

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

## Open Network Oriented

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

## Realizes Integrated Programming Support

Provides an environment in which each support tool can be launched by simply clicking on a device in a network structure diagram or system configuration diagram on a PC.

Allows setup of parameters of inverter and servo via SPH and enables remote data monitor operation, thereby eliminating troublesome wiring changes.

## Integrated control, information, and communication

With the aid of an upgraded data processing function, mass memory storage, and a built-in Ethernet function, the SPH is capable of monitoring the operation of production systems and devices and recording operation history and errors in addition to conventional FA control, enabling you to use the controller for wider applications of IT-based remote monitoring, maintenance support, and preventive maintenance.

CPU and power supply redundancy can also be achieved in response to the growing demand for higher reliability.

Realization of high speed / the machine control to be heightened

An opening point

Realization of the general programming support

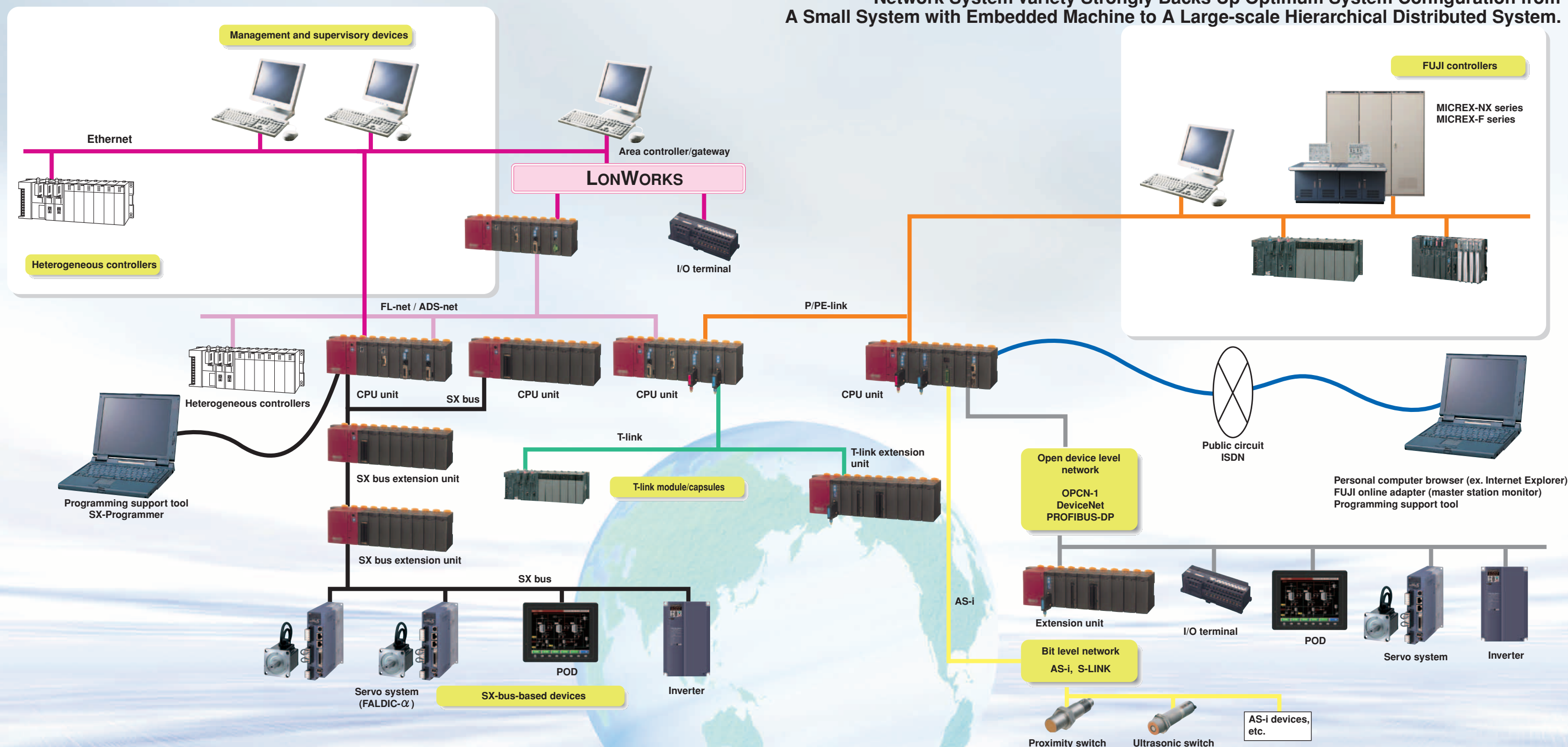
SPH2000 which plans control and fusion of information / the communication

## INDEX

|                                          |                                   |                                     |
|------------------------------------------|-----------------------------------|-------------------------------------|
| • Overview of MICREX-SX series..... 2    | <Contents>                        |                                     |
| • Network configuration of SPH ..... 4   | • General specifications ..... 12 | • Function and positioning          |
| • Features of SPH series ..... 6         | • Power supply module ..... 13    | control module ..... 57             |
| • Integrated programmable support..... 8 | • CPU module ..... 14             | • Programming support tool ..... 68 |
| • Basic configuration of SX bus..... 10  | • Base board ..... 19             | • Related devices ..... 78          |
|                                          | • Standard I/O module ..... 20    | • Dimensions ..... 82               |
|                                          | • Communication module ..... 32   | • Ordering informations ..... 87    |
|                                          |                                   | • Product warranty ..... 91         |



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

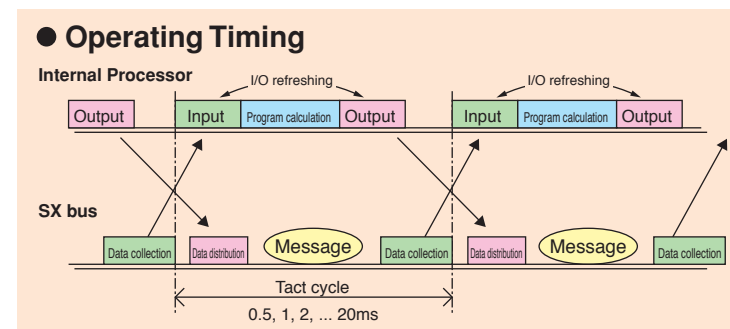
- Program scan time of 1ms is implemented by increased instruction processing speed.
- Real number operation and high-precision positioning control have been put to practical use by dramatically improved floating-point operation speed.

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

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

#### 1ms I/O refreshing

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



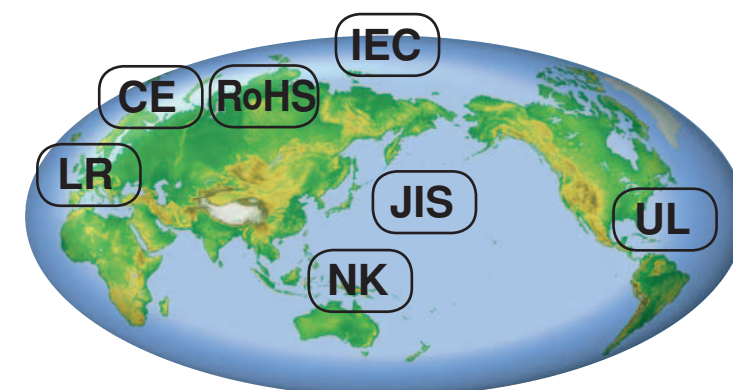
### Controller Conforms to International Standard

#### 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).

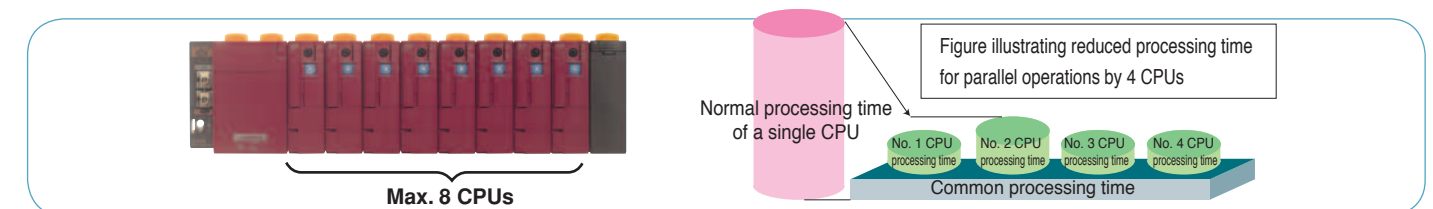


### Multi-CPU System Applicable to Up to 8 CPUs

#### Parallel processing with up to 8 CPUs (SPH300/SPH2000/SPH3000)

Alleviates the load for each CPU allowing high speed processing of a large application program.

For example, the load can be distributed for advanced processing and sequence control processing with additional CPUs. I/O refresh control is performed automatically even if parallel processing by multiple CPUs is performed.



### Redundant System Assuring System Safety and Reliability

#### 1-to-1 warm-standby feature (SPH300/SPH2000)

This redundancy configuration enables continued operation without system downtime if a CPU fails.

(Control may temporarily stop due to fault detection and CPU changeover.)

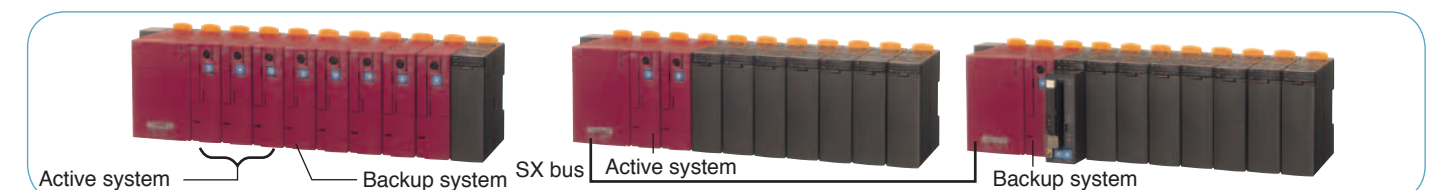
- The same program is stored in CPUs for the active and backup systems, allowing constant data value equalization.



#### N-to-1 backup feature (SPH300)

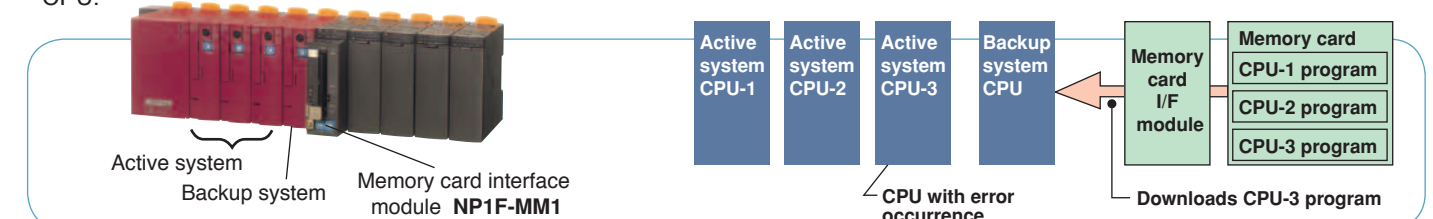
This redundancy configuration enables reduction of the number of CPUs to one, though, when a CPU fails, data retained in the active system and that in the standby system are not equalized.

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



- 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.



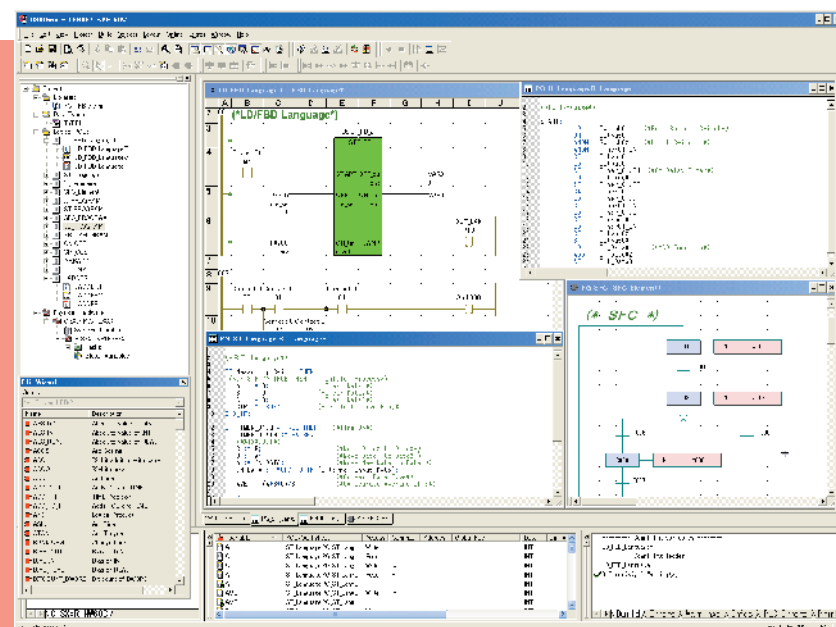
## Two Types of Programming Support Tools in Accordance with Development Style

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



#### Usage

##### Improvement of software development efficiency

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

##### Programming of the same techniques as those of microcomputers and personal computers

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

#### Features

##### Accommodates a mixture of code written in two or more programming languages.

- The Expert (D300win) completely supports five types of program representations specified by the standards.
- It allows the programmer to code the combination of representations best suited for the control target.

