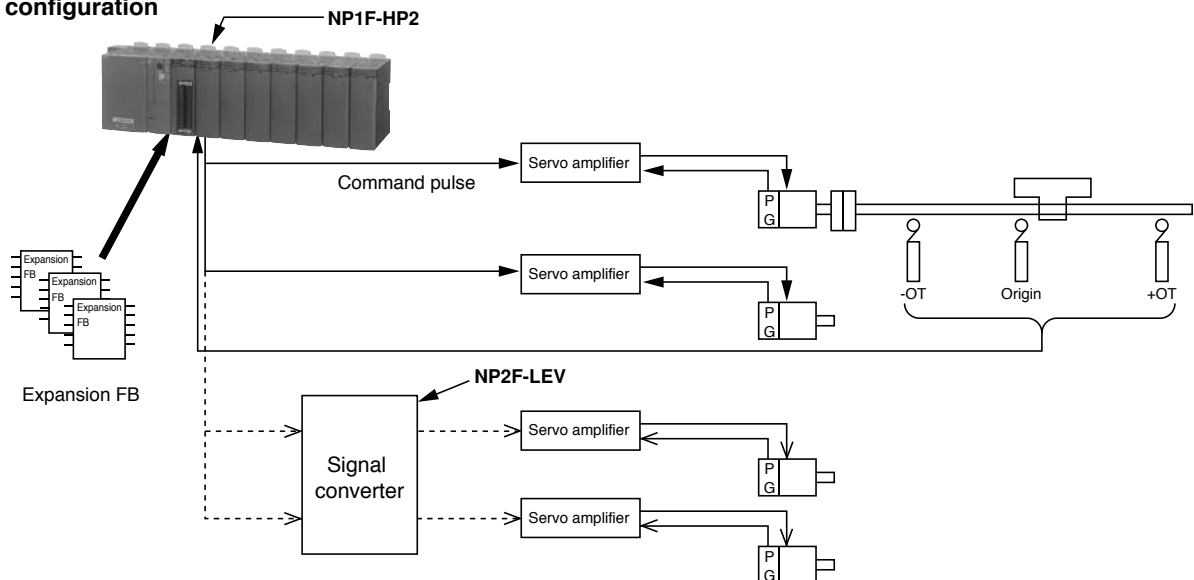
- Combined with the servo amplifier motor of the pulse train command input type or the stepping motor driver allows high-precision positioning.
- Use of an expansion FB facilitates embedding necessary functions including axis-independent single-function positioning to multi-axis simultaneous start positioning (pseudo linear interpolation).
- Use of the signal converter (**NP2F-LEV**) enables connecting the differential input type equipment.



### ■ 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 <sup>32</sup> -1 pulse /command
Command pulse	Command frequency
	Frequency resolution
	Output type
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



### ■ Signal converter (NP2F-LEV) specifications

Item	Specification
No. of control axes	2 axes (4 channels)
Input signal	Input frequency
	Input type
Output signal	Output frequency
	Output type
External power supply	24V DC, 35mA
Mass	Approx. 130g

# Programmable Controllers

## MICREX-SX series SPH

### Positioning Control Module

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

##### ■ Features

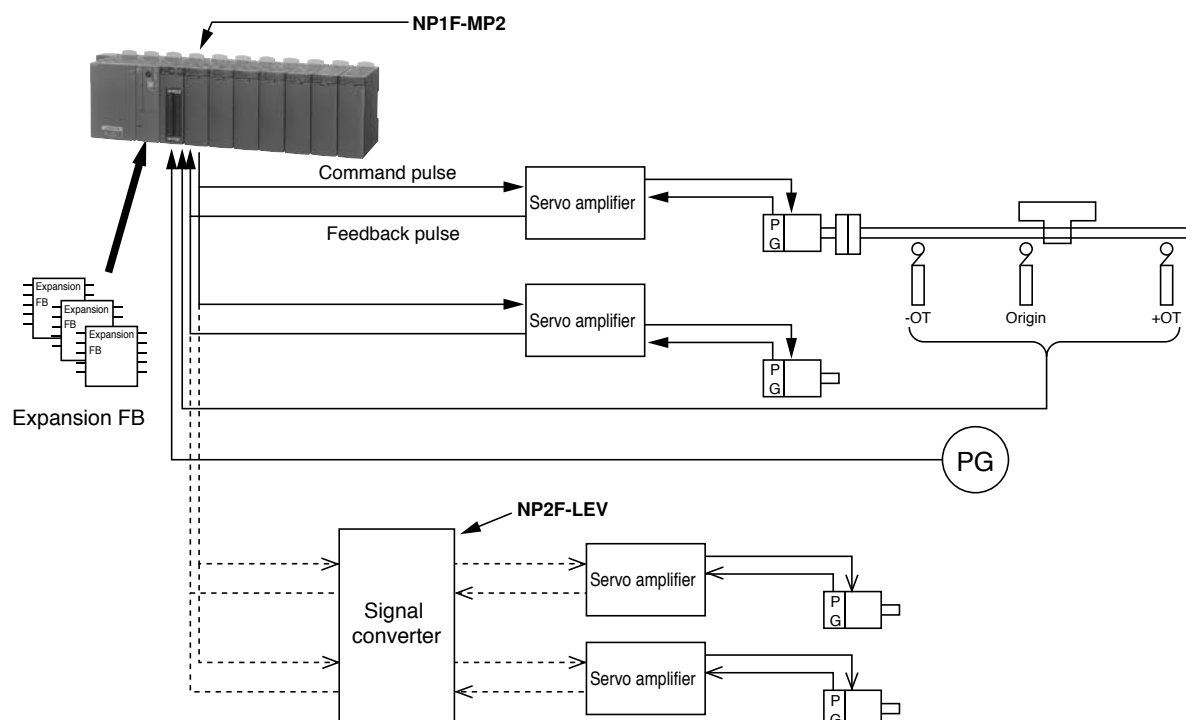
- Combined with the servo amplifier motor of the pulse train command input type or the stepping motor driver allows high-precision positioning.
- Use of an expansion FB facilitates embedding necessary functions including axis-independent single-function positioning to multi-axis simultaneous start positioning (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.
- Use of the signal converter (NP2F-LEV) enables connecting differential input type equipment.



##### ■ 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





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

#### ■ Features

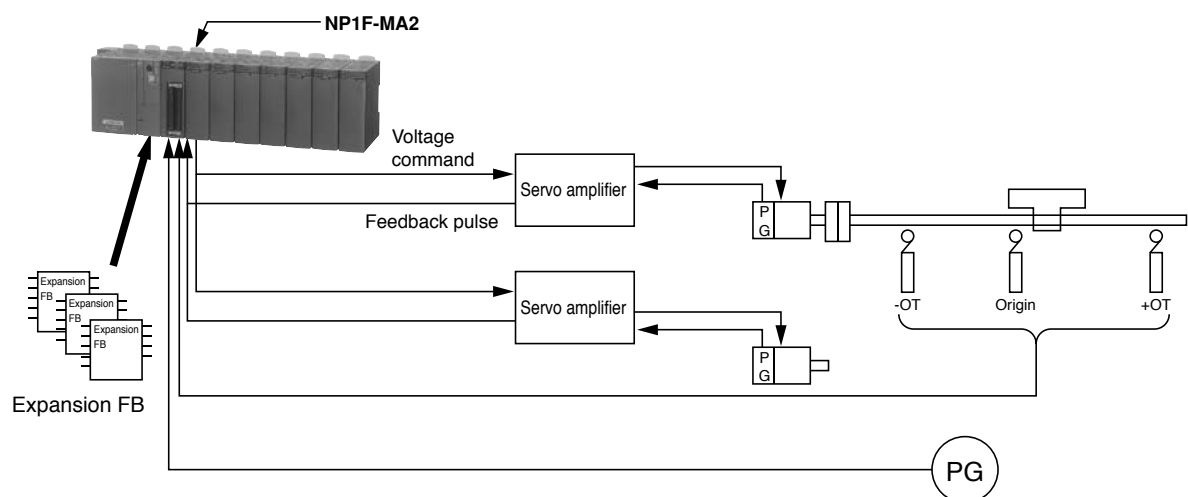
- Combined with the servo amplifier motor of the pulse train command input type or the stepping motor driver allows high-precision positioning.
- Use of an expansion FB facilitates embedding necessary functions including axis-independent single-function positioning to multi-axis simultaneous start positioning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



#### ■ 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 $\pm 10.24V$ )
	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



Programmable Controllers

**MICREX-SX series SPH**

**Positioning Control Module**

**4-axis Pulse Train Output Positioning Control Unit:**

**NR1SF-HP4DT**

■ **Features**

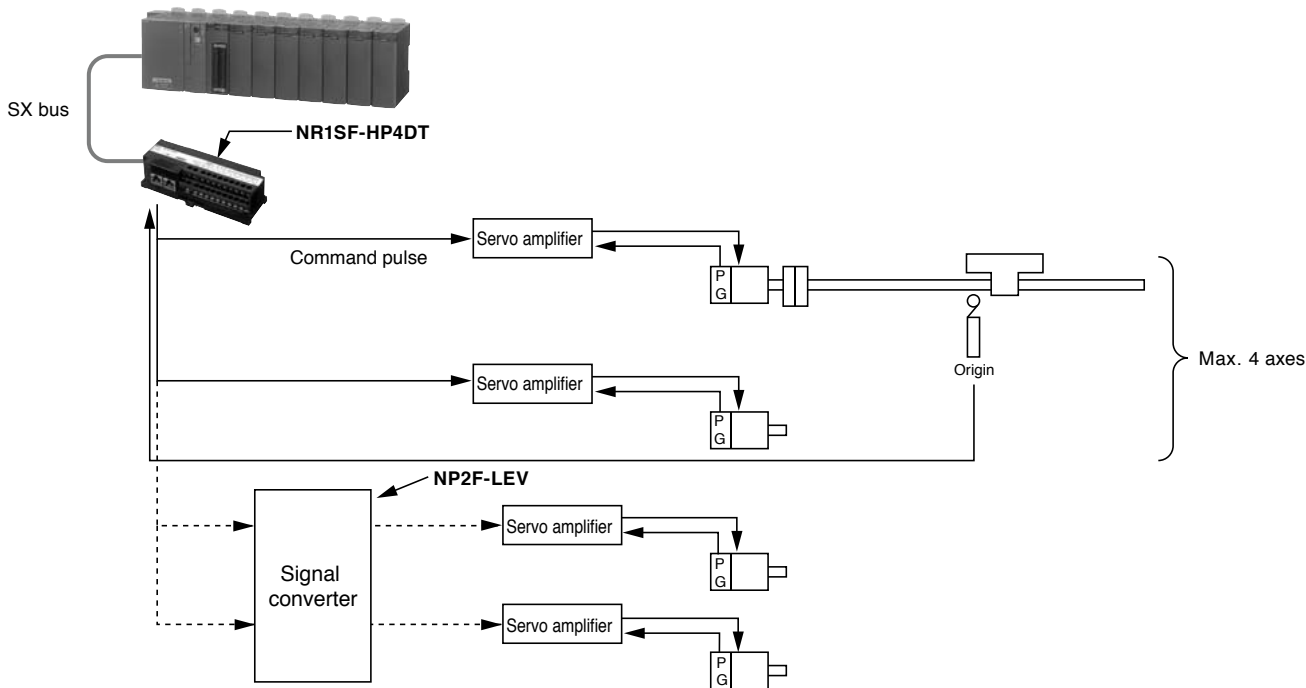
- Combination of this module and driver for servo amplifier and motor of pulse sequence command input type or driver for stepping motor allows you to carry out highly precise positioning.
- Minimum program for data setting and command operation that does not need an expansion FB allows you to control the positioning.
- Using the signal converter (NP2F-LEV) allows you to connect this module to devices of differential input type.