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

##### Excellent documentation function

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

##### Simulation function

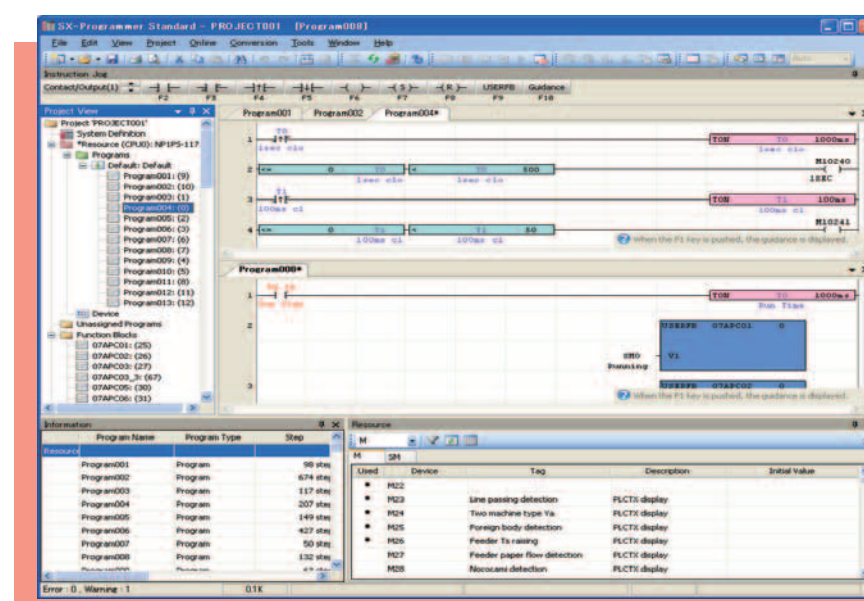
- The simulation function allows the user to conduct test runs of programs using the Expert (D300win) built-in PLC function in place of a real machine.

##### Programmable Operation Display (POD) cooperation function

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

#### Standard

Operability Oriented Support Tools



#### Usage

##### Ladder operation for on-site maintenance personnel

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

##### Utilization of programming resources

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

#### Features

##### Multi-language support

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

##### Intuitive screen operation

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

##### Simulation function

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

##### Resume function

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

##### Device editor and collation function

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



## SX Bus Meets Diverse Demands for System Extension

### Basic SX Bus Configuration

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

#### SX bus implements distributed installation of equipment.

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

#### Free topology is implemented by T branches.

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

#### SX bus implements connecting maximum 254 modules.

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

### Classification of System Configuration

#### Limit of modules connected in single configuration

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

Note: For details 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)</li> <li>FL-net module (NP1L-FL3)</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 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.



|                                                         |           |
|---------------------------------------------------------|-----------|
| <b>General Specifications .....</b>                     | <b>12</b> |
| <b>Power Supply Module .....</b>                        | <b>13</b> |
| Features .....                                          | 13        |
| Power supply specifications .....                       | 13        |
| <b>CPU Module .....</b>                                 | <b>14</b> |
| Features .....                                          | 14        |
| Performance specifications .....                        | 14        |
| Features of the SPH2000 and SPH300EX .....              | 16        |
| SPH2000 Redundant System .....                          | 17        |
| Outer view .....                                        | 18        |
| <b>Base Board .....</b>                                 | <b>19</b> |
| Dimensions .....                                        | 19        |
| <b>Standard I/O Module .....</b>                        | <b>20</b> |
| Digital Input Module .....                              | 20        |
| Digital Output Module .....                             | 21        |
| Digital Input/Output Module .....                       | 22        |
| High-speed Digital Input Module .....                   | 23        |
| Pulse Train Output Built-in Digital Output Module ..... | 23        |
| Analog Input Module .....                               | 24        |
| Analog Output Module .....                              | 25        |
| Analog Input/Output Module .....                        | 26        |
| Resistance Bulb Input Module .....                      | 27        |
| Thermocouple Input Module .....                         | 28        |
| Distributor Module .....                                | 29        |
| I/O Connection of Connector-type Modules .....          | 30        |
| Terminal Relay .....                                    | 31        |
| <b>Communication Module .....</b>                       | <b>32</b> |
| <b>Computer-level Communication Module .....</b>        | <b>32</b> |
| Web Module .....                                        | 32        |
| Ethernet Interface Module .....                         | 33        |
| Online Adapter .....                                    | 34        |
| <b>Controller-level Communication Module .....</b>      | <b>35</b> |
| FL-net (OPCN-2) Ver. 2.0 Module .....                   | 35        |
| LONWORKS Network Interface Module .....                 | 36        |
| LONWORKS Network Interface Module Support Tool .....    | 36        |
| P-link/PE-link Module .....                             | 37        |
| LE-net, LE-net Loop, LE-net Loop 2 Module .....         | 38        |
| General Purpose Communication Module .....              | 39        |
| <b>Device-level Communication Module .....</b>          | <b>40</b> |
| OPCN-1 Master / Slave / Interface Module .....          | 40        |
| DeviceNet Master / Slave / Interface Module .....       | 41        |
| T-link Master / Slave / Interface Module .....          | 42        |
| PROFIBUS-DP Master / Slave Module .....                 | 43        |
| I/O Terminal .....                                      | 44        |
| <b>Bit-level Communication Module .....</b>             | <b>50</b> |
| AS-i Master Module .....                                | 50        |
| S-LINK Master Module .....                              | 51        |
| Remote Terminal Master / Slave Module .....             | 52        |
| <b>SX Bus Optical Link Module .....</b>                 | <b>53</b> |
| <b>SX Bus Optical Converter Unit .....</b>              | <b>53</b> |
| <b>SX Bus Electric Repeater Unit .....</b>              | <b>54</b> |
| <b>Optical T-link and P/PE-link systems .....</b>       | <b>55</b> |
| <b>T-link Optical Converter .....</b>                   | <b>56</b> |
| <b>P/PE-link Optical Converter .....</b>                | <b>56</b> |

|                                                                                                        |           |
|--------------------------------------------------------------------------------------------------------|-----------|
| <b>Function Module/Positioning Control Module/<br/>Positioning Extension FB Software Package .....</b> | <b>57</b> |
| Memory Card Interface Module .....                                                                     | 57        |
| Dummy Module .....                                                                                     | 58        |
| Multiuse Communication Module .....                                                                    | 59        |
| Flowmeter F/AD Conversion Module .....                                                                 | 60        |
| High-speed Counter Module .....                                                                        | 61        |
| Two-axis Pulse Train Output Positioning Control Module ..                                              | 62        |
| Two-axis Pulse Train Multiple Positioning Control Module ..                                            | 63        |
| Two-axis Analog Multiple Positioning Control Module .....                                              | 64        |
| 4-axis Pulse Train Output Positioning Control Unit .....                                               | 65        |
| Positioning Module Function List .....                                                                 | 66        |
| Functional Extension FB Software Package .....                                                         | 67        |
| <b>Programming Support Tool .....</b>                                                                  | <b>68</b> |
| Programming Support Tool SX-Programmer<br>Expert (D300win) .....                                       | 68        |
| Programming Support Tool SX-Programmer Standard .....                                                  | 72        |
| Fuji Integrated Support Tool @E.Integrator .....                                                       | 74        |
| OPC-Coordinated Library SX Communication<br>Middleware .....                                           | 75        |
| SX Instrumentation Package .....                                                                       | 76        |
| Handy Monitor .....                                                                                    | 77        |
| <b>Related Devices .....</b>                                                                           | <b>78</b> |
| PCI-Bus-Based SPH300 CPU Board .....                                                                   | 78        |
| PCI-Bus-Based FL-net (OPCN-2) Ver. 2.0 Board .....                                                     | 79        |
| PCI-Bus-Based LE-net Loop 2 Board .....                                                                | 80        |
| Renewal Tool .....                                                                                     | 81        |
| <b>Dimensions .....</b>                                                                                | <b>82</b> |
| <b>Ordering Information .....</b>                                                                      | <b>87</b> |



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: ± 4kV<br>Aerial discharge: ± 8kV                                                                                       | IEC 61000-4-2 |
|                                  | Radiated, radio-frequency, electromagnetic field | 80 to 1000MHz (10V/m)<br>1.4~2.0GHz (3V/m)<br>2.0~2.7GHz (1V/m)                                                                           | IEC 61000-4-3 |
|                                  | EFT/B (Electrical fast transient/burst)          | Power supply line and I/O signal line (AC unshielded line): ±2 kV<br>Communication line and I/O signal line (DC, AC shielded line): ±1 kV | IEC 61000-4-4 |
|                                  | Lightning impulse surge                          | AC power supply: Common mode ±2 kV, normal mode: ±1 kV<br>DC power supply: Common mode ±0.5 kV, normal mode: ±0.5 kV                      | IEC 61000-4-5 |
|                                  | Conducted radio frequency                        | 150kHz to 80MHz, 10V                                                                                                                      | IEC 61000-4-6 |
|                                  | Power frequency magnetic field                   | 50Hz, 30A/m                                                                                                                               | IEC 61000-4-8 |
|                                  | Square wave                                      | ± 1.5kV rise time 1ns, pulse width 1μs 50Hz                                                                                               |               |
| Construction                     |                                                  | Open Type device                                                                                                                          |               |
| Cooling                          |                                                  | Self-cooling                                                                                                                              |               |

# 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<br>(Rated voltage, rated load)                                  | 10ms or less<br>(Rated voltage, rated load)                       | 1 cycle or less<br>(Rated voltage, rated load)                     |                                                                    |
| AC waveform distortion factor | 5% or less                                                                      | —                                                                 | 5% or less                                                         |                                                                    |
| Ripple factor tolerance       | —                                                                               | Three-phase full-wave rectification<br>can be used 5% or less     | —                                                                  |                                                                    |
| Leakage current               | 0.25mA or less                                                                  |                                                                   |                                                                    |                                                                    |
| Inrush current                | 22.5Ao-p or less<br>(Ta=25°C not repeated)                                      | 150Ao-p or less    2ms or less                                    | 22.5Ao-p or less<br>(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           | 2300Vrms AC, 1 second, between<br>power input terminals and ground              | 510Vrms AC, 1 second, between<br>power input terminals and ground | 2300Vrms AC, 1 second, between<br>power input terminals and ground | 1400Vrms AC, 1 second, between<br>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<br>(Monitoring of output voltage: 24V DC, 0.3A or less) |                                                                   | None                                                               |                                                                    |
| Multiple power supply         | Compatible (Up to 3 units mountable on the base board.)                         |                                                                   | None                                                               |                                                                    |
| Mass                          | Approx. 360g                                                                    |                                                                   | Approx. 180g                                                       |                                                                    |

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

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



CPU Module: NP1P □ - □ □

■ Features

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

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

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



■ Performance specifications

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

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

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

# Programmable Controllers

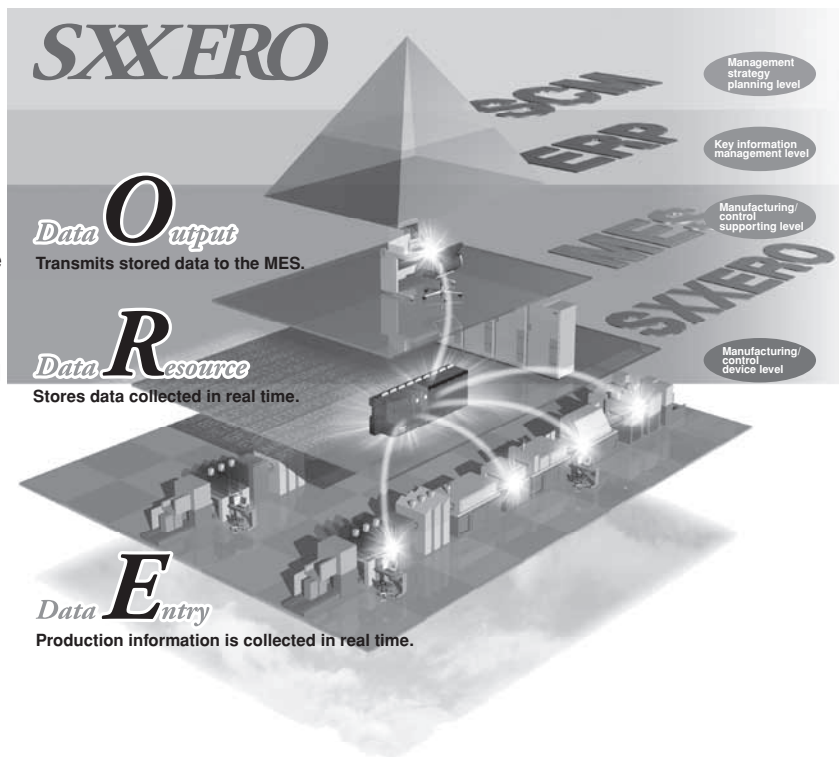
## MICREX-SX series SPH

### CPU Module

#### SPH2000

##### ■ Features

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

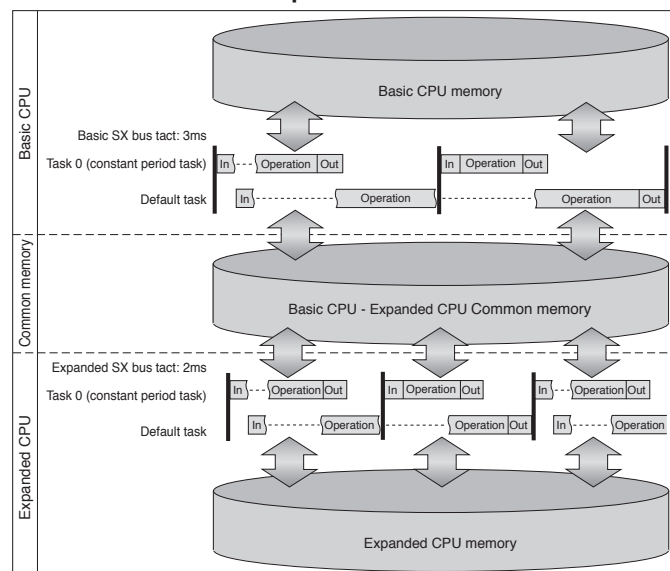


#### SPH300EX

##### ■ Features

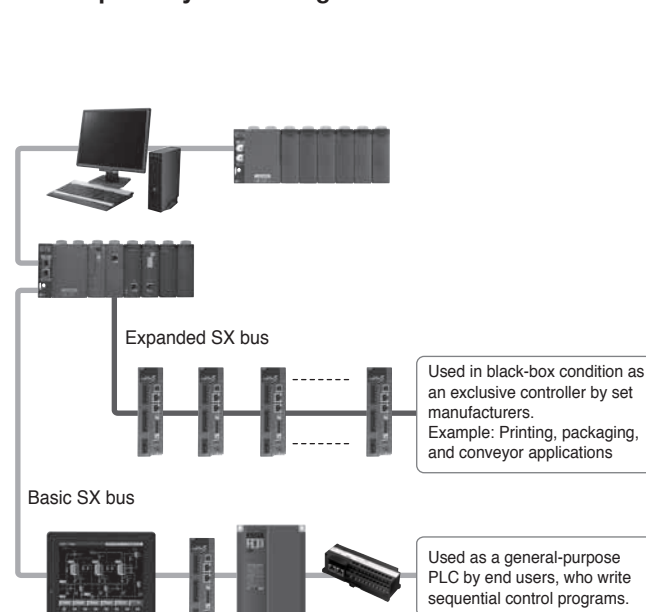
- Features dual control CPUs as standard equipment  
The basic CPU for ordinary sequential processing is used together with an expanded CPU for high-speed processing, to disperse the work load.
- Application to multi-axis servo systems  
The CPU and expanded CPU operate asynchronously, allowing the expanded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