■ **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: Sealed 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**



Programmable Controllers  
**MICREX-SX** series SPH  
Positioning Control Module

■ Positioning Module Function List

No.	Function	Description	NP1F-HP2	NP1F-MP2		NP1F-MA2		NR1SF-HP4DT
				Pulse generation	Position command	Pulse generation	Position control	
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.	○	○	○	○	○	○

# Programmable Controllers

## **MICREX-SX** series SPH

### Functional Extension FB Software Package

#### Functional Extension FB Software Package

##### ■ 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 package:

###### **NP4N-TRBFV3 (Expert (D300win) adapted)**

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 packages 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 package:

###### **NP4N-PIDFV3 (Expert (D300win) adapted)**

###### **NP4N-PIDFST (Standard adapted)**

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

# Programmable Controllers MICREX-SX series SPH Programming Support Tool Expert (D300win)

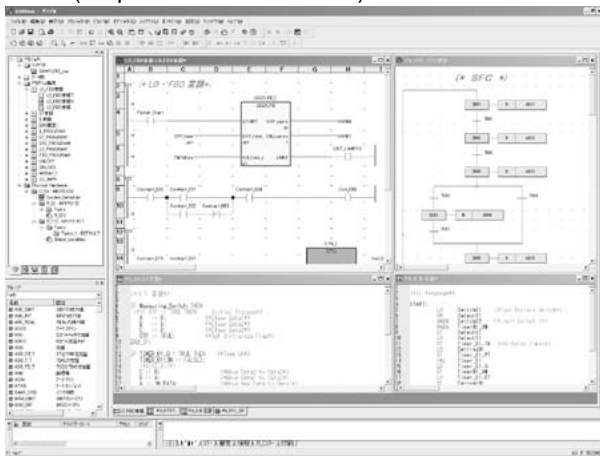
## Programming Support Tool Programming Support Tool SX-Programmer Expert (D300win): NP4H-SEDBV3

### ■ 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.

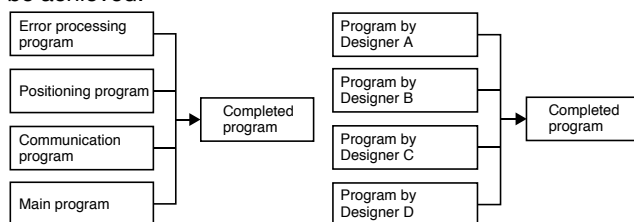
### • Supported representations

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



### • Structured programming

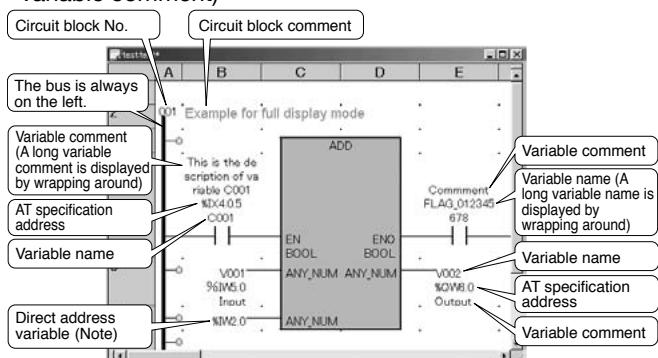
Programming in units of POU or worksheets allows the use of the structured design method by which a program is created by dividing it by functionality or process. This method enables multiple designers to divide the program design among them so that substantial reduction in the program creation time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

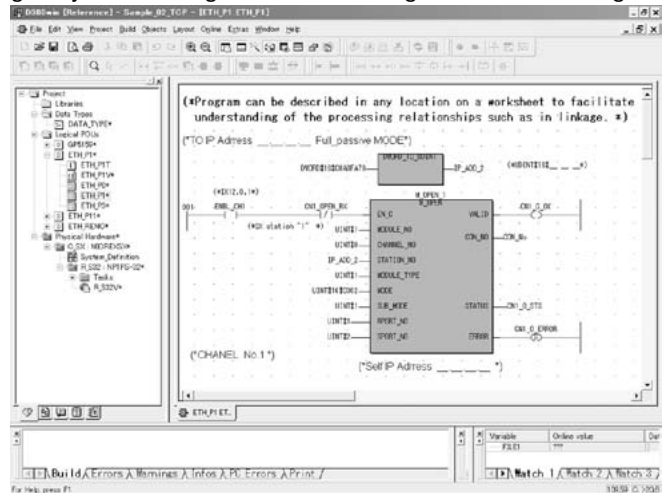


Note: If a direct address variable (= no variable name) is used, no variable comment is displayed, even if it is registered.

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

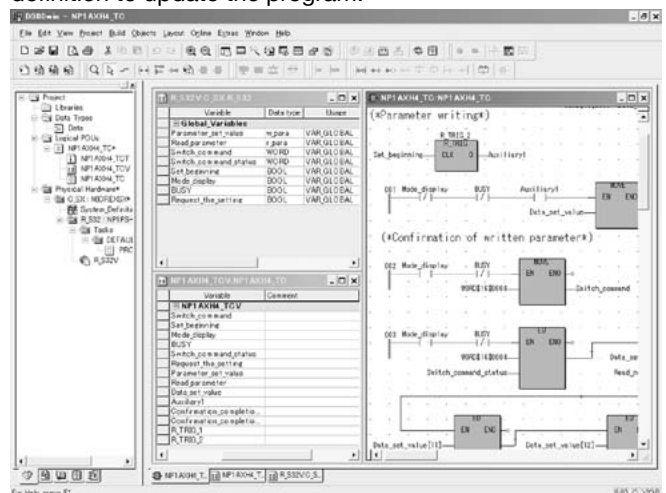
Programs can be described in any location on a worksheet to facilitate understanding of the processing relationships such as in linkage between the interlock condition and the sequence processing section/computing section, allowing efficient programming.

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.





# Programmable Controllers

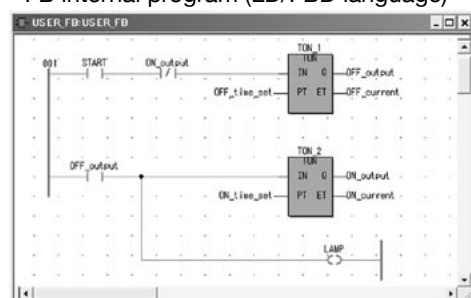
## MICREX-SX series SPH

### Programming Support Tool Expert (D300win)

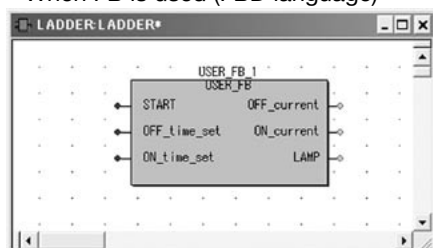
#### • Integrates user-original circuits into an FB

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)

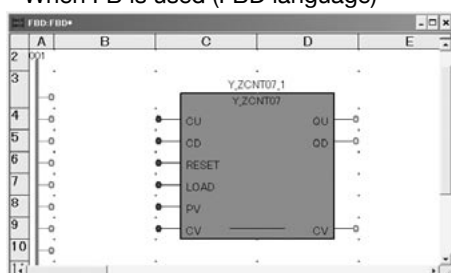
```

1 Y_ZCNT07D_Y_ZCNT07
2 IF CU
3 THEN IF NOT(TRIG_U)
4 THEN IF CV < DINT#2147483647
5 THEN CV := CV + DINT#1;
6 QX := QX+1;
7 END_IF;
8 TRIG_U := TRUE;
9 END_IF;
10 ELSE TRIG_U := FALSE;
11 END_IF;
12 IF CD
13 THEN IF NOT(TRIG_D)
14 THEN IF CV > DINT#-2147483648
15 THEN CV := CV - DINT#1; END_IF;
16 TRIG_D := TRUE;
17 END_IF;
18 ELSE TRIG_D := FALSE;
19 END_IF;
20 END_IF;
21 IF RESET
22 THEN CV := DINT#0; END_IF;
23 IF LOAD
24 THEN CV := PV; END_IF;
25 IF CV <= DINT#0
26 THEN GO := TRUE;
27 ELSE GO := FALSE;
28 END_IF;
29 IF CV >= PV
30 THEN GO := TRUE;
31 ELSE GO := FALSE;
32 END_IF;
33

```



#### • When FB is used (FBD language)



#### • Simulation function

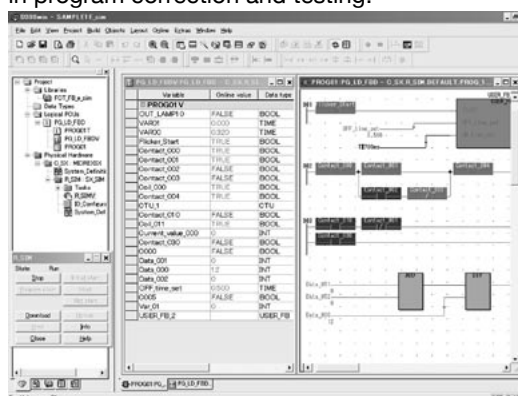
This tool enables program logic test using the software PLC function for simulation built in Expert (D300win), without using the actual unit.

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.



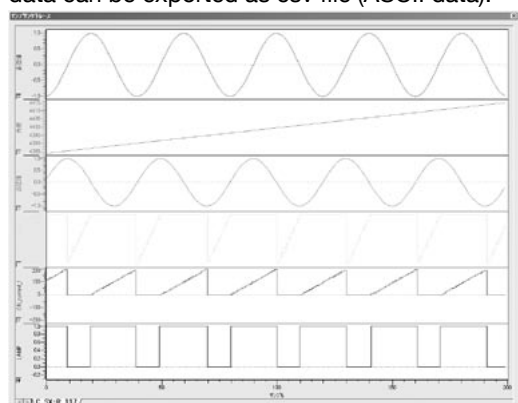
#### • Error & jump check function

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).



# Programmable Controllers MICREX-SX series SPH 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.

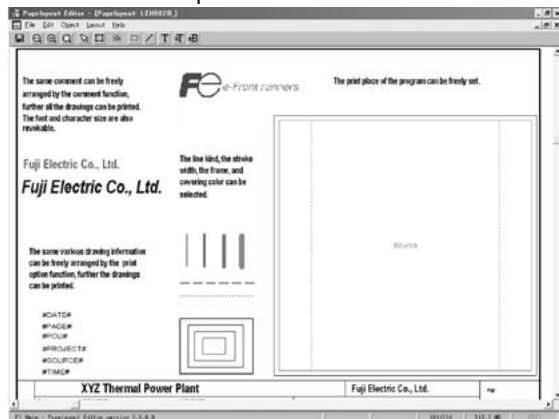
**Frame creation:** Program list can be printed with frames. The frames can be freely designed facilitating reproduction of a conventionally used drawing sheet.

**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.

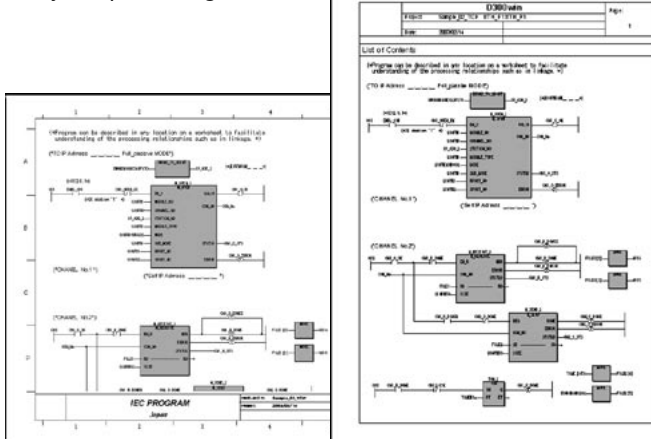
**Page:** Page number can be placed in a specified position within the frame.