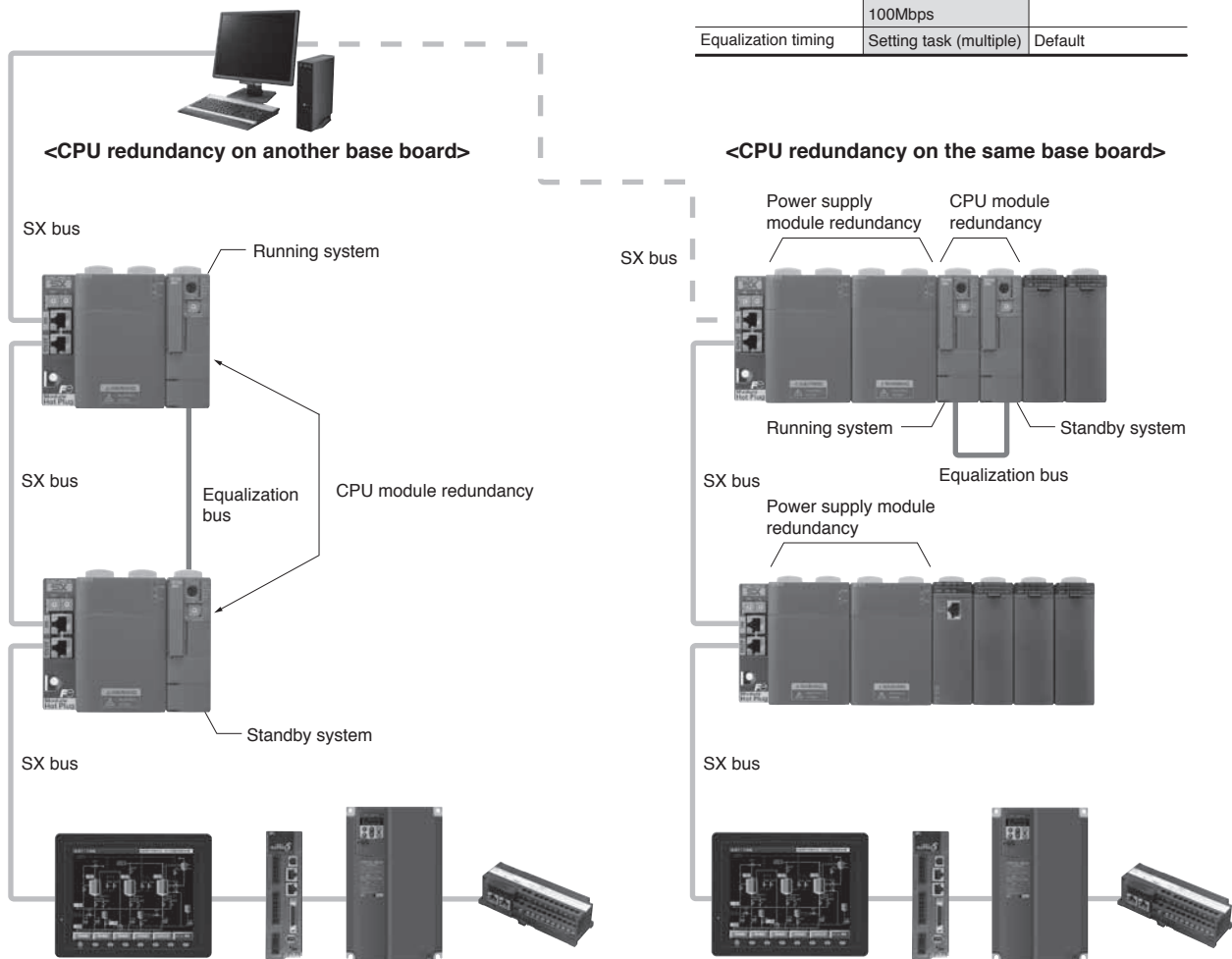
- Mass equalization data  
Up to 320K words of data can be equalized.
- High-speed transmission through dedicated equalization bus  
100Mbps dedicated equalization bus transmits the equalization data.  
Also, as a connection cable, a commercially available LAN cable (shielded category 5, cross connect 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-CPUs can be used for redundancy in multi-CPU (distributed processing) systems.
- Easy equalization setting  
Equalization area can be set up on a per-FB instance basis in addition to on a per-variable basis.
- System configuration with standard modules enabled  
Standard modules allow you to construct systems such as power supplies, base boards and I/O modules.

Comparing SPH redundancy performance

|                               | SPH2000<br>NP1PM-256H             | SPH300<br>NP1PS-□□ |
|-------------------------------|-----------------------------------|--------------------|
| Maximum equalization capacity | 320K words                        | 8K words           |
| Equalization performance      | 20ms/8K words<br>250ms/320K words | 200ms/8K words     |
| Equalization bus              | Ethernet (for only)<br>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.

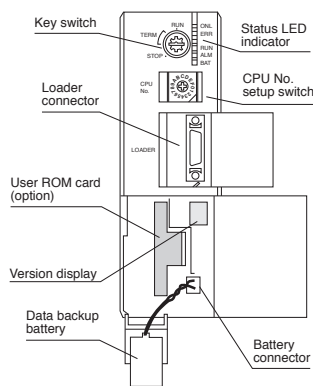
# Programmable Controllers

## MICREX-SX series SPH

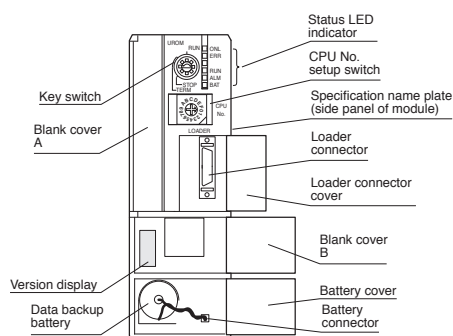
### CPU Module

#### ■ Outer view

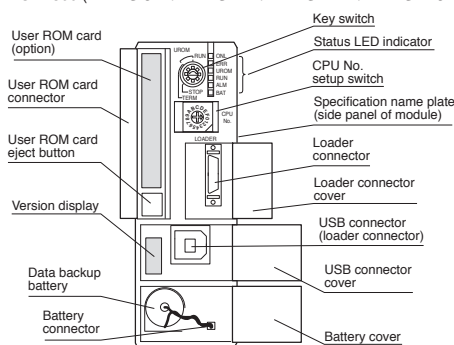
##### • SPH200 (NP1PH-08/NP1PH-16)



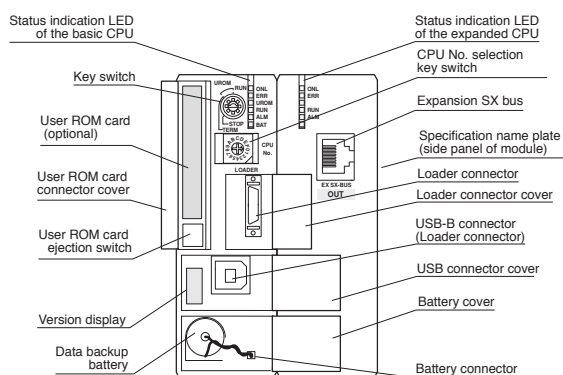
##### • SPH300 (NP1PS-32)



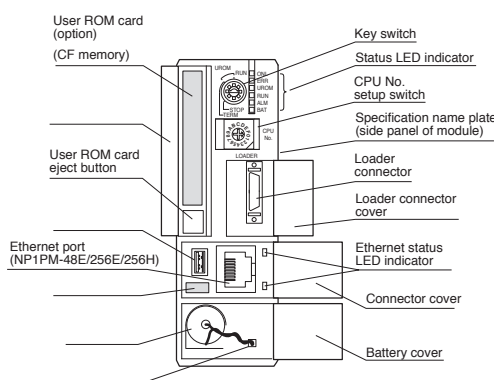
##### • SPH300 (NP1PS-32R/NP1PS-74R/NP1PS-117R/NP1PS-245R)



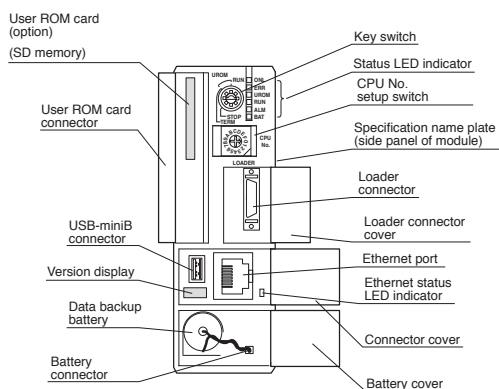
##### • SPH300EX (NP1PS-74D)



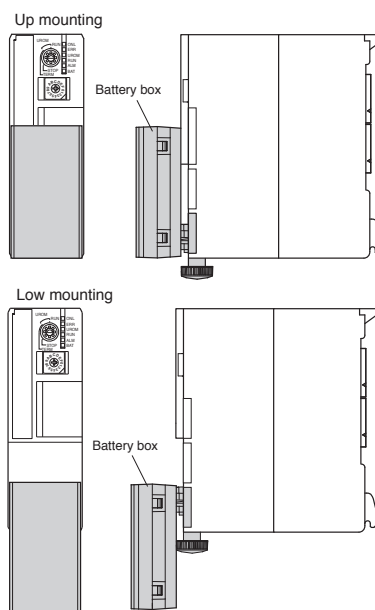
##### • SPH2000 (NP1PM-48R/NP1PM-48E/NP1PM-256E/NP1PM-256H)



##### • SPH3000 (NP1PU-048E/NP1PU-256E)



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



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



# 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.

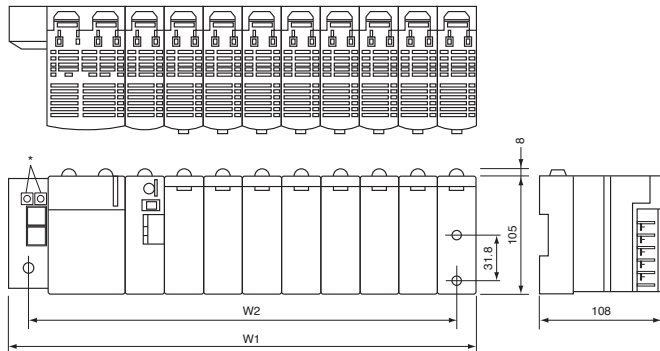
Make sure to always mount power supply module at the left side of the base board.

High-performance base board is used when configuring the system, such as multi-CPU's 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**

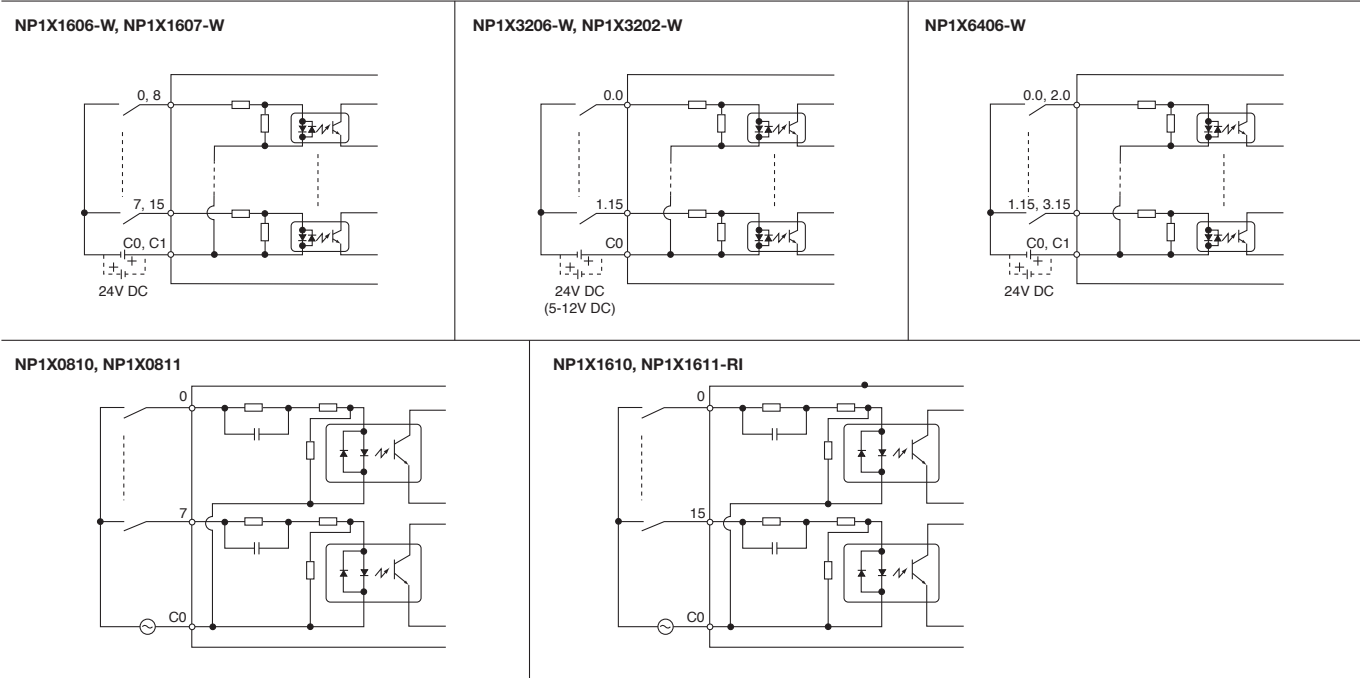
**Standard I/O Module**

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<br>Variable by parameter setting |              | Photocoupler     | LED indication    | 8 (x 2)               | Terminal block           | 35mA or less                          | Approx. 150g |
| NP1X1607-W  |                        |                     | 48V DC         | 5mA           | 34 to 60V         | 0 to 10V  |                                             |              |                  |                   |                       |                          | 35mA or less                          | Approx. 150g |
| NP1X3206-W  |                        | 32                  | 24V DC         | 4mA           | 15 to 30V         | 0 to 5V   |                                             |              |                  |                   | 32 (x 1)              | Connector                | 50mA or less                          | Approx. 130g |
| NP1X3202-W  |                        |                     | 5 to 12V DC    | 3 to 9mA      | 3.5 to 13.2V      | 0 to 1V   |                                             |              |                  |                   |                       |                          | 50mA or less                          | Approx. 130g |
| NP1X6406-W  |                        | 64                  | 24V DC         | 4mA           | 15 to 30V         | 0 to 5V   |                                             |              |                  |                   | 32 (x 2)              | 85mA or less             | Approx. 180g                          |              |
| NP1X0810    | AC input               | 8                   | 100 to 120V AC | 10mA          | 80 to 132V        | 0 to 20V  | Approx. 10ms                                | Approx. 10ms |                  |                   | 8 (x 1)               | Terminal block           | 35mA or less                          | Approx. 130g |
| NP1X1610    |                        | 16                  |                |               |                   |           |                                             |              |                  |                   | 16 (x 1)              |                          | 40mA or less                          | Approx. 170g |
| NP1X0811    |                        | 8                   | 200 to 240V AC | 7mA           | 160 to 264V       | 0 to 40V  | Approx. 30ms                                | 8 (x 1)      |                  |                   | 35mA or less          | Approx. 130g             |                                       |              |
| NP1X1611-RI |                        | 16                  |                |               |                   |           |                                             | 16 (x 1)     |                  |                   | 40mA or less          | Approx. 180g             |                                       |              |

■ Internal circuit diagram



# Programmable Controllers

## MICREX-SX series SPH

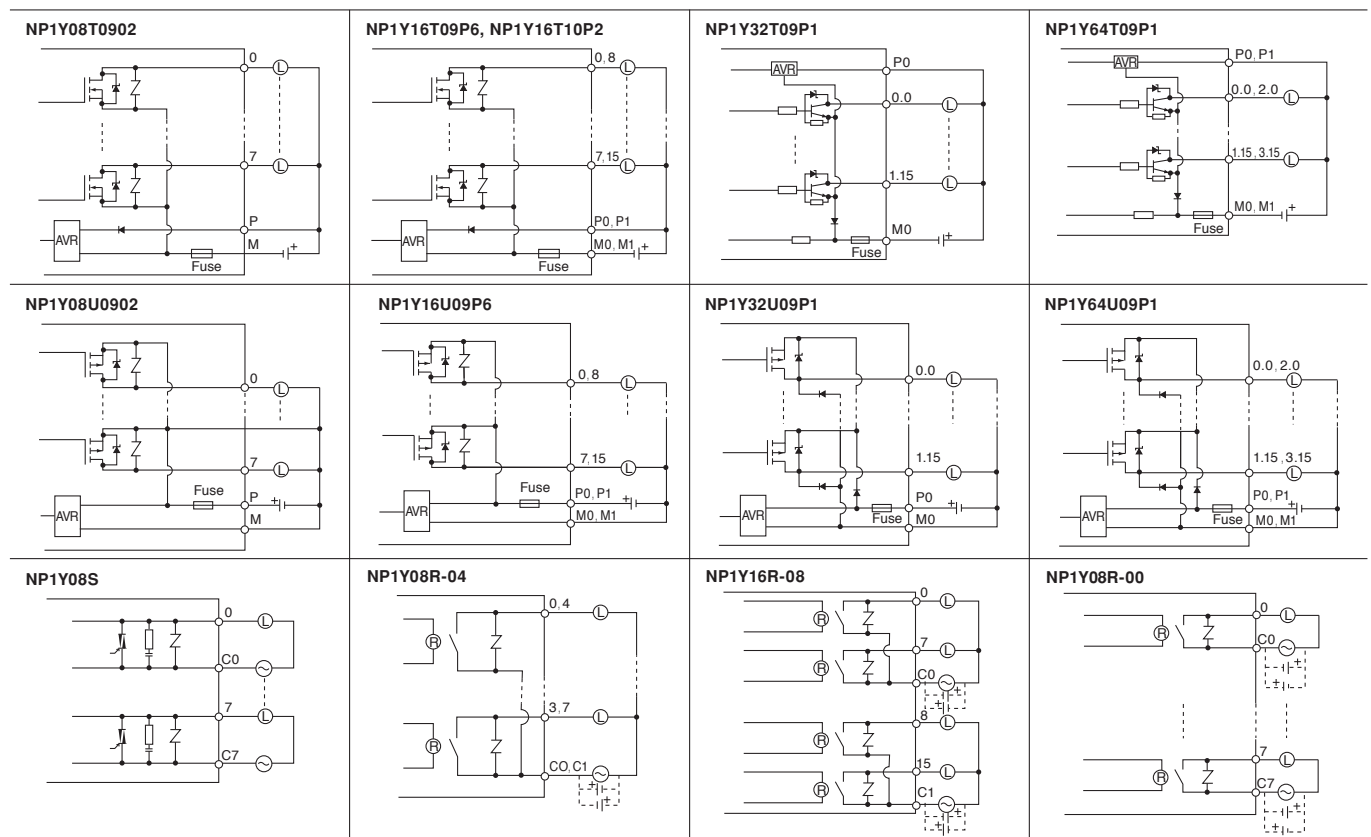
### Standard I/O Module

#### 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 |                          |                      | 48V DC           | 0.2A                  | 1.6A                |                  |                   |                        |                  |                          |                                       |                |               |                            |             |               |              | 42mA or less | Approx. 160g |              |              |              |              |              |          |                            |
| NP1Y32T09P1 |                          | 32                   | 12 to 24V        | 0.12A                 | 3.2A                |                  |                   |                        |                  |                          |                                       |                |               |                            |             |               |              |              |              | 32 (x 1)     | Zener diode  | Connector    | 45mA or less | Approx. 130g |          |                            |
| NP1Y64T09P1 |                          | 64                   | DC               |                       |                     |                  |                   |                        |                  |                          |                                       |                |               |                            |             |               |              |              |              |              |              |              |              |              | 32 (x 2) | 90mA or less               |
| NP1Y08U0902 | Transistor output source | 8                    |                  | 2.4A                  | 8A                  | 8 (x 1)          | Varistor          | Terminal block         | 20mA or less     | Approx. 150g             |                                       |                |               |                            |             |               |              |              |              |              |              |              |              |              |          |                            |
| NP1Y16U09P6 |                          | 16                   |                  | 0.6A                  | 4A                  |                  |                   |                        |                  |                          | 8 (x 2)                               | 30mA or less   | Approx. 160g  |                            |             |               |              |              |              |              |              |              |              |              |          |                            |
| NP1Y32U09P1 |                          | 32                   |                  | 0.12A                 | 3.2A                |                  |                   |                        |                  |                          |                                       |                |               | 32 (x 1)                   | Zener diode | Connector     | 45mA or less | Approx. 140g |              |              |              |              |              |              |          |                            |
| NP1Y64U09P1 |                          | 64                   |                  |                       |                     |                  |                   |                        |                  |                          |                                       |                |               |                            |             |               |              |              | 32 (x 2)     | 90mA or less | Approx. 180g |              |              |              |          |                            |
| NP1Y08S     |                          | SSR output           | 8                | 100 to 240V AC        | 2.2A                |                  |                   |                        |                  |                          |                                       |                |               |                            |             |               |              |              |              |              |              | 2.2A         | 10ms or less | 10ms or less | Relay    | All points are independent |
| NP1Y08R-04  | Relay output             | 8                    | 110V DC/ 240V AC | 30V DC/ 264V AC: 2.2A | 30V DC/ 264V AC: 4A | Approx. 10ms     | Approx. 10ms      | 4 (x 2)                | Varistor         |                          |                                       |                |               |                            |             |               |              |              |              |              |              | 80mA or less | Approx. 150g |              |          |                            |
| NP1Y16R-08  |                          | 16                   |                  | 110V DC: 0.2A         | 110V DC: 0.8A       |                  |                   |                        |                  |                          | 8 (x 2)                               |                | 176mA or less |                            |             |               |              |              |              |              |              |              |              | Approx. 190g |          |                            |
| NP1Y08R-00  |                          | 8                    |                  | -                     |                     |                  |                   |                        |                  |                          |                                       |                |               | All points are independent |             | 100mA or less | Approx. 170g |              |              |              |              |              |              |              |          |                            |

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

Internal circuit diagram

NP1W1606T

Input circuit

Output circuit

NP1W1606U

Input circuit

Output circuit

NP1W3206T

Input circuit

Output circuit

NP1W3206U

Input circuit

Output circuit

NP1W6406T

Input circuit

Output circuit

NP1W6406U

Input circuit

Output circuit

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

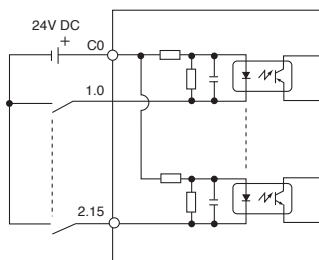
- Digital input module with pulse catch input
- Pulse catch input of minimum 20μs or normal input
- Pulse counter input function of maximum 20kHz, 4 ch. (2-phase)

#### Specifications

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

#### Internal circuit diagram

NP1X3206-A



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

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

#### Specifications

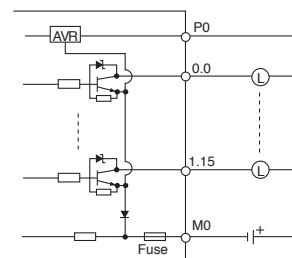
| Type          | Output                  | No. of output points | Rated voltage | Max. load current |        | Response time              |                           | Isolation method | Status indication | No. of points /common | Surge protection | External wire connection | Internal current consumption (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<br>(2) Pulse train + Sign                                              |
| Output pulse counting method         | Built-in 16-bit up-down counter                                                                         |
| Operation mode                       | Start, stop, and clear operations,<br>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

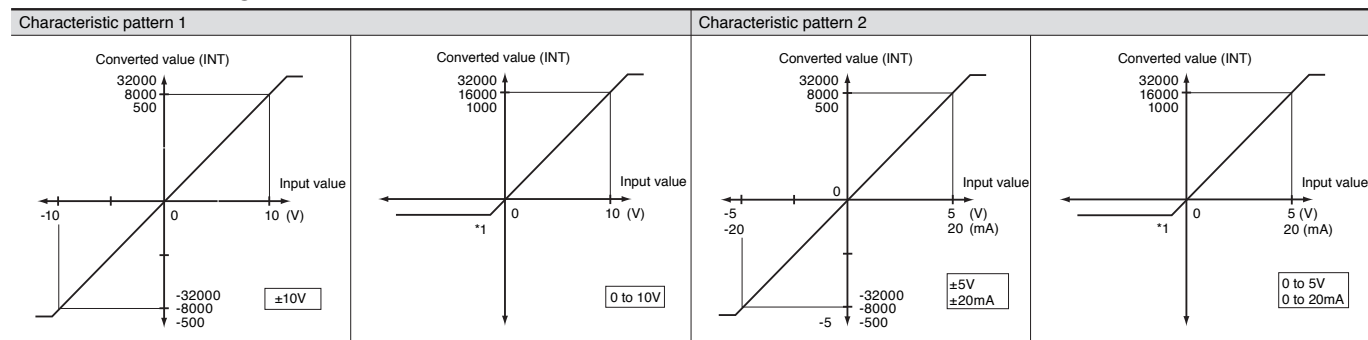
#### Analog Input Module: NP1AX □

#### ■ Performance specifications

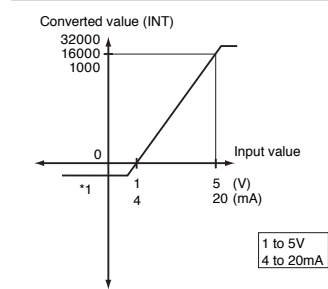
| Type         | Input             | No. of channels | Signal range                                                         | Digital output value                 | Digital resolution | Total accuracy                                                                           | Converting speed     | Occupied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