**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.

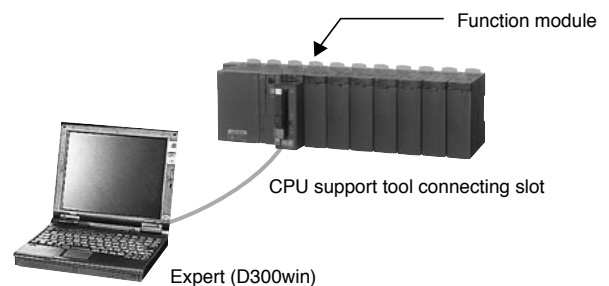
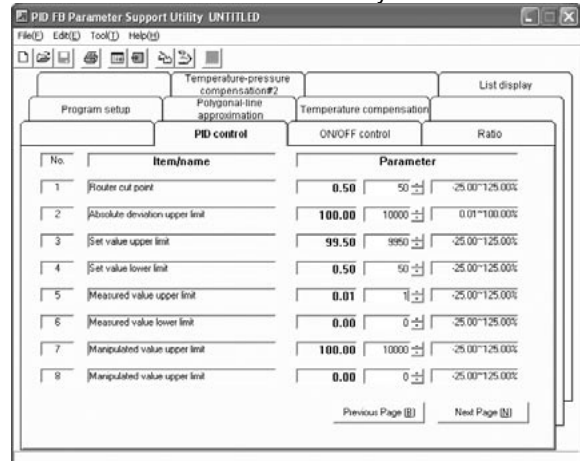
## • Function module support

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.



## • 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.



Programmable Controllers

**MICREX-SX series SPH**

**Programming Support Tool Expert (D300win)**

• **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 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 or SPH2000. Also, data can be written into/read from the user ROM card.

• **SPB SX mode support**

Programming in Expert (D300win) is enabled by rewriting firmware of SPB (small block PLC) using the SPB system software utility attached to the Expert (D300win) software package. For details of the SPB, refer to the chapter of “Related Devices” or the SPB dedicated catalog (No. LEH984).

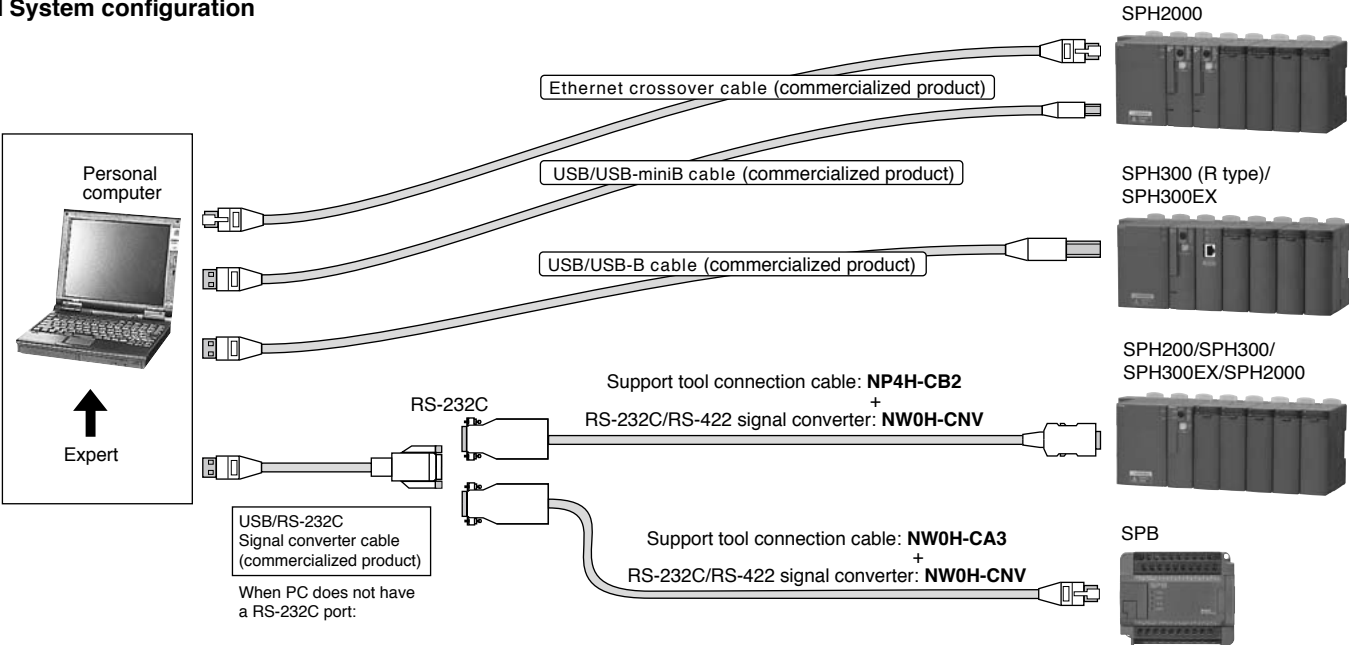
• **Password function**

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)
	P/PE-link Possible
	SX bus Possible
	FL-net Possible
OS	Windows2000/XP/NT4.0
Portability	Depends on commercial mobile personal computer.
Environmental durability	Depends on environmental conditions of commercial personal computer.

■ **System configuration**



# Programmable Controllers MICREX-SX series SPH Programming Support Tool Standard

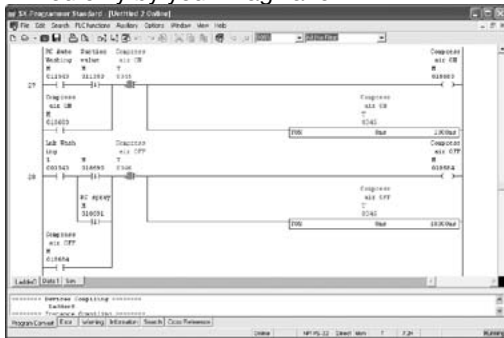
## Programming Support Tool Programming Support Tool SX-Programmer Standard: NP4H-SWN

### ■ 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 (JIS B 3503)

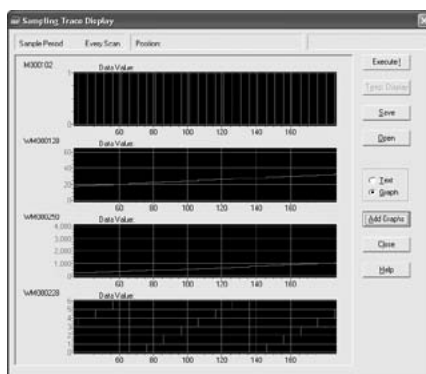
Program representations support the LD language, which is most standard. The ST and FBD programming languages are also supported. Programming in units of POU in which the structured design method is applicable can be performed.

#### • Full-fledged programming environment

- Programming allows all addresses to be specified, and allows off-line editing (edit and continue).
- Support the Structured design and the parting that used to the FB (Function block).
- Function block (FB) callers are expressed as block-format FBD, enabling you to identify in and out parameters at a glance (SX mode).

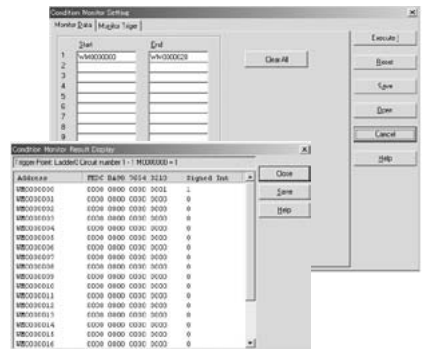


- Debugging features  
Powerful debugging facilities are provided, including step execution, conditional monitoring, sampling traces, and fault analysis.



#### • Conditional monitor function

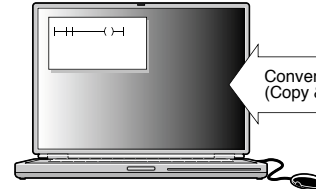
This is a function to read and display data collected by PLC when conditions are met. This function enables high-precision analysis.



#### • Leverage your program assets

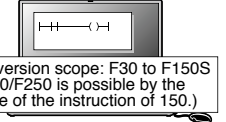
In SX mode, you can copy and paste your programs from our FLEX-PC series PLCs. On-line help describes alternate methods for circuits and instructions that cannot be pasted in. In N mode, use your program and comment files as-is.

##### SX-Programmer Standard



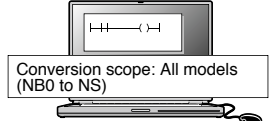
Conversion  
(Copy & paste)

##### MICREX-F loader



Conversion scope: F30 to F150S  
(F200/F250 is possible by the range of the instruction of 150.)

##### FLEX-PC loader



Conversion scope: All models  
(NB0 to NS)

- 1) Instruction address  
Address allocation rules can be customised
- 2) On-line help displays alternate methods for instructions that cannot be converted automatically.



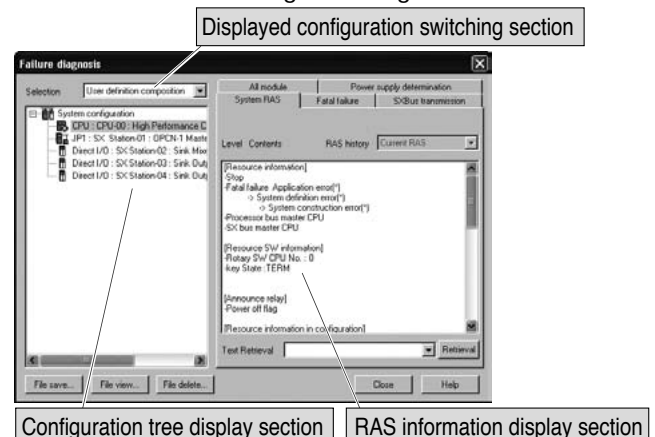
#### • Resume feature

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.

#### • Failure diagnostic function

Failure diagnosis is easy because you can analyze failure information while checking the configuration information.



Displayed configuration switching section

Configuration tree display section

RAS information display section

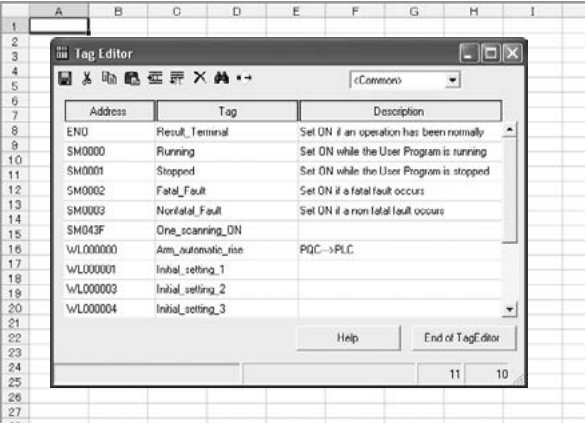
Programmable Controllers

**MICREX-SX series SPH**

**Programming Support Tool Standard**

• **Link with spreadsheet program**

Directly copy comments edited/created in a spreadsheet program (Excel) into your program.



• **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 can be performed at high speed using a commercial USB cable.

• **Data access to the user ROM**

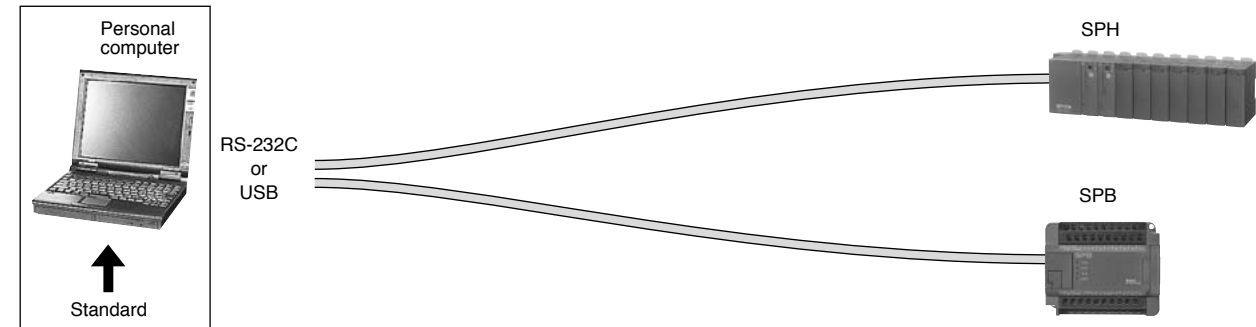
Projects can be downloaded from/uploaded to the user ROM card (compact flash card) supplied with SPH300 (NP1PS-□□R), SPH300EX or SPH2000. Also, data can be written into/read from the user ROM card.

■ **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, SPH300EX and SPH2000)
	P/PE-link Possible
	SX bus Possible
FL-net	Possible
	Possible
OS	Windows95/98/ME/2000/XP/WindowsNT4.0
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.





## 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

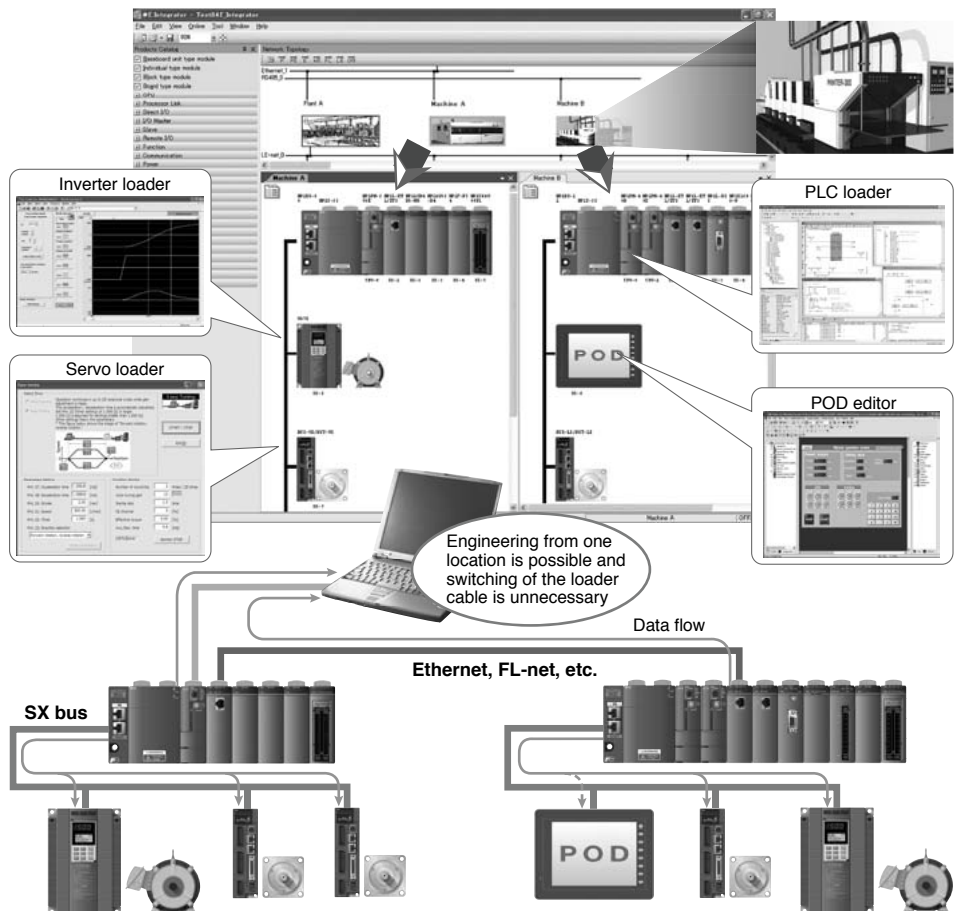
- Relieved from cable switch work
- Transparent connection with the network
- Relieved from tool select operation

#### • Economy

- Enhanced efficiency of content management
- Enhanced engineering efficiency of all processes

#### • Evolution

- Pursuit of further convenience



### ■ 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.	<b>NP4N-ITGR</b>	V1.0.0.0
PLC loader	Support tool for PLC. Edits the MICREX-SX program and monitors the state.	<b>NP4H-SEDBV3</b>	V3.4.4.0
SX-Programmer		<b>NP4H-SWN</b>	V2.3.5.1
POD editor	Support tool for POD. Edits and operates the POD screen.	<b>V-SFT-5</b>	V5.3.0.0
Inverter loader	Support tool for vector inverter VG7.	<b>WPS-VG7-PCL</b>	V2.1.0.1
PC Loader for FRENIC5000VG7	Adjusts parameters and monitors the state.	-	V1.8
Servo loader	Support tool for ALPHA5.		
PC Loader for ALPHA5	Adjusts parameters and monitors the state.		

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

\*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.

#### 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



Programmable Controllers

**MICREX-SX series SPH**

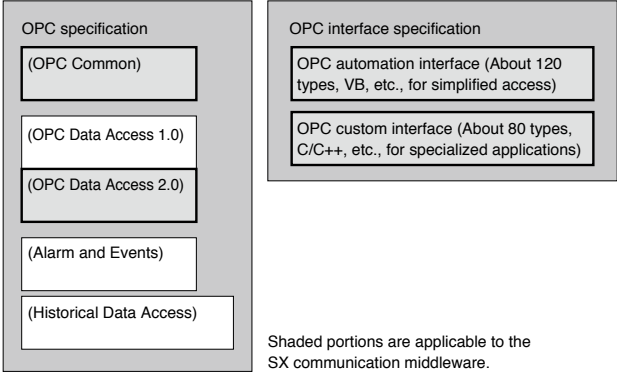
**OPC-Coordinated Library SX Communication Middleware**

**OPC-Coordinated Library SX Communication Middleware: NP4N-MDLW**

■ 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.



■ Operating environment

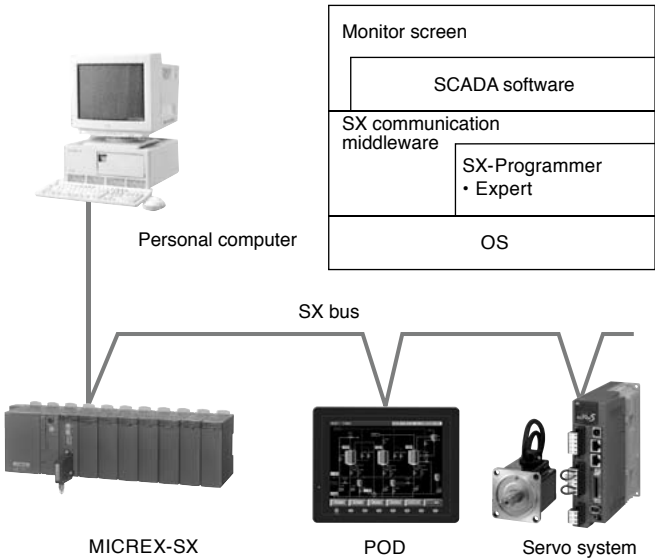
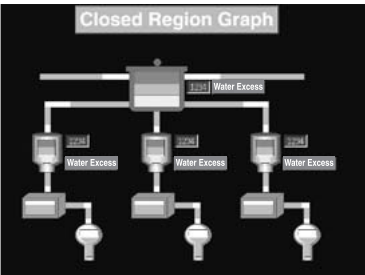
Item	Specification
Hardware	IBM-PC/AT compatible
CPU	Intel Pentium 233MHz or higher
Hard disk	Free space of 10M bytes or more (with additional disk space for Programming support tool)
CD-ROM unit	1 unit (x 4 speed or faster), media: ISO 9660 format
Memory capacity	128M bytes or more
Keyboard	101 keyboard
Mouse	USB mouse, bus mouse, or PS2 mouse
Indicator	1024 x 768-dots resolution or higher
Communication interface	Ethernet
	RS-232C
	Modem
	FL-net
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.



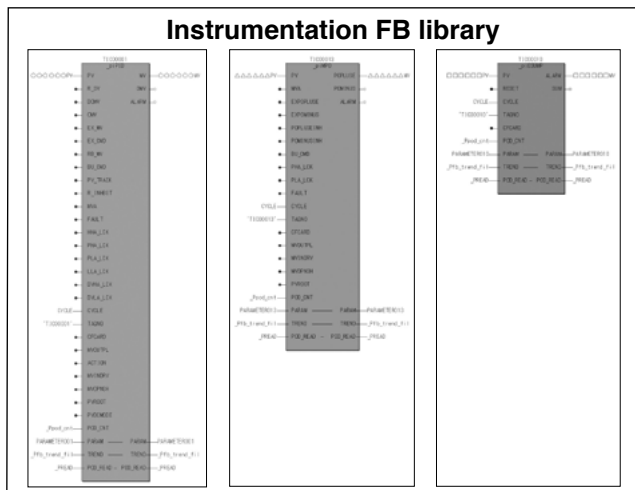
The SX communication middleware accommodates system business talks. For details, please contact our sales section.

# Programmable Controllers MICREX-SX series SPH SX Instrumentation Package

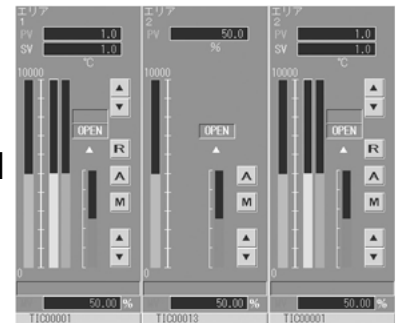
## SX Instrumentation Package: NP4N-IPAC <Japanese version>

### ■ 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.



Easily Generated



### • Abundant instrument FB libraries



Overview

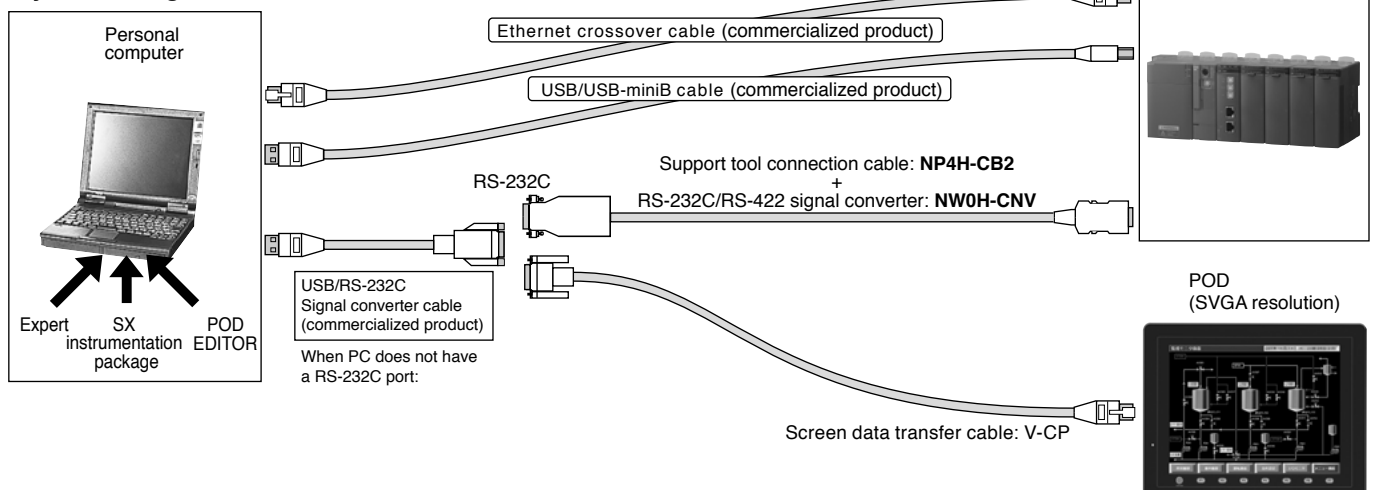


Group monitoring



Loop tuning

### ■ System configuration



Programmable Controllers  
**MICREX-SX** series SPH  
Handy Monitor

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).

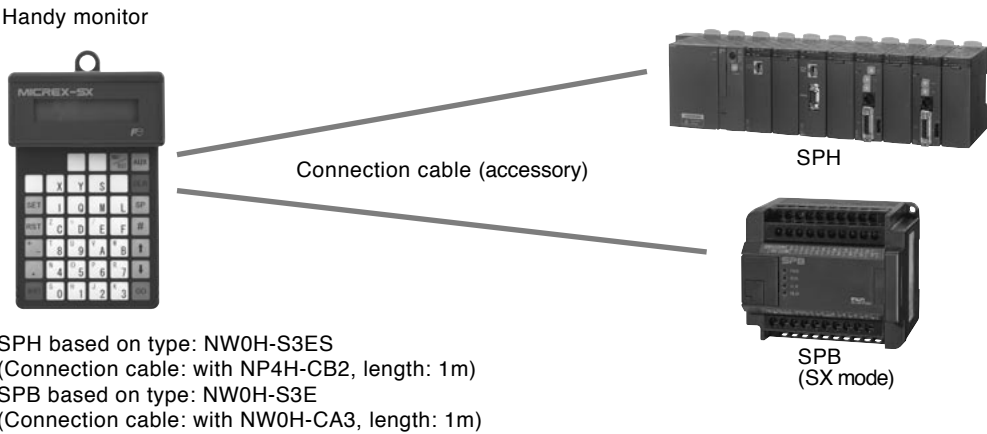


■ Performance specification

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



## Small Block PLC SPB: NW0P- □

High-performance SPB programmable logic controller is packed with many useful function in a compact body.