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

#### ■ Characteristic diagram



#### Characteristic pattern 3



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

#### ■ Input value and converted value

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



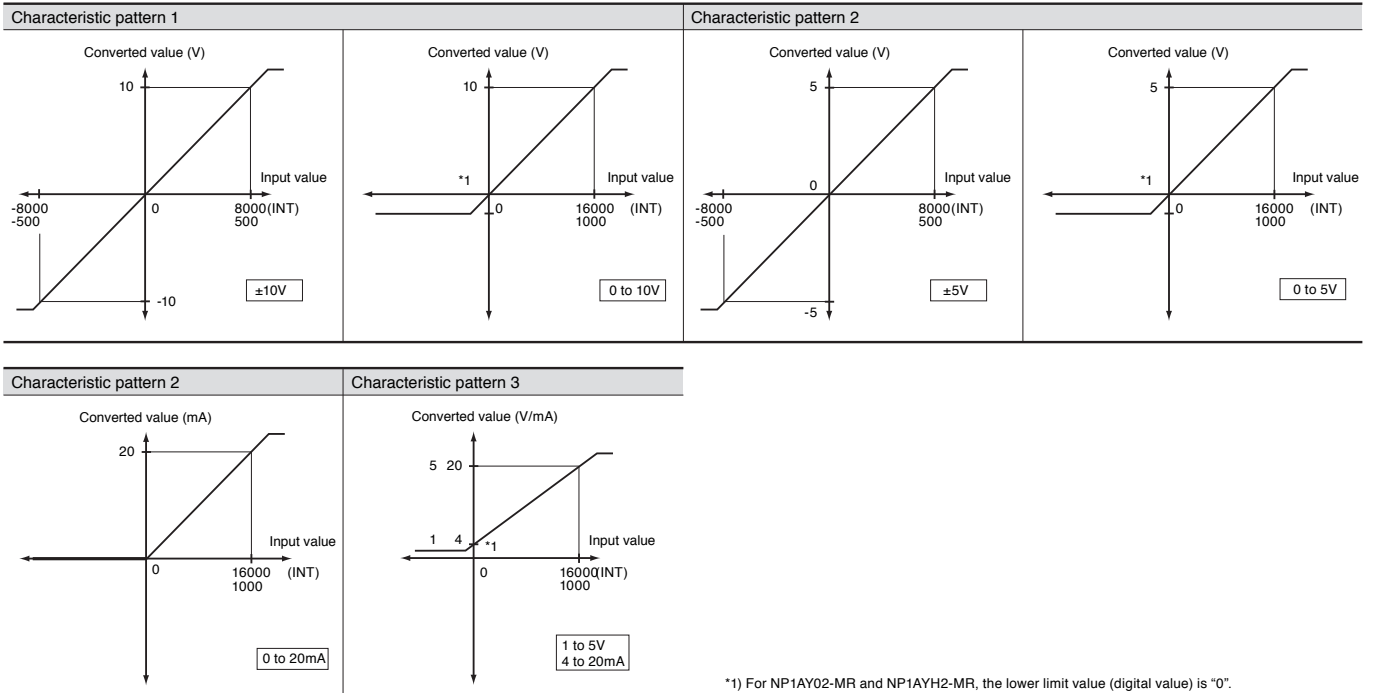
## Analog Output Module: NP1AY

### Performance specifications

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

\*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

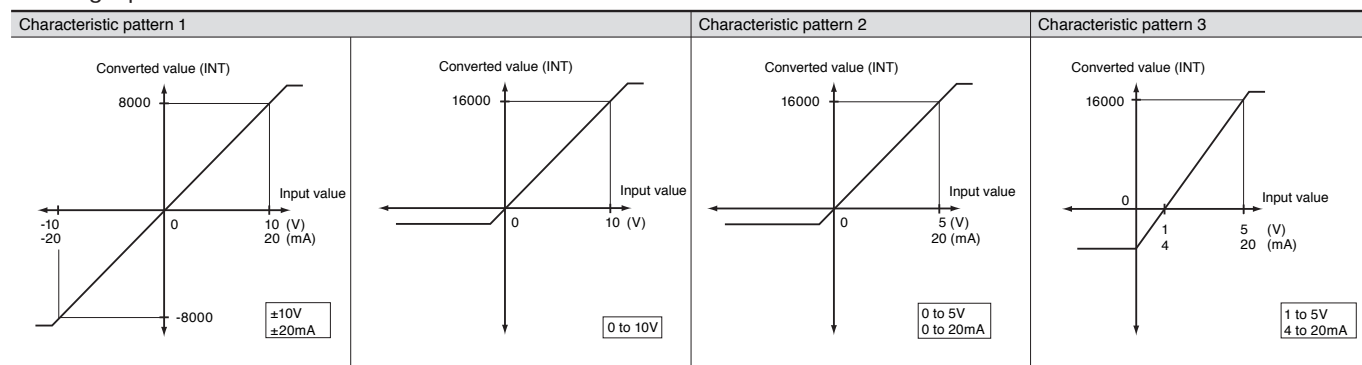
#### Analog Input /Output Module: NP1AWH6-MR

#### ■ Performance specifications

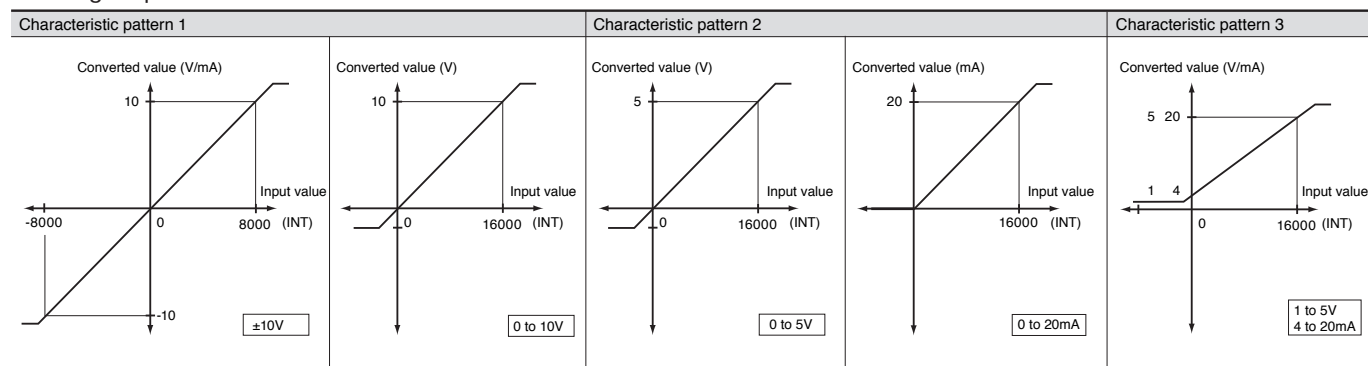
| Type       | Input                    | No. of channels | Signal range                                                                                                                                     | Digital input output value         | Digital resolution | Total accuracy                                                                                                                 | 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:<br>0 to 5V DC<br>0 to 10V DC<br>1 to 5V DC<br>-10 to +10V DC<br>Current input:<br>0 to 20mA DC<br>4 to 20mA DC<br>-20 to +20mA DC | -8000 to +8000<br>or<br>0 to 16000 | 14 bits            | ± 0.1% or less (at 18 to 28°C)<br>± 0.2% or less (at 0 to 55°C)<br>± 0.3% or less (at 0 to 55°C,<br>0 to 20mA/4 to 20mA range) | 1ms/4 ch         | 4 words +<br>4 words           | Non-insulation              | Terminal block           | 200mA or less                         | Approx. 240g |
|            |                          | 2 ch            | Voltage output:<br>0 to 5V DC<br>0 to 10V DC<br>1 to 5V DC<br>-10 to +10V DC<br>Current output:<br>0 to 20mA DC<br>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<br>±0.7% (ambient temperature 0 to 55°C) | ±0.05 to ±0.07% (ambient temperature 18 to 28°C)<br>±0.239% (ambient temperature 0 to 55°C)                                                                       |
| Allowable input wiring resistance | 10Ω or less<br>500ms/4 ch                                                           | 20Ω or less<br>45ms/6 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.<br>(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)<br>Measuring temperature range | Fahrenheit (°F)<br>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                                  |                    |
|                                        | 0.0 to 100.0                                | 32.0 to 212.0                                  |                    |
|                                        | 0.0 to 400.0                                | 32.0 to 752.0                                  |                    |
|                                        | -200.0 to 200.0                             | -328.0 to 392.0                                |                    |
|                                        | -200.0 to 500.0                             | -328.0 to 932.0                                |                    |
|                                        |                                             |                                                |                    |

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

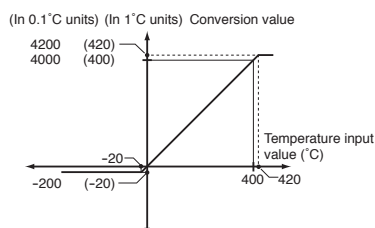
#### NP1AXH6G-PT

| Type of resistance thermometer element | Celsius (°C)<br>Measuring temperature range | Fahrenheit (°F)<br>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                                  |                    |
|                                        | -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 to 200                                    | 32 to 392                                      | 0.01               |
|                                        | -20 to 80                                   | -4 to 176                                      |                    |
|                                        | 0 to 100                                    | 32 to 212                                      |                    |
|                                        | 0 to 400                                    | 32 to 752                                      |                    |
|                                        | -200 to 200                                 | -328 to 392                                    |                    |
|                                        | -200 to 500                                 | -328 to 932                                    |                    |
|                                        | 0.0 to 200.0                                | 32.0 to 392.0                                  |                    |
|                                        | -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                                | 0.1                |
|                                        | -200.0 to 500.0                             | -328.0 to 932.0                                |                    |
|                                        |                                             |                                                |                    |
|                                        |                                             |                                                |                    |
|                                        |                                             |                                                |                    |

### Characteristic diagram

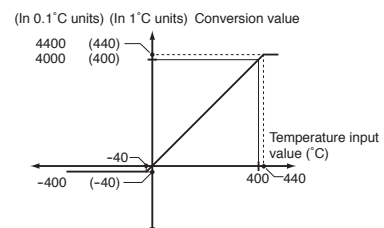
#### NP1AXH4-PT

In case of PT0.0 to 400.0°C



#### 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                              | <b>NP1AXH4-TC</b>                                                                   | <b>NP1AXH8G-TC</b>                                                                                                                                                |
| Measurement accuracy * 3           | ±0.3% (ambient temperature 18 to 28°C) * 1<br>±0.7% (ambient temperature 0 to 55°C) | ±0.05% (ambient temperature 25°C) * 2                                                                                                                             |
| Cold contact compensation accuracy | ±1°C (ambient temperature 18 to 28°C)                                               | ±1°C (ambient temperature 18 to 28°C)                                                                                                                             |
| 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.<br>(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)                | Fahrenheit (°F)             | Resolution of data |
|-------------------|-----------------------------|-----------------------------|--------------------|
|                   | Measuring temperature range | Measuring temperature range |                    |
| 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)                | Fahrenheit (°F)             | Resolution of data |
|-------------------|-----------------------------|-----------------------------|--------------------|
|                   | Measuring temperature range | Measuring temperature range |                    |
| 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             |                    |
|                   | 0.00 to 300.0               | -                           | 0.05               |
| B                 | 0 to 1820                   | 32 to 3308                  | 1                  |
| R                 | -50 to 1760                 | 58 to 3200                  | 1                  |
| S                 | -50 to 1760                 | 58 to 3200                  | 1                  |
| E                 | -250 to 1000                | -418 to 1832                | 1                  |
|                   | -120.0 to 1000.0            | -184.0 to 1832.0            | 0.1                |
|                   | -120.00 to 160.00           | -                           | 0.03               |
| J                 | -200 to 500                 | -328 to 932                 | 1                  |
|                   | -200 to 800                 | -328 to 1472                | 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            |                    |
|                   | -100.0 to 1100.0            | -148.0 to 2012.0            |                    |
|                   | -80.00 to 180.00            | -                           | 0.04               |
| T                 | -260 to 400                 | -436 to 752                 | 1                  |
|                   | -150.0 to 200.0             | -238.0 to 392.0             | 0.1                |
| N                 | -200 to 1300                | -328 to 2372                | 1                  |
| U                 | -150 to 550                 | -238 to 1022                | 1                  |
|                   | 0.0 to 550.0                | 32.0 to 1022.0              | 0.1                |
| L                 | -150 to 400                 | -238 to 752                 | 1                  |
|                   | -150 to 850                 | -238 to 1562                | 0.1                |
|                   | 0.0 to 400.0                | 32.0 to 752.0               |                    |
|                   | 0.0 to 850.0                | 32.0 to 1562.0              |                    |
| PL II             | 0 to 1300                   | 32 to 2372                  | 1                  |
|                   | 0.0 to 1300.0               | 32.0 to 2372.0              | 0.1                |
| W5Re, W26Re       | 0 to 2300                   | 32 to 4172                  | 1                  |

### Distributor Module: NP1AXH4DG-MR

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

### Specifications

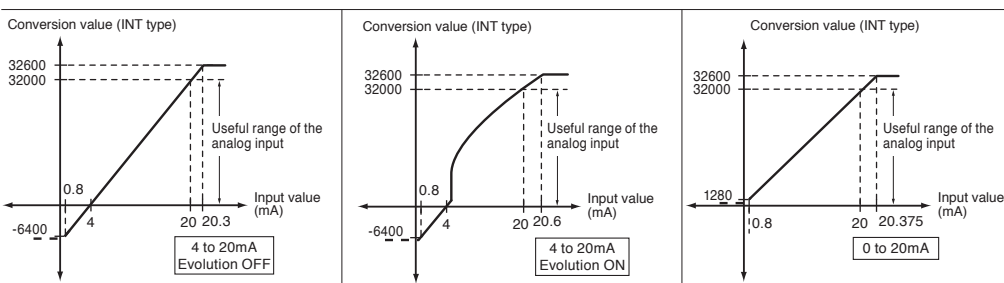
| Item                                      | Specification                                                                                                                                                                                                                                                          |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Specification                             | <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%<br>2) Permissible current: 23mA or less<br>3) Short-circuit limitation current: Approx. 25mA<br>4) Ripple noise: Approx. 250mV (p-p) or less<br>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)<br>Transformer insulation (between analog input terminals and channels)                                                                                                              |
| Dielectric strength                       | 1000V AC 1 minute (between I/O terminals and FG) (short circuit current: 10mA)<br>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)<br>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.)<br>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                                        |
| Digital input/output module                     | NP1Y64U09P1   | Transistor source, 12 to 24V DC, 64 points, 0.12A/point, 3.2A/common                                        |
|                                                 | 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                       | NP1W6406U     | 24V DC, 32 points, Bidirectional input, 12 to 24V DC, Tr source 32-point output                             |
|                                                 | NP1F-HC2      | 500kHz x 2 ch, 90-degree phase difference 2-phase signal, pulse + directional signal, others                |
|                                                 | NP1F-HC8      | 50kHz x 8 ch, 90-degree phase difference 2-phase signal, pulse + directional signal, others                 |
|                                                 | NP1F-HP2      | Pulse train command 250kHz x 2 ch.                                                                          |
| Pulse train output positioning control module   | NP1F-MP2      | 2-axis pulse train command positioning control combined module output pulse: 250kHz, Feedback pulse: 500kHz |
| Pulse train positioning control combined module | NP1F-MA2      | 2-axis analog command positioning control combined module feedback pulse: 500kHz                            |

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

#### ■ Recommended connectors

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

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

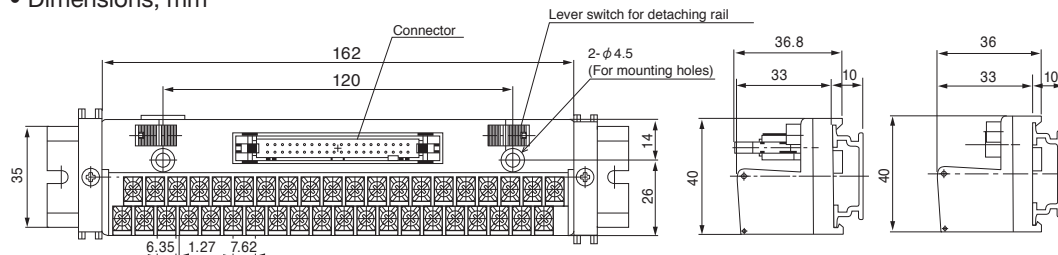
Note) For more retail, refer to each user's manuals.