### ■ Features

#### • Compact size

The SPB is a compact size in which the installation place is not chosen.

Ideal for reducing control panel space.

	External Dimensions (mm)		
	Width	Height	Depth
20-points basic unit	80	90	81
30-points basic unit	110	90	81
40-points basic unit	140	90	81
60-points basic unit	180	90	81
16-points expansion unit	64	90	81
32-points expansion unit	110	90	81
60-points expansion unit	180	90	81

#### • Two programming languages

With one type of hardware, SPB is applicable to two programming languages:

- SX mode: MICREX-SX (language compliant with IEC)
- N mode: FLEX-PC N (language of ladder and instruction words)

#### • Large-capacity memory

Programming with rich memory

Type	Memory capacity			
	Program memory		Data memory	
	SX mode * 1	N mode	SX mode	N mode
20points basic unit	2 Ksteps	4Ksteps	5 Kwords	9 Kwords
30points basic unit				
40points basic unit	4 Ksteps	8 Ksteps	8.5 Kwords	
60points basic unit				

\* 1 There are Included the initiated value of the retain memory.

#### • High-speed processing

Ideal for small-size machines requiring fast processing. Fast 0.44  $\mu$ s. per Sequence instruction and 2.19  $\mu$ s (N mode). and 1.50  $\mu$ s (SX mode). for Data instructions.

#### • Many types of instructions

Many types of instructions allow ease of programming. The program size can be reduced by effectively using a combination of instruction words.

SX mode: 202 types, N mode: 211 types.

#### • Online program edit function

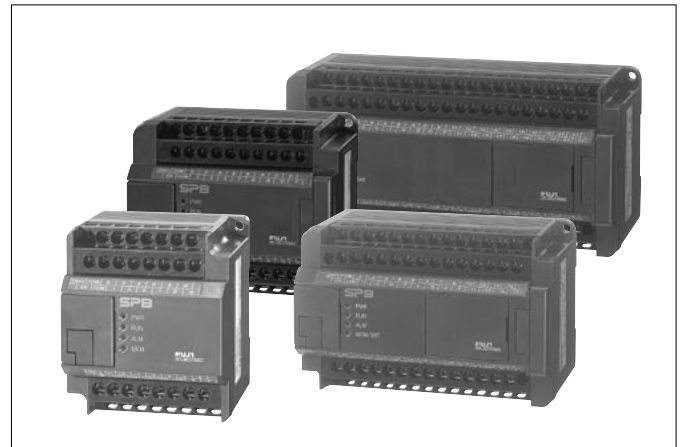
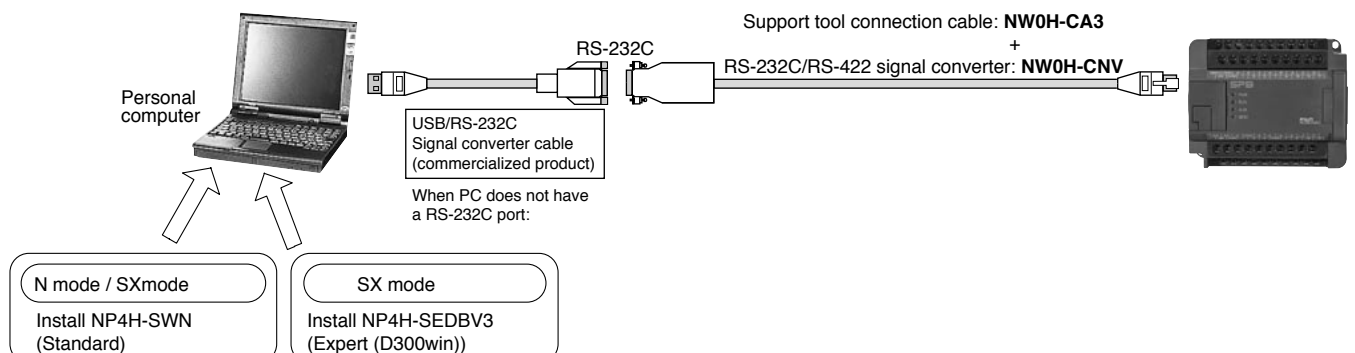
Allows program modification without interrupting machine operation.

#### • International standards conformity

All SPB models conform to the UL/cUL standards as well as the CE mark standard.

Conforms to the CE marking, UL standard and RoHS directive (conforming one after another) as well as IEC standard.

### ■ System configuration



#### • Two analog timers

Two analog timers are built in for convenient fine-tuning and testing.

#### • Communication & Networking

Communication adapters are available for RS-232C, RS-485, and simplified personal computer link connections.

#### • POD direct connection

The SPB can be connected to the POD via the loader port. No special communication unit is required.

#### • Diversified functions for expanding applications

- Internal high-speed counter function
- Interrupting function
- Pulse train output function
- Pulse catch function
- Constant scan setting
- Pulse width modulation function

#### • Adapted to analog control

Multi-range (voltage / current) adapted. 3 types of analog unit with detachable terminal blocks are added to the lineup. Capable of analog control, such as temperature control by PID instruction.

#### • Self-lifting terminal block & Finger protection

Use of the self-lifting terminal block - the terminals automatically pop up when unscrewed, reducing the wiring works and preventing less of screws. The finger protection structure ensures safety.



# Programmable Controllers

## MICREX-SX series SPH

### Related Devices

#### 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.

##### ■ 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-32/NP1PS-74**.

Built-in board type	Module type	Program memory capacity
<b>NP3PS-SX1PCS32</b>	<b>NP1PS-32</b>	32768 steps
<b>NP3PS-SX1PCS74</b>	<b>NP1PS-74</b>	75776 steps

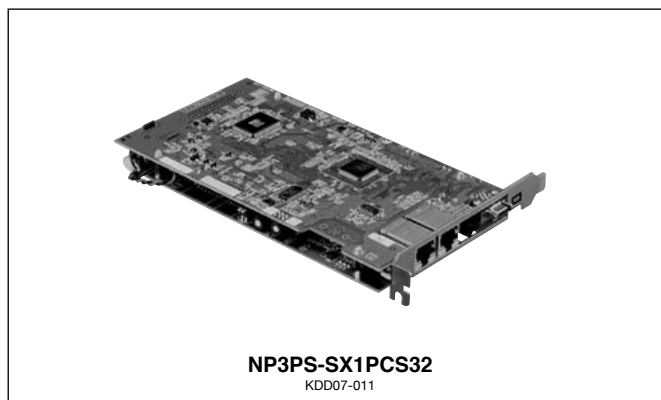
For details on performance and specifications, refer to “CPU Module: **NP1PS-□□**” on this catalog.

##### ■ 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).



- 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.

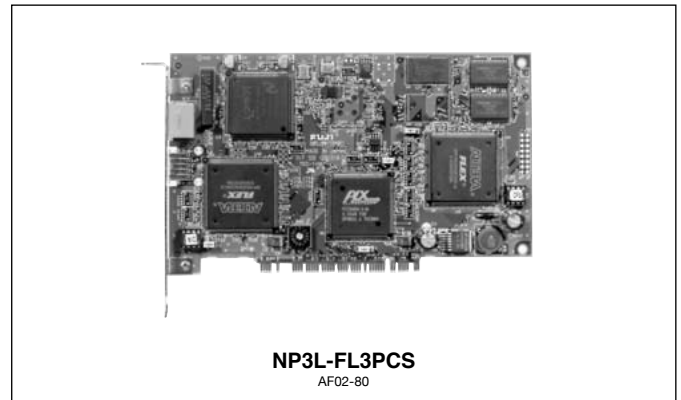
**PCI-Bus-Based FL-net (OPCN-2) Ver. 2.0 Board:  
 NP3L-FL3PCS**

■ **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.

■ **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).



Programmable Controllers

**MICREX-SX series SPH**

**Related Devices**

**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.

■ **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.

■ **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).



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

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.

# Programmable Controllers

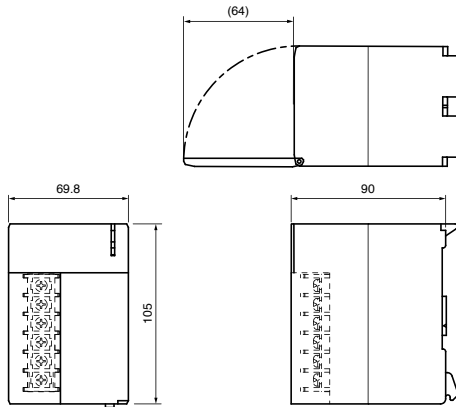
## MICREX-SX series SPH

### Dimensions

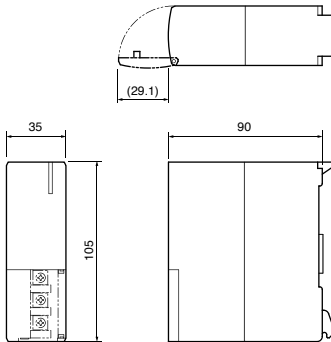
#### ■ Dimensions

(1) Power supply module

1) NP1S-22, NP1S-42

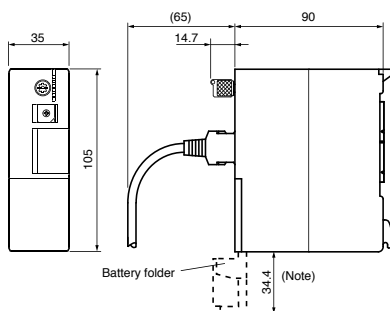


2) NP1S-91, NP1S-81



(2) CPU module

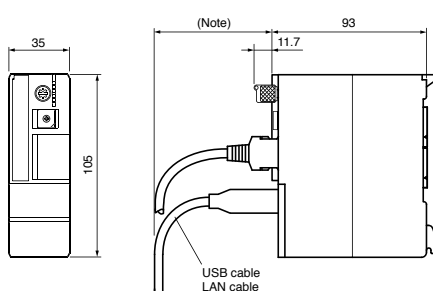
1) SPH200 NP1PH-16, NP1PH-08



Note: For the SPH200, open the battery folder at an angle of 180° when user ROM card is removed.

2) SPH300/SPH2000

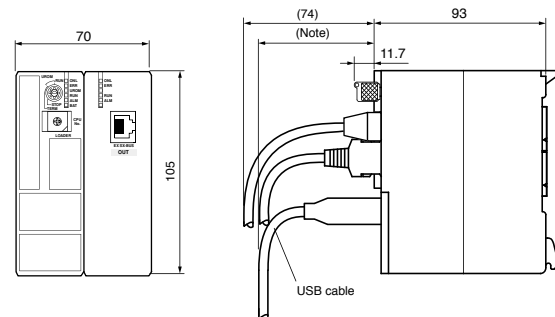
NP1PS-32/32R, NP1PS-74/74R, NP1PS-117/117R,  
NP1PS-245R, NP1PM-48R/48E, NP1PM-256E,  
NP1PM-256H



Note: For bend radius, check the specification for the loader cable you use.

3) SPH300EX

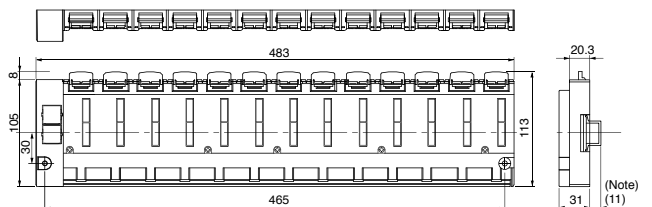
NP1PS-74D



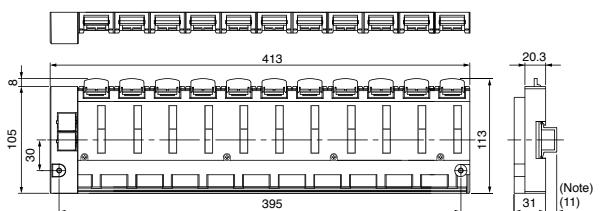
Note: For bend radius, check the specification for the loader cable you use.

(3) Base board

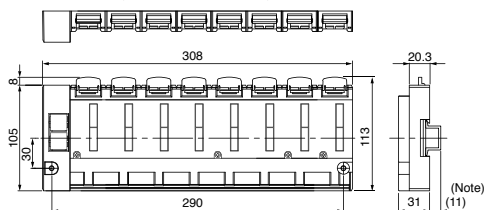
1) NP1BP-13, NP1BS-13, NP1BP-13S, NP1BS-13S,  
NP1BS-13D, NP1BP-13D



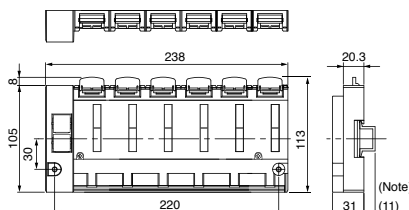
2) NP1BS-11, NP1BS-11S, NP1BS-11D



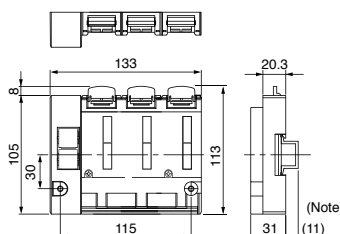
3) NP1BS-08, NP1BS-08S, NP1BS-08D



4) NP1BS-06



5) NP1BS-03



Note: ( ) means to use the rail (TH35-15AL) made by FUJI.

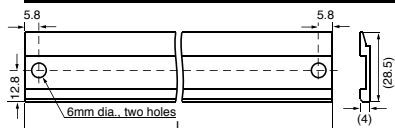
# Programmable Controllers

## MICREX-SX series SPH

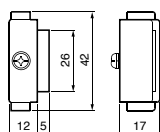
### Dimensions

#### (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

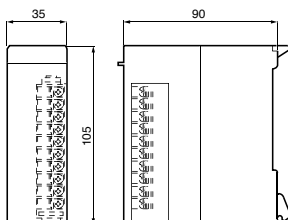


#### (5) Base board mounting stud **NP8B-ST**



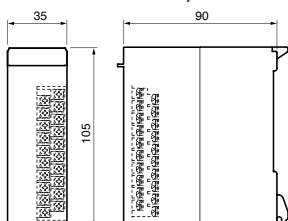
#### (6) I/O module

##### 1) 6-point/8-point module (digital)

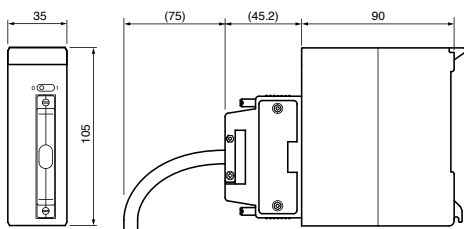


Note: Transistor sink 8-point output type (NP1Y08T0902) and SSR 8-point output type (NP1Y08S) are equivalent to the 16-point module below.

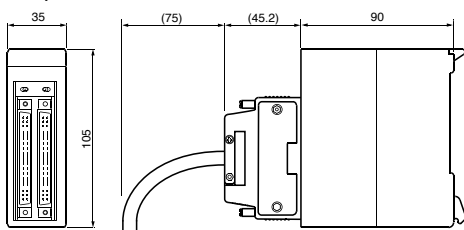
##### 2) 16-point module (digital) / Analog input module / Analog output module (**NP1AY□2-MR, NP1AX□4-MR, NP1AX08V-MR, NP1AX08V-MR**)



##### 3) 32-point module

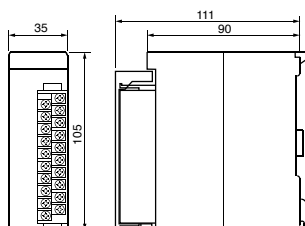


##### 4) 64-point module



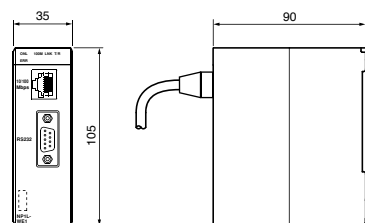
#### 5) Terminal block protrusion module

(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□-MRC, NP1AWH6□-MR**),  
Distributor module **NP1AXH4DG-MR**,  
Flow meter F/AD conversion module **NP1F-PI4**



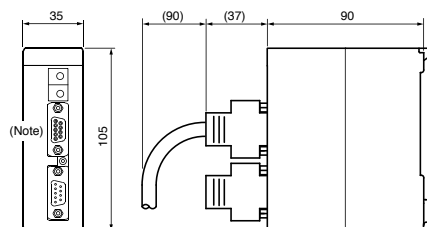
#### (7) Communication module

##### 1) Web module **NP1L-WE1/WE2**, Ethernet module **NP1L-ET1/ET2**



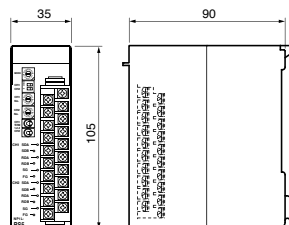
Note: This differs by type, whether or not connectors and switches exist, but outside dimensions are the same for all types.

##### 2) General purpose communication module **NP1L-RS1/2/3/4**, PROFIBUS-DP master module **NP1L-PD1**, PROFIBUS-DP slave module **NP1L-PS1**

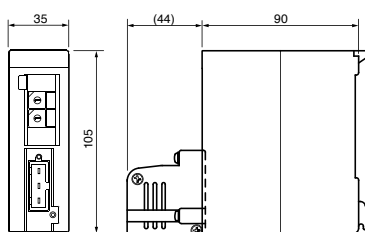


Note: This differs by type, whether or not connectors and switches exist, but outside dimensions are the same for all types.

##### General purpose communication module **NP1L-RS5**

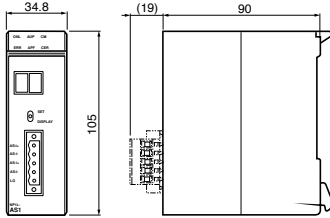


##### 3) T-link master module **NP1L-TL1**, T-link slave module **NP1L-TS1**, T-link interface module **NP1L-RT1**, P-link module **NP1L-PL1**, PE-link module **NP1L-PE1**, OPCN-1 master module **NP1L-JP1**, OPCN-1 slave module **NP1L-JS1**, OPCN-1 interface module **NP1L-RJ1**

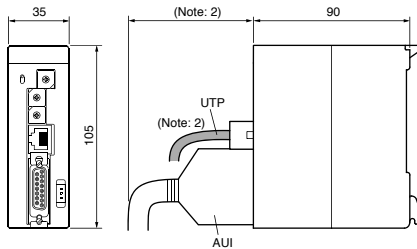


Note: This differs by type, whether or not connectors and switches exist, but outside dimensions are the same for all types.

4) AS-i master module **NP1L-AS2**



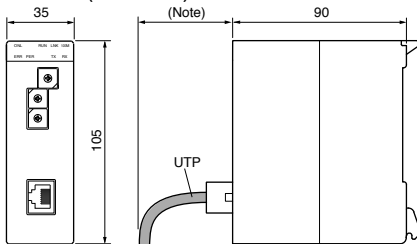
5) ADS-net module **NP1L-AD1**



Note: 1) This differs by type, whether or not switches exist, but outside dimensions are the same for all types.

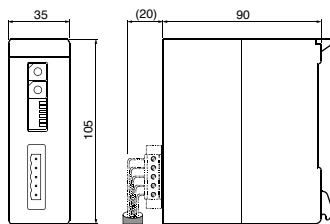
Note: 2) For AUI and UTP cables, you need to take connector dimensions and cable bend into consideration. (For bend radius, check the specification for the cable you use.)

6) FL-net (OPCN-2) module **NP1L-FL3**

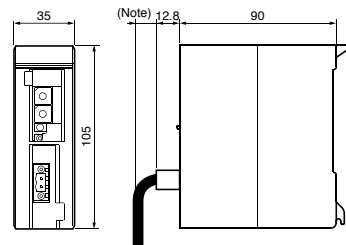


Note: For AUI and UTP cables, you need to take connector dimensions and cable bend into consideration. (For bend radius, check the specification for the cable you use.)

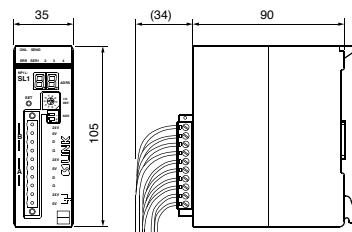
7) DeviceNet master module **NP1L-DN1**,  
 DeviceNet slave module **NP1L-DS1**,  
 DeviceNet interface module **NP1L-RD1**



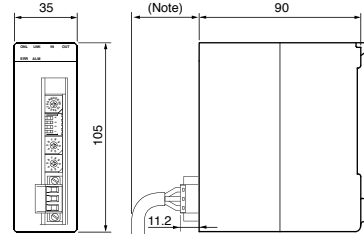
8) LONWorks interface module **NP1L-LW1**



9) S-LINK master module **NP1L-SL1**

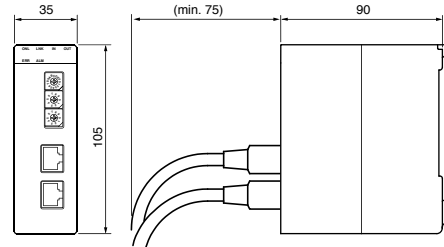


10) LE-net module **NP1L-LE1**

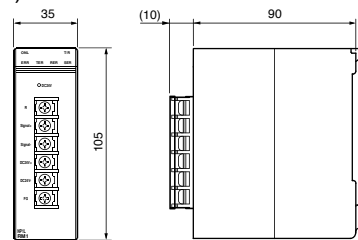


Note: Consider the bend of the cable you use.

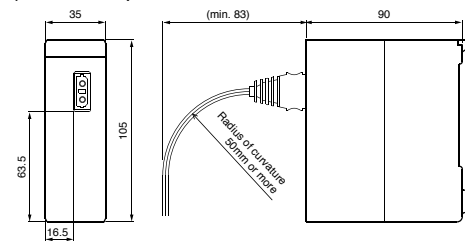
11) LE-net loop module **NP1L-LL1**,  
 LE-net loop 2 module **NP1L-LL2**



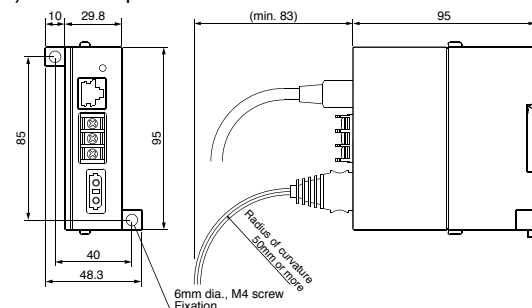
12) Remote terminal master/slave module **NP1L-RM1**



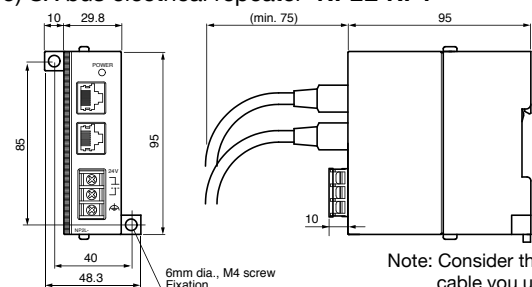
13) SX bus optical link module **NP1L-OL1**



14) SX bus optical link converter **NP2L-OE1**



15) SX bus electrical repeater **NP2L-RP1**



Note: Consider the bend of the cable you use.