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

##### • Specifications

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

##### • Dimensions, mm



##### • 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

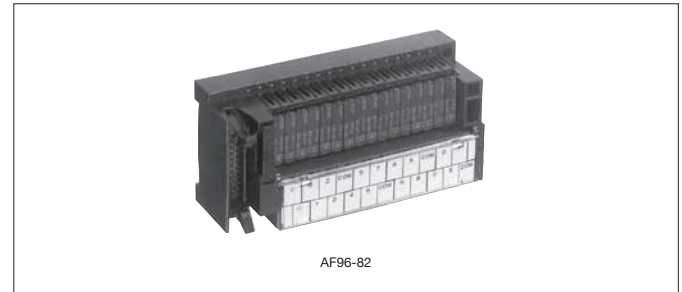
(Model by Fuji Electric FA Components & Systems Co., Ltd.)

#### ■ 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<br>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><br>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                                                                                           |



- 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)              |

#### ■ Terminal relay cable

- Type, model, and ordering code

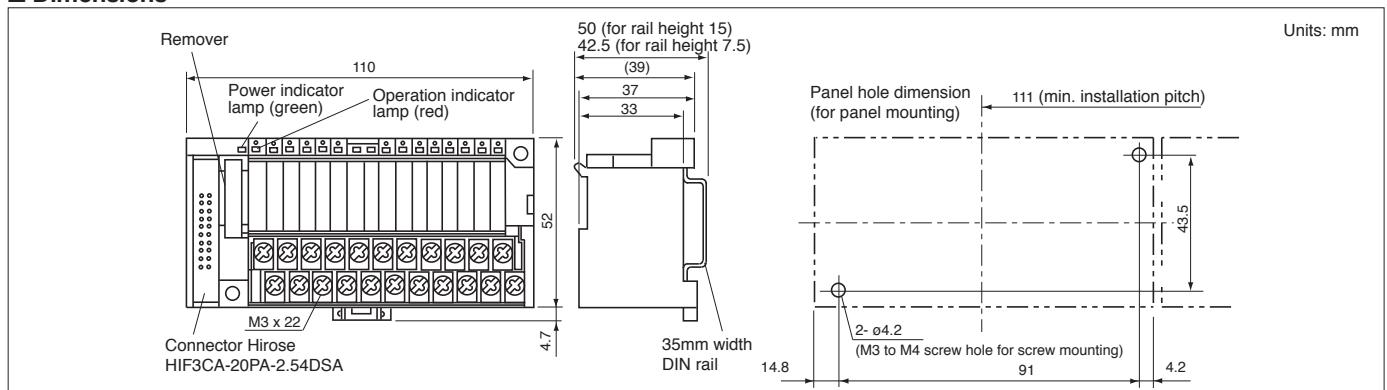
| Type                                                                | Cable Length | Model (ordering code) |
|---------------------------------------------------------------------|--------------|-----------------------|
| Cable with connectors (1:2)<br>For MICREX-SX<br>(for input, output) | 1,000mm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

- Model, and ordering code

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

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

#### ■ Dimensions





# 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

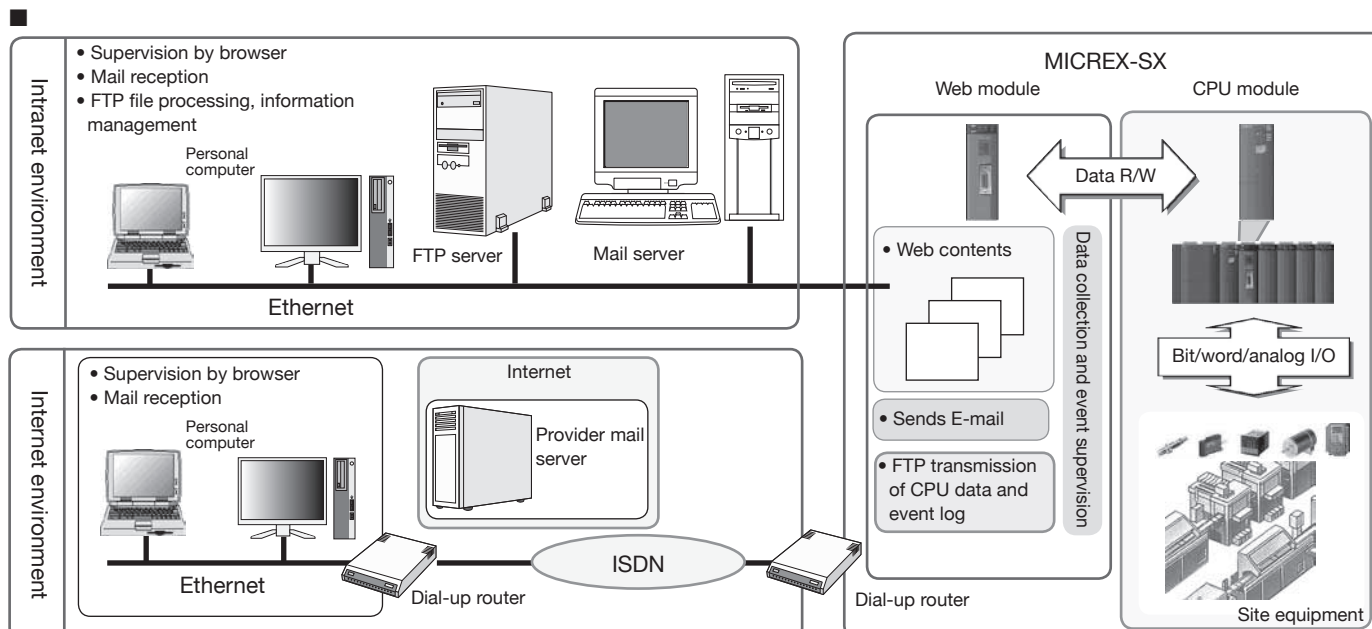
| Item                            | Specification                                                                                                                                                                                                                                                                    |
|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Web server functions            | Controller data can be monitored and set using a browser (Internet Explorer) on a remote personal computer.<br>Mounts the tabular form data display and trend graph display functions as standard.<br>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.<br>Saved data can be processed to generate a daily/monthly report or trend graph.                                                                                               |
| Security function               | Limits users and setup operations by user name and password.                                                                                                                                                                                                                     |
| Remote loader function          | Remote operation of SX support tool (D300win), such as monitoring of SPH sequence, from a personal computer                                                                                                                                                                      |
| PPP function                    | Realizes the above functions through the modem (telephone and PHS circuit connection service) and mobile arc (Dopa network) on the RS-232C interface.                                                                                                                            |
| User contents creation function | Incorporates user-created contents in the Web module.                                                                                                                                                                                                                            |
| SNTP function                   | Controller data can be calibrating the date data (calendar) of the CPU module.                                                                                                                                                                                                   |

#### ■ Performance specifications

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



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



**Ethernet Interface Module: NP1L-ET1**

■ **Features**

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

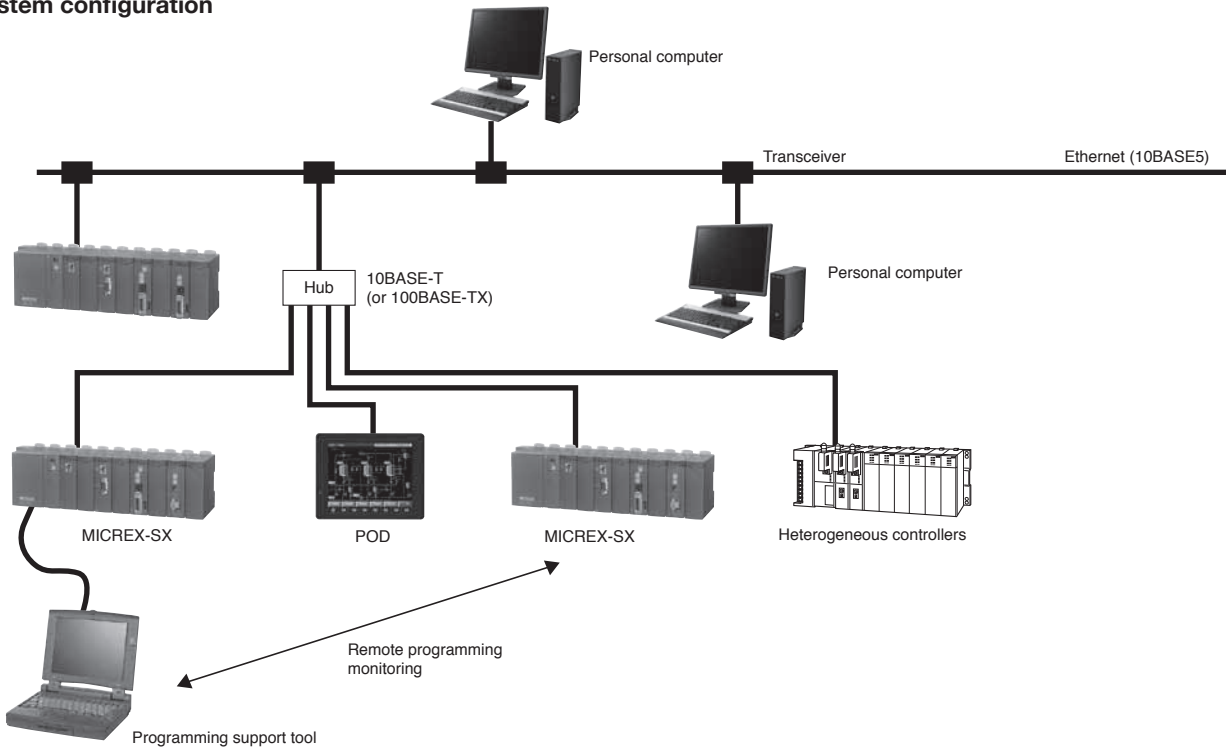


■ **Performance specifications**

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

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

■ **System configuration**



# Programmable Controllers

## MICREX-SX series SPH

### Communication Module

#### Online Adapter: FOA-ALFA2 [Japanese Version]

##### ■ Features

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

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

##### ■ Specifications

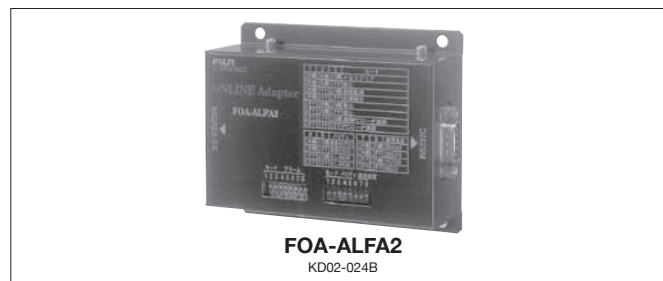
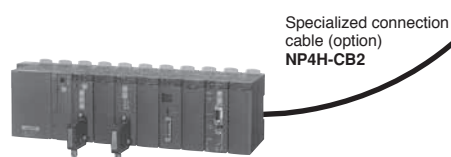
###### • General specifications

| Item                           | Specification                                                                                               |
|--------------------------------|-------------------------------------------------------------------------------------------------------------|
| Physical environment           | Operating ambient temperature                                                                               |
|                                | 0 to $\pm 55^{\circ}\text{C}$ (without condensation)                                                        |
|                                | Storage temperature                                                                                         |
|                                | $-20$ to $+70^{\circ}\text{C}$ (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                                                                                           |
| Battery type/operating life    | $\pm 90$ seconds/month ( $25^{\circ}\text{C}$ , conduction)                                                 |
|                                | Lithium primary battery 3.6V                                                                                |
|                                | 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.

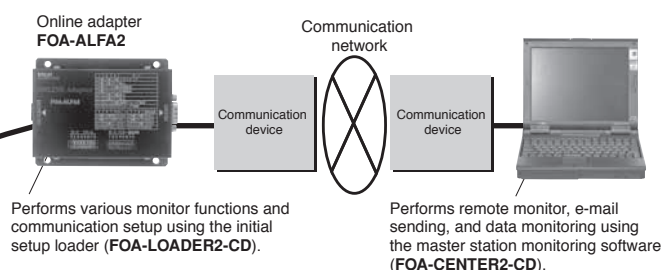
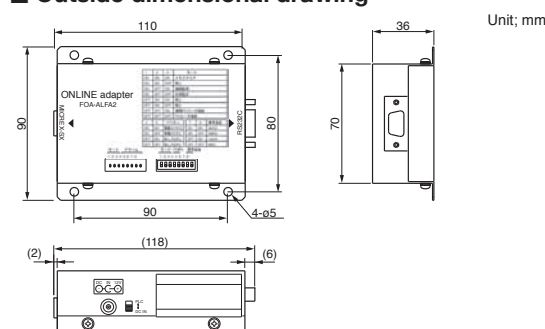
##### ■ System configuration



##### • Functional specifications

| Mode                | Contents                                                                                  |
|---------------------|-------------------------------------------------------------------------------------------|
| Online adapter mode | Execution mode of various monitor functions                                               |
| Loader mode         | Monitors SPH programming monitor.                                                         |
| Remote mode         | Monitors SPH 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.