# Programmable Controllers

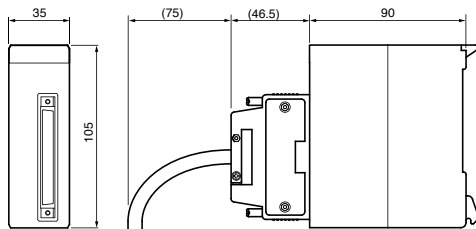
## MICREX-SX series SPH

### Dimensions

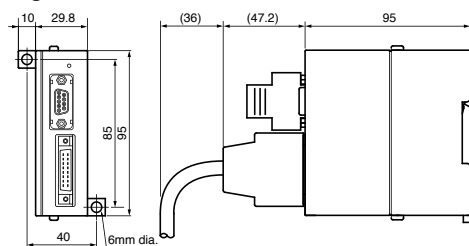
#### (8) Positioning control module / Unit

##### 1) High-speed counter module **NP1F-HC2, NP1F-HC2MR, NP1F-HC2MR1,**

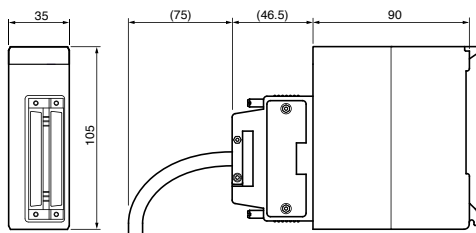
Multi channel high-speed counter module **NP1F-HC8**



##### 2) Signal converter **NP2F-LEV**

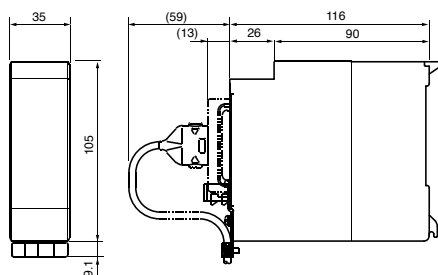


##### 3) Positioning control module **NP1F-MA2, NP1F-MP2, NP1F-HP2**

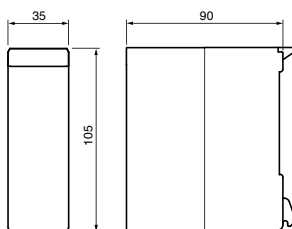


#### (9) Function module / Unit

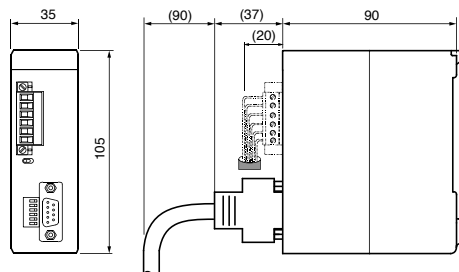
##### 1) Memory card interface module **NP1F-MM1**



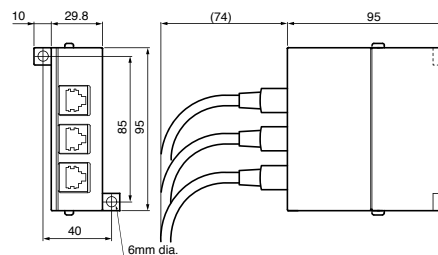
##### 2) Dummy module **NP1F-DMY**



#### 3) Multi-use communication module **NP1F-MU1**

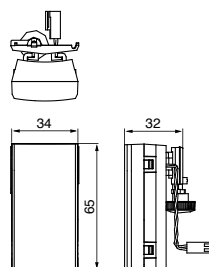


#### 4) SX bus T-branch unit **NP8B-TB**

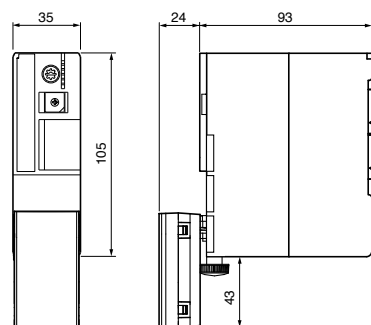


#### (10) Option

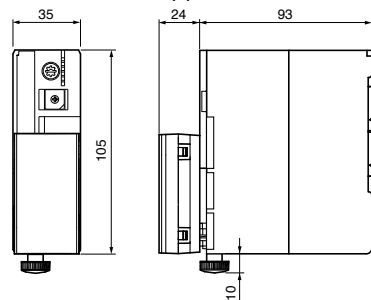
##### 1) Battery box **NP8P-BTS**



#### • Dimension at lower installation



#### • Dimension at upper installation

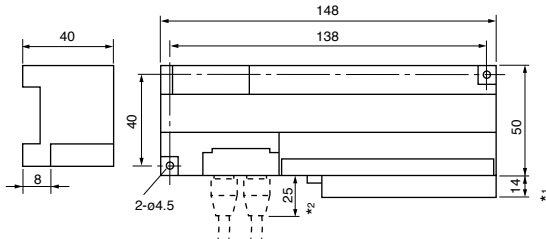


# Programmable Controllers

## MICREX-SX series SPH

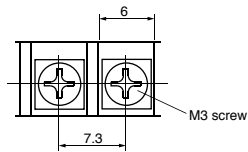
### Dimensions

#### (11) I/O Terminal 1) NR1 series **NR1** □

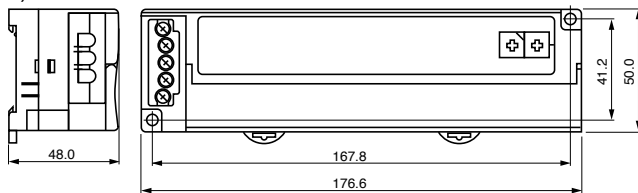


\*1) When the extension terminal block is mounted.  
\*2) When the SX bus-adapted unit is connected.

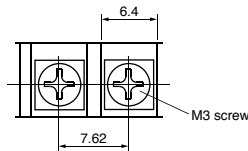
<Terminal dimensions>



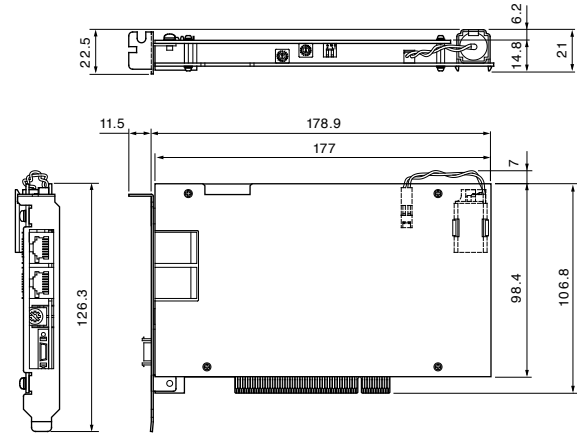
#### 2) NR2 series **NR2** □



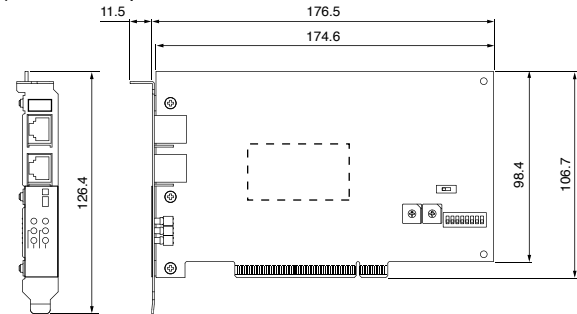
<Terminal dimensions>



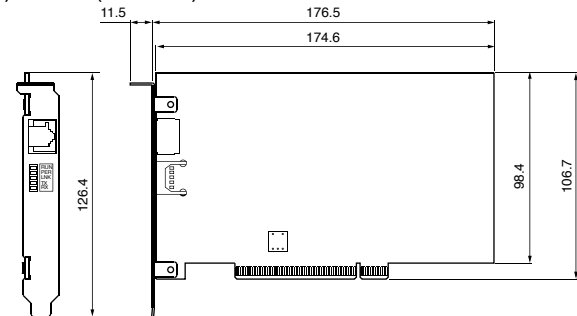
#### (12) PCI-bus-based board 1) SPH300 CPU board **NP3PS-SX1PCS** □ □



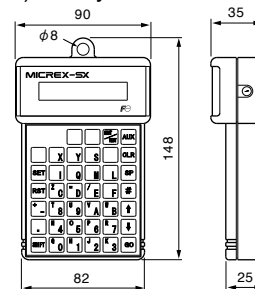
#### 2) LE-net loop2 board **NP3L-LL2PCS**



#### 3) FL-net (OPCN-2) board **NP3L-FL3PCS**



#### (13) Handy monitor **NW0H-S3ES**





# Programmable Controllers

## MICREX-SX series SPH

### Ordering Information

#### ■ Types/Ordering codes

Typical Catalog					Standards					
Names		Types (Ordering codes)	Specifications, Names		CE	UL	LR	NK		
					* 2	cUL	* 3			
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) SX bus terminating plug 2 pieces CPU mode selection key switch Screwdriver (for the CPU setting)	Basic instruction execution speeds	○	○	○	○	
		NP1PH-16	SPH200 Program memory capacity 16K steps Max. No. of I/O points 8192 points		70ns or more	○	○	○	○	
	SPH300	NP1PS-32	SPH300 Program memory capacity 32K steps Max. No. of I/O points 8192 points		Basic instruction execution speeds	○	○	○	○	
		NP1PS-74	SPH300 Program memory capacity 74K steps Max. No. of I/O points 8192 points		20ns or more	○	○	○	○	
		NP1PS-117	SPH300 program memory capacity 117K steps Max. No. of I/O points 8192 points			○	○	○	○	
		NP1PS-32R	SPH300 Program memory capacity 32K steps User ROM/USB adapted, Max. No. of I/O points 8192 points			○	○	○	○	
		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			○	○			
		NP1PS-74D	SPH300EX Program memory capacity 74K steps x 2 User ROM/USB adapted, Max. No. of I/O points 8192 points x 2			○	○			
	SPH300EX									
		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			○		○	○			
Power supply module		NP1S-22	100/240V AC Input power supply, output capacity 35W, Accessories: Connector for ALM contact, Voltage selection jumper plate			○	○	○	○	
		NP1S-91	100 to 120V AC Input power supply 15W (1 slot)			○	○			
		NP1S-81	200 to 240V AC Input power supply 15W (1 slot)			○	○			
		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	Accessories: Base board mounting bracket		○	○	○	○	
		NP1BS-06	For 6 slots Processor buses 3 slots			○	○	○	○	
		NP1BS-08	For 8 slots Processor buses 3 slots			○	○	○	○	
		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	○	○	○	○	
					Standards	○	○	Certificated	—	Exceptions

Standards ○ Certified — 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 Some products supporting RoHS may not yet be in stock. Please contact and confirm with the sales division before placing your order.

# Programmable Controllers

## MICREX-SX series SPH

### Ordering Information

Names	Types (Ordering codes)	Specifications, Names		Standards				
				CE	UL	LR	LNK	
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	○	○	○	○	○
	NP1Y06S	SSR, 100 to 240V AC, 6 points, 2.2A/point, 4.4A/common	Screw terminal	○	○	○	○	○
	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, 16 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	○	○			
Terminal Relay (Fuji Electric FA Components & Systems Co., Ltd.)	RS16E-DE04	24V DC source input						
	RS16-DE04	24V DC sink output		○	○			
	RS16-DE04P	24V DC source output			○			
	RS910M2-0104	Terminal cable for MICREX-SX: 1m						
	RS910M2-0204	Terminal cable for MICREX-SX: 2m						
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	○	○	○	○	○
	NP1AWH6-MR	High speed type multi-range input/output, input 4ch, output 2ch, resolution: 14 bits	Screw terminal	○	○			
Analog I/O module 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-ET2	Ethernet interface module 10BASE5			○			
	NP1L-FL1	FL-net module Ver. 1.0 Accessories: Power supply cable for the 10BASE5		○	○			
	NP1L-FL2	FL-net module Ver. 2.0 Accessories: Power supply cable for the 10BASE5		○	○			
	NP1L-FL3	FL-net module Ver. 2.0 (10/100Mbps)		○	○			
	NP1L-AD1	ADS-net module Self-directed distributed protocol (R3.0) support Accessories: Power supply cable for the 10BASE5		○	○			
	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-LL1	LE-net loop 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.

\*5 Some products supporting RoHS may not yet be in stock. Please contact and confirm with the sales division before placing your order.