##### ■ 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.

**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.

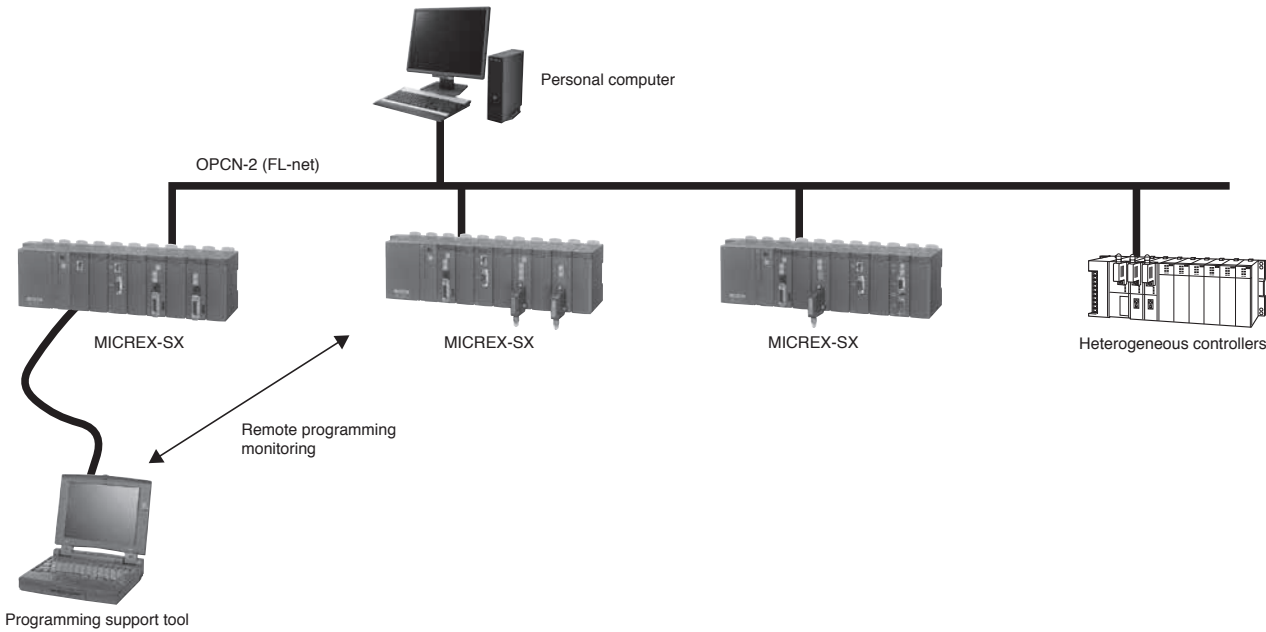


■ **Performance specifications**

| 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              | • Cyclic broadcast transmission method    Data size: Max. 8.5 Kwords<br>• Message transmission method    Data size: Max. 512 words |
| Host interface                    | Common memory cyclic refresh method, block data read / write                                                                       |
| Internal current consumption      | 24V DC, 160mA or less                                                                                                              |
| Mass                              | Approx. 220g                                                                                                                       |

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

■ **System configuration**





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

**LONWORKS Network Interface Module: NP1L-LW1**

■ **Features**

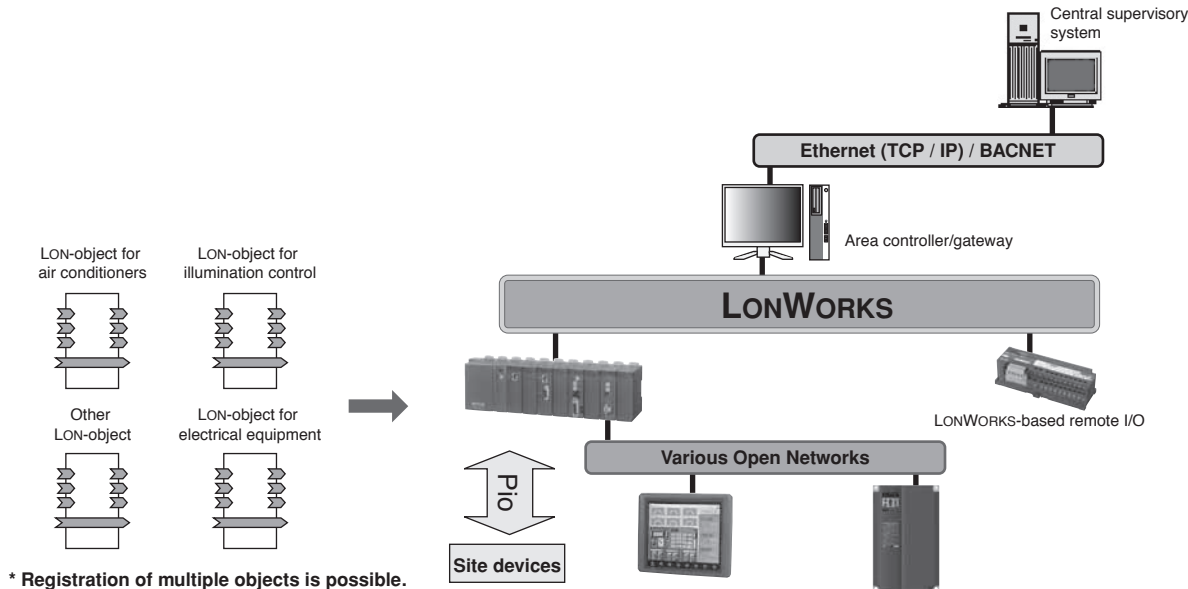
- Uses the communication extension FB compatible with the LONWORKS network, making it easier to transfer and receive MICREX-SX application data to/from other LONWORKS nodes.
- Max. number of NVs: 300, Number of CPs: Up to 200 intelligent nodes can be configured.
- Up to two units can be mounted in one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



■ **Specifications**

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

■ **System configuration**



**LONWORKS Network Interface Module Support Tool: [Japanese Version]**

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

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

- Features

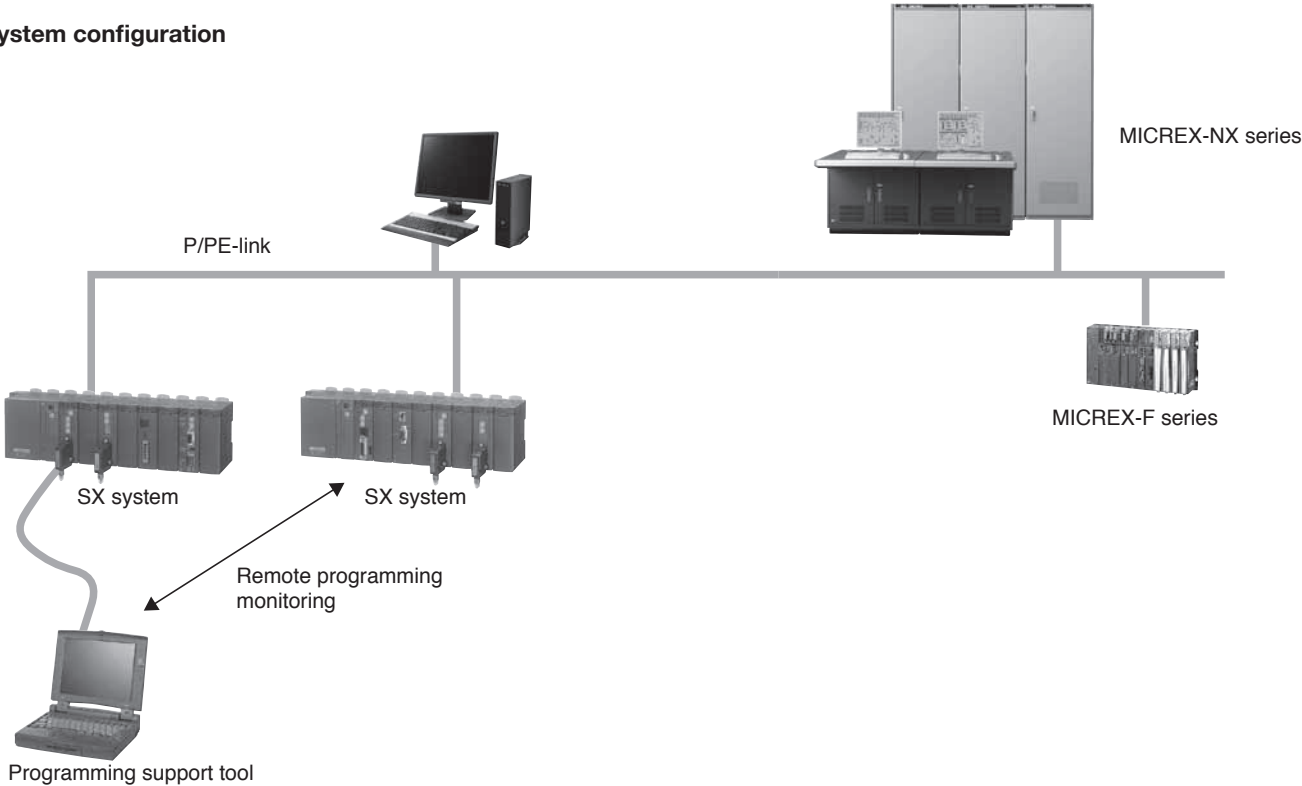
  - Up to 2 P/PE-link modules can be installed in a single system configuration. (For SPH200, up to two modules)
  - N-to-N communications in the token passing method
  - Data exchange between processors  
Broadcast communication, message communication
  - User program upload/download and processor start/stop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



■ Performance specifications

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

■ System configuration



Programmable Controllers

**MICREX-SX series SPH**

**Communication Module**

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

■ **Features**

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



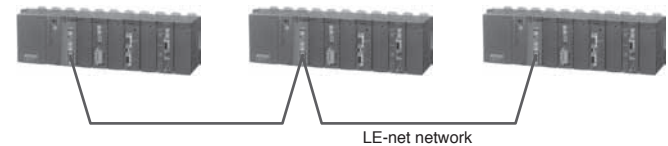
Note: Multi-drop networks, loop-2 networks cannot be connected with each other because each network uses a different transmission protocol. To connect them together, the transmission method must be unified.

■ **Performance specifications**

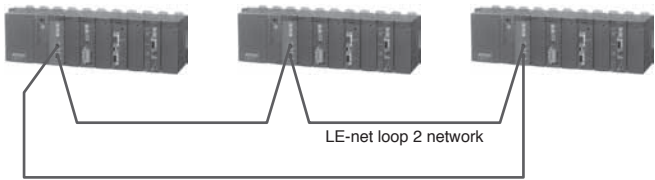
| Item                                        | LE-net module                                                                        | Loop 2 module                                                            |
|---------------------------------------------|--------------------------------------------------------------------------------------|--------------------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

■ **System configuration**

- LE-net module

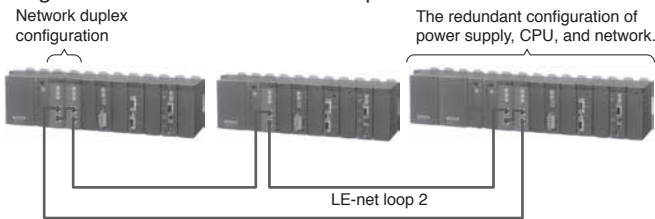


- LE-net loop 2 module
- 1) Basic system



- 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.



# 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<br>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 |



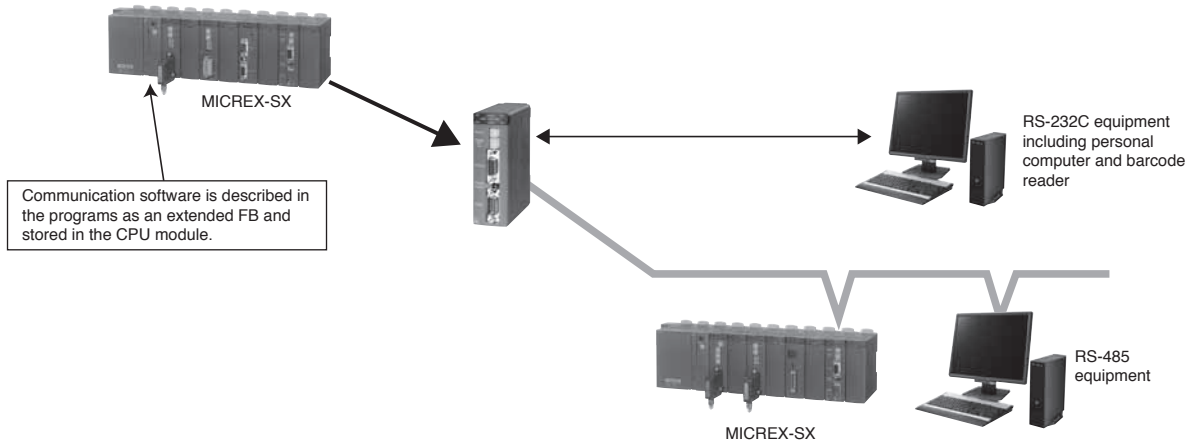
- Communication port specifications

| 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.

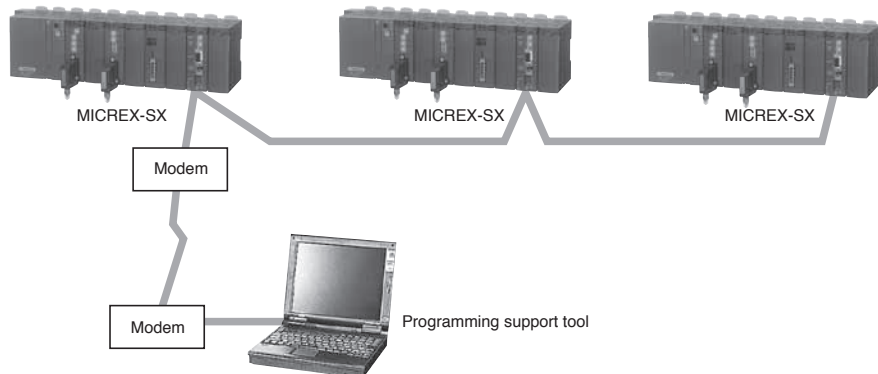
\*2: For transmission rates 300, 600, 76800, and 115200 bps, use FBs corresponding to the transmission rate.

### ■ 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





# Programmable Controllers

## MICREX-SX series SPH

### Communication Module

#### Device-level Communication Module

OPCN-1 Master Module: NP1L-JP1

OPCN-1 Slave Module: NP1L-JS1

OPCN-1 Interface Module: NP1L-RJ1

#### ■ Features

##### NP1L-JP1

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

##### NP1L-JS1

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

#### ■ 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)<br>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<br>(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.