# Programmable Controllers

## MICREX-SX series SPH

### Ordering Information

Names	Types (Ordering codes)	Specifications, Names	Standards			
			CE	UL	LR	NK
Communication module	<b>NP1L-RS1</b>	General purpose communication module RS-232C (connector), RS-485 (connector) each 1ch	○	○	○	○
	<b>NP1L-RS2</b>	General purpose communication module RS-232C (connector) 1ch	○	○	○	○
	<b>NP1L-RS3</b>	General purpose communication module RS-232C (connector) 2ch	○	○		
	<b>NP1L-RS4</b>	General purpose communication module RS-485 (connector) 1ch	○	○	○	○
	<b>NP1L-RS5</b>	General purpose communication module RS-485 (screw terminal) 2ch	○	○		
	<b>NP1L-JP1</b>	OPCN-1 master module Accessories: OPCN-1 connector, Terminating resistor 2 pieces	○	○	○	○
	<b>NP1L-JS1</b>	OPCN-1 slave module Accessories: OPCN-1 connector	○	○		
	<b>NP1L-RJ1</b>	OPCN-1 interface module Accessories: OPCN-1 connector, SX bus terminating plug 2 pieces	○	○	○	○
	<b>NP1L-DN1</b>	DeviceNet master module Accessories: Screw connector (for cable splicing)	○	○		
	<b>NP1L-DS1</b>	DeviceNet slave module 1ch Accessories: Screw connector (for cable splicing)	○	○		
	<b>NP1L-RD1</b>	DeviceNet interface module Accessories: Screw connector (for cable splicing), SX bus terminating plug 2 pieces	○	○		
	<b>NP1L-TL1</b>	T-link master module Accessories: T-link connector, T-link terminating resistor 2 pieces	○	○	○	○
	<b>NP1L-RT1</b>	T-link interface module Accessories: T-link connector, SX bus terminating plug 2 pieces	○	○	○	○
	<b>NP1L-TS1</b>	T-link slave module Accessories: T-link connector	○	○	○	○
	<b>NP1L-PD1</b>	PROFIBUS-DP master module Communication standard (IEC 66158, EN 50171, DIN 19245)	○	○		
	<b>NP1L-PS1</b>	PROFIBUS-DP slave module Communication standard (IEC 66158, EN 50171, DIN 19245)	○	○		
	<b>NP1L-AS1</b>	AS-i master module Ver. 2.0 Accessories: Screw connector (for cable splicing)	○	○		
	<b>NP1L-AS2</b>	AS-i master module Ver. 2.1 Accessories: Screw connector (for cable splicing)	○	○		
	<b>NP1L-SL1</b>	S-LINK master module 1ch Accessories: Screw connector (for cable splicing)				
	<b>NP1L-RM1</b>	Remote terminal master/slave module Accessories: Screw connector (for cable splicing) Functionate to the master/slave station of remote terminal RM20/RM21 series				
	<b>NP1L-OL1</b>	SX bus optical link module Accessories: SX bus terminating plug	○	○		
	<b>NP2L-OE1</b>	SX bus electrical - optical converter Accessories: SX bus terminating plug	○	○		
	<b>NP2L-RP1</b>	SX bus electrical - electrical repeater Accessories: SX bus terminating plug	○	○		
Positioning module * 1	<b>NP1F-HC2</b>	High speed counter module 500kHz x 2ch Input signal voltage: 5V DC Accessories: Optional Connector	○	○		
	<b>NP1F-HC2MR</b>	High speed counter module 200kHz x 2ch Input signal voltage: 5/12/24 DC Accessories: Optional Connector	○	○		
	<b>NP1F-HC2MR1</b>	High speed counter module 50kHz x 2ch Input signal voltage: 5/12/24 DC Accessories: Optional Connector	○	○		
	<b>NP1F-HC8</b>	Multi-channel high speed counter module 50kHz x 8ch Accessories: Optional Connector	○	○		
	<b>NP1F-HP2</b>	Pulse train output positioning control module Pulse train command 250kHz x 2ch Accessories: Optional Connector	○	○		
	<b>NP1F-MP2</b>	Pulse train positioning control combined module Output pulse: 250kHz x 2ch, Feedback pulse: 500kHz, Accessories: Optional Connector	○	○		
	<b>NP1F-MA2</b>	Analog command positioning control combined module Feedback pulse: 500kHz x 2ch, Accessories: Optional Connector	○	○		
	<b>NP2F-LEV</b>	Signal converter Converts signal level: 4ch, open collector to differential signal, Accessories: I/O connector each 1 piece	○	○		
Function module	<b>NP1F-MM1</b>	Memory card interface module Memory card interface 1ch, Accessories: Memory card mounting bracket, Dummy card	○	○		
	<b>NP1F-DMY</b>	Dummy module	○	○	○	○
	<b>NP1F-MU1</b>	Multi-use communication module RS-232C x 1ch, RS-485 x 1ch Communication by the arbitrary protocol				
	<b>NP1F-PI4</b>	Flowmeter F/AD conversion module 10kHz x 4ch, between channels insulated	○	○		
Extended FB software package	<b>NP4N-TRBFV3</b>	Fault diagnosis FB software package Version 3	—	—	—	—
	<b>NP4N-PIDFV3</b>	PID FB software package Version 3	—	—	—	—
	<b>NP4N-PTPFV3</b>	Positioning control FB software package Version 3	—	—	—	—
	<b>NP4N-CAMFV3</b>	Electronic cam FB software package Version 3	—	—	—	—
	<b>NP4N-COMFV3</b>	General purpose communication software package for Factory Automation machine Version 3	—	—	—	—
	<b>NP4N-FSETV3</b>	Extension FB software package set Version 3	—	—	—	—
	<b>NP4N-MDLW</b>	SX communication middleware	—	—	—	—
	<b>NP4N-IPAC</b>	SX instrumentaion package (Japanese version)	—	—	—	—
Personal computer loader	<b>NP4N-LNDF</b>	LonWORKS module support tool SLDEF (ACSESS format) (Japanese version)	—	—	—	—
	<b>NP4H-SEDBV3</b>	Programming support tool based on IEC 61131-3 Expert (D300win) software package Version 3	—	—	—	—
	<b>NP4H-SWN</b>	Programming support tool based on IEC 61131-3 Standard	—	—	—	—
	<b>NP4N-ITGR</b>	Fuji Integrated support tool (@E.Integrator)	—	—	—	—
Handy monitor	<b>NW0H-S3ES</b>	SPH applicable English type, Accessories: Loader cable (length: 1m)				
Loader connecting cable	<b>NP4H-CB2</b>	Programming support tool connection cable for AT compatible personal computer (Necessary to the signal converter: <b>NW0H-CNV</b> )	—	—	—	—
	<b>NW0H-CNV</b>	Programming support tool for AT compatible personal computer. Signal converter for CPU module connecting (It used to with combined the loader connecting cable ( <b>NP4H-CB2</b> , Optional).	○	—	—	—
Simulative-input switch	<b>NP8X-SW</b>	Simulative-input switch for DC input module (16 points)	—	—	—	—
ROM cassette	<b>NP8PMF-16</b>	User ROM cassette for the SPH200, Capacity: 16MB	—	—	—	—
	<b>NP8PCF-256</b>	User ROM card compact flash memory for the SPH300, Capacity: 256MB	—	—	—	—
Online adapter and Relational software	<b>FOA-ALFA2</b>	Online adapter (Necessary for the <b>NP4H-CB2</b> on connection to personal computer)				
	<b>FOA-LOADER2-CD</b>	Initial setting loader software for the online adapter (Japanese version)	—	—	—	—
	<b>FOA-CENTER2-CD</b>	Master station monitoring software for the online adapter (Japanese version)	—	—	—	—

Standards	○	Certificated	Exceptions
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\*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.

\*5 Some products supporting RoHS may not yet be in stock. Please contact and confirm with the sales division before placing your order.

# Programmable Controllers

## MICREX-SX series SPH

### Ordering Information

Names		Types (Ordering codes)	Specifications, Names	Standards					
				CE	UL	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		—	—	—	—	
		NP8B-ST	Base board mounting stud (DIN rail type)		—	—	—	—	
		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	○	○		
			NR1JY-08R07DT		Ry output 240V AC / 110V DC, 8 points, detachable terminals	○	○		
			NR1JY-16T05DT		Tr sink output 24V DC, 16 points, detachable terminals	○	○		
			NR1JW-16T65DT		Source input 24V DC, 8 points, Tr sink output 24V DC, 8 points, detachable terminals	○	○		
	DeviceNet	NR1DX-1606DT		No polarity, input 24V DC, 16 points, detachable terminals	○	○			
		NR1DY-08R07DT		Ry output 240V AC / 110V DC, 8 points, detachable terminals	○	○			
		NR1DY-16T05DT		Tr sink output 24V DC, 16 points, detachable terminals	○	○			
		NR1DW-16T65DT		Source input 24V DC, 8 points, Tr sink output 24V DC, 8 points, detachable terminals	○	○			
	T-LINK	NR1TX-1606DT		No polarity, input 24V DC, 16 points, detachable terminals	○	○			
		NR1TY-08R07DT		Ry output 240V AC / 110V DC, 8 points, detachable terminals	○	○			
		NR1TY-16T05DT		Tr sink output 24V DC, 16 points, detachable terminals	○	○			
		NR1TW-16T65DT		Source input 24V DC, 8 points, Tr sink output 24V DC, 8 points, detachable terminals	○	○			
	SX bus	NR1SX-1606DT		No polarity, input 24V DC, 16 points, detachable terminals	○	○			
		NR1SY-08R07DT		Ry output 240V AC / 110V DC, 8 points, detachable terminals	○	○			
		NR1SY-16T05DT		Tr sink output 24V DC, 16 points, detachable terminals	○	○			
		NR1SW-16T65DT		Source input 24V DC, 8 points, Tr sink output 24V DC, 8 points, detachable terminals	○	○			
		NR1SF-HP4DT		Pulse train output Pulse train command: 250kHz 4 axes (2 points/1 axes)	○				
	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	○	○		
			NR2DY-32T05DT		Tr sink output 24V DC, 32 points, detachable terminals	○	○		
			NR2DY-16R07DT		Ry output 240V AC / 120V DC, 16 points, detachable terminals	○	○		
			NR2DW-32T65DT		No polarity, input 24V DC, 16 points, Tr sink output 24V DC, 16 points, detachable terminals	○	○		
		OPCN-1	NR2JAX-08VMRDT		Multi-range input 8ch, resolution: 13 bits (voltage type), detachable terminals	○			
			NR2JAX-08IMRDT		Multi-range input 8ch, resolution: 13 bits (current type), detachable terminals	○			
			NR2JAY-04VMRDT		Multi-range output 8ch, resolution: 13 bits (voltage type), detachable terminals	○			
			NR2JAY-04IMRDT		Multi-range output 8ch, resolution: 13 bits (current type), detachable terminals	○			
CPU board		NP3PS-SX1PCS32	PCI bus based on SPH300 CPU board Program memory capacity: 32K steps	Accessories: Driver (CD version), Data backup battery, SX bus terminating plug 2 pieces CPU mode selection key switch, Name and use seal					
		NP3PS-SX1PCS74	PCI bus based on SPH300 CPU board Program memory capacity: 74K steps						
Interface board		NP3L-LL2PCS		PCI bus based on LE-net loop2 board	Accessories: Driver (CD version)		○	○	
		NP3L-FL1PCS		PCI bus based on FL-net board Ver. 1.0	Accessories: Driver (CD version), Name and use seal				
		NP3L-FL2PCS		PCI bus based on FL-net board Ver. 2.0					
		NP3L-FL3PCS		PCI bus based on FL-net board Ver. 2.0 (10/100Mbps based on)					
					Standards	○	Certified	—	Exceptions

Standards | ○ Certified | — 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.

\*5 Some products supporting RoHS may not yet be in stock. Please contact and confirm with the sales division before placing your order.

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### 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**

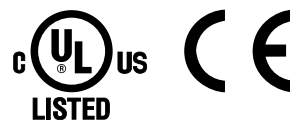
- For safe operation, before using the product read the instruction manual or user manual that comes with the product carefully or consult the Fuji sales representative from which you purchased the product.
- Products introduced in this catalogue have not been designed or manufactured for such applications 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.

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