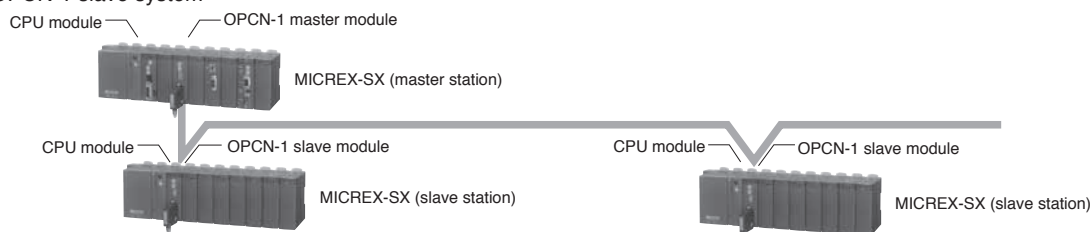


##### NP1L-RJ1

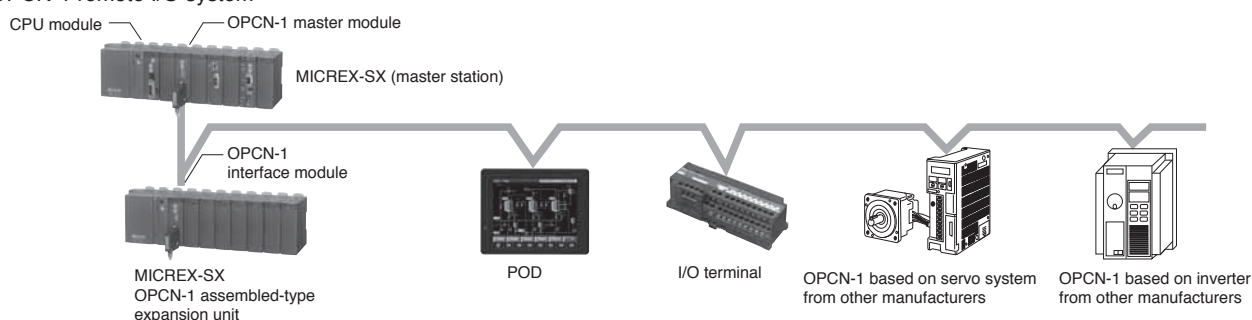
- Slave station configuration, conforming to the OPCN-1 Standard, implements compact, economical, centralized remote I/O as a multi-vendor network.
- Input filtering time of the input module can be set with DIP switch on the front.

#### ■ 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.

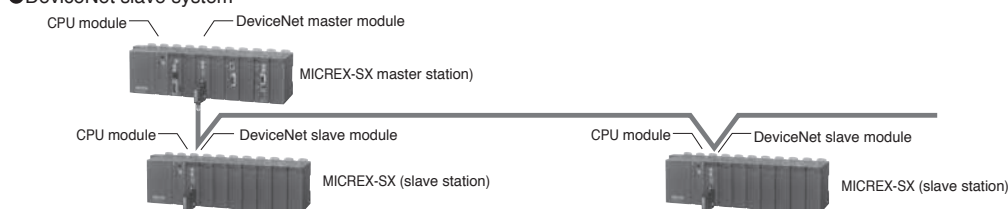


#### ■ Communication specifications

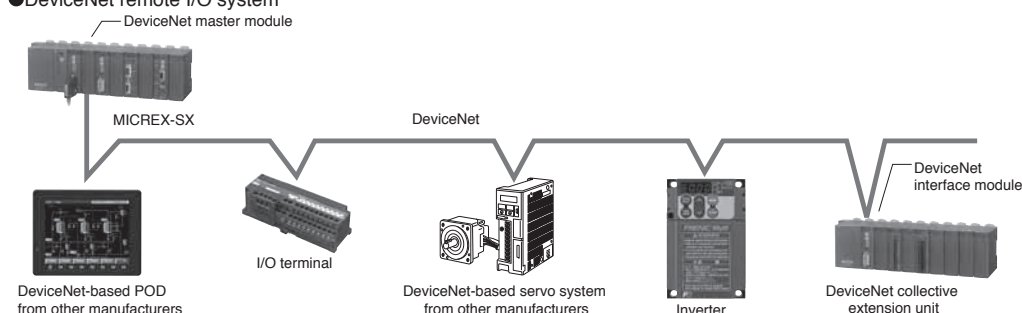
| Item                              | Specification                                                                                                                                                                                                                                                         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

#### ■ System configuration

##### ● DeviceNet slave system



##### ● DeviceNet remote I/O system



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.



**NP1L-RT1**

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

■ Communication specifications

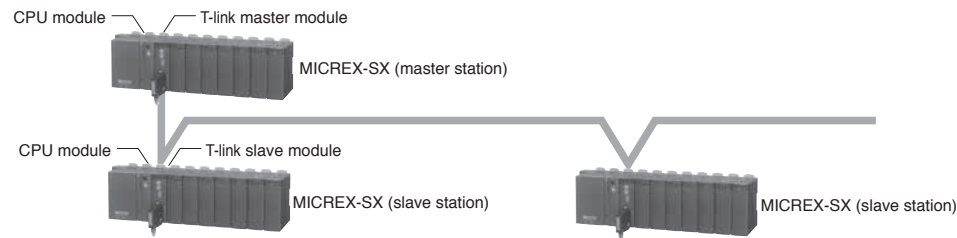
| Item                                      | Specification                                                                                                                                                                                                             |                 |                 |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|
| 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, multicomponet cable (Optical connector FNC120/130 is needed for the optical transmission line) |                 |                 |
| Transmission method                       | Half-duplex, serial transmission                                                                                                                                                                                          |                 |                 |
| Data exchange method                      | 1:N (polling / selecting) method                                                                                                                                                                                          |                 |                 |
| Transmission speed                        | 500kbps                                                                                                                                                                                                                   |                 |                 |
| Error check                               | FCS ( $X^{16}+X^{12}+X^5+1$ )                                                                                                                                                                                             |                 |                 |
| No. of I/O points                         | Normal mode: Max. 2048 points (128 words)<br>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.

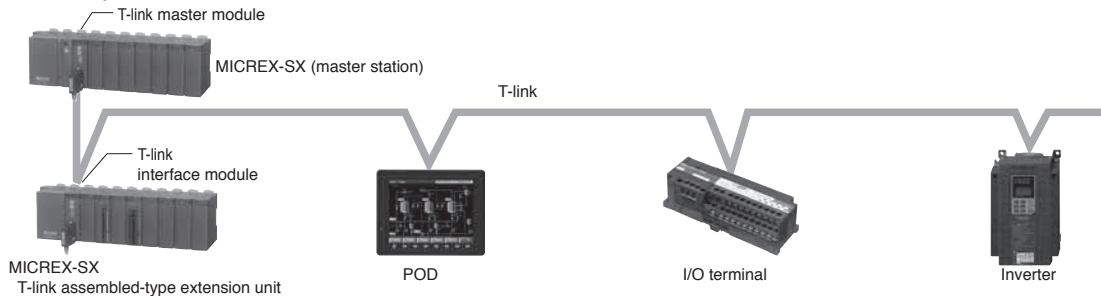
\* 2 Up to 64 units can be connected as slaves when using the T link electric repeater.

■ System configuration

● T-link slave system



● T-link remote I/O system



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

■ **Features**

**NP1L-PD1**

• **Open system**

Diverse slave products of PROFIBUS-DP can be connected (from more than 300 vendors). As for the DP slave, the compatibility authenticated by the PROFIBUS association has been confirmed.

• **Flexible system configuration**

In addition to the basic configuration consisting of one DP master and multiple DP slaves, combination with multiple DP masters and multiple DP slaves are possible, making it easier to distribute master functions.

The maximum number of unit connections (including master stations) is 126. With 33 units or more, repeaters are required.

• **Transmission rate**

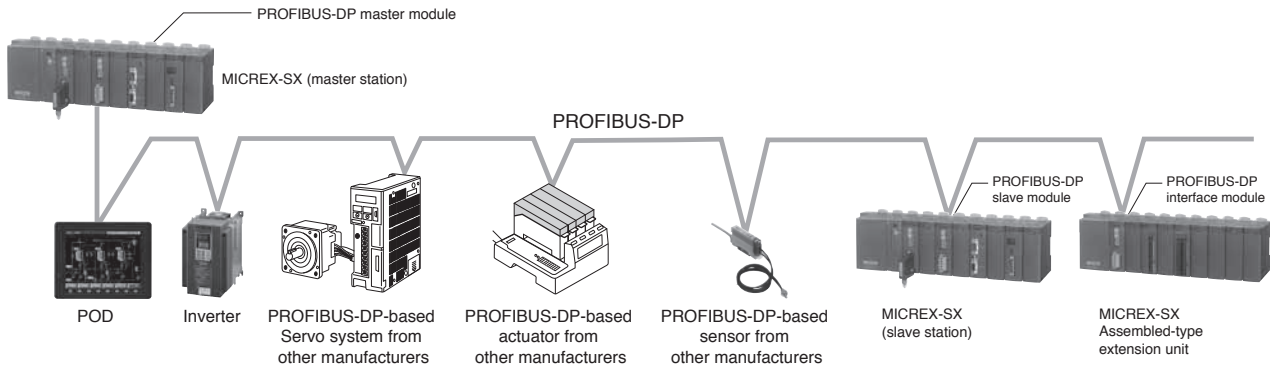
Can be selected from nine options: 9.6/19.2/93.75/187.5/500/1500/3000/6000/12000kbps. (The upper limit depends on the type of the DP slave.)

■ **Performance specifications**

| Item                                      | Specification                                                                                                       |       |       |       |       |                                                            |      |      |          |       |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------|-------|-------|-------|------------------------------------------------------------|------|------|----------|-------|
| Type                                      | NP1L-PD1                                                                                                            |       |       |       |       | NP1L-PS1                                                   |      |      | NP1L-RP1 |       |
| No. of SX bus connectable modules         | Max. 8/configuration                                                                                                |       |       |       |       |                                                            |      |      | —        |       |
| Applicable standards                      | IEC 66158, EN 50170, DIN 19245                                                                                      |       |       |       |       | PROFIBUS-DP slave function                                 |      |      |          |       |
| Communication function                    | PROFIBUS-DP master (DPM1) function                                                                                  |       |       |       |       | —                                                          |      |      |          |       |
| No. of slave station connections          | Up to 32 units (up to 126 units with repeaters)                                                                     |       |       |       |       | 0 to 99                                                    |      |      |          |       |
| Station No. (station address) setup range | 0 to 125                                                                                                            |       |       |       |       |                                                            |      |      |          |       |
| Transmission line form                    | Bus configuration (multi-drop)                                                                                      |       |       |       |       |                                                            |      |      |          |       |
| Communication standard                    | Applicable to EN 50170 and DIN 19245.                                                                               |       |       |       |       |                                                            |      |      |          |       |
| Data exchange system                      | 1:N (polling/selecting)                                                                                             |       |       |       |       |                                                            |      |      |          |       |
| Transmission rate                         | Nine options (set by configuration of the programming loader)<br>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<br>(Shielded twist pair cable)                                                                    |       |       |       |       |                                                            |      |      |          |       |
| No. of I/O points                         | Normal mode: Max. 2048 points (128 words) *1<br>Extension mode or I/O Extension mode: Max. 8160 points (510 words)  |       |       |       |       | In total I/O: Max. 128 words<br>(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.



**NP1L-PR1**

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

**NP1L-PS1**

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

• **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.

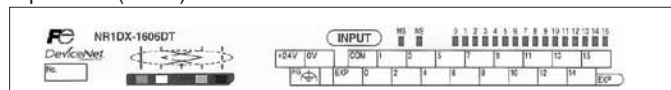
#### NR1 series



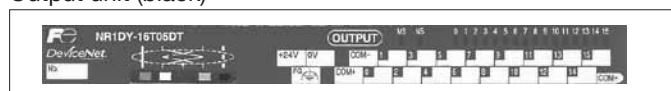
#### NR2 series



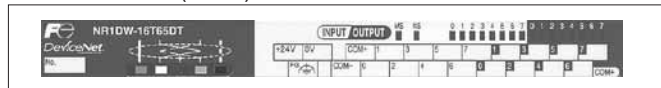
- Preventing mis-wiring  
Uses different colors for the surface sheets of the main unit: input (white), output (black), and I/O mixture (zebra). Applicable networks are also displayed, enabling determination of the unit type at a glance.
- NR1 series  
Input unit (white)



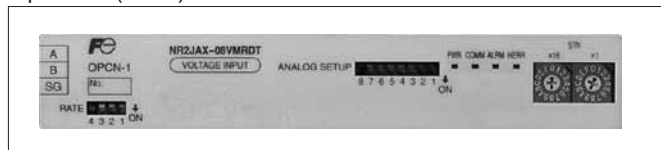
#### Output unit (black)



#### 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

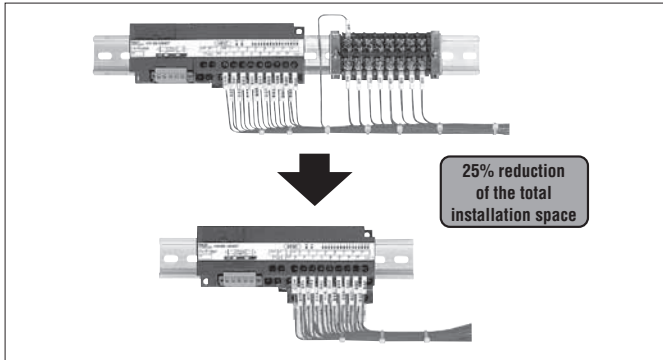
- Efficient safe terminal block structure  
This terminal block has terminal screws which are self-lifting by themselves after loosening, thus preventing screws from being lost at the time of wiring to the round amplifier terminal, increasing the wiring work efficiency. The use of power supply and I/O 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.

- 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%.

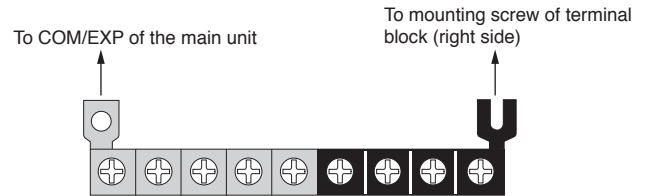


#### ■ Common extension bar

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

\* 1:  specification (applicable network specification): J=OPCN-1, S=SX bus, T=T-link, D=DeviceNet

\* 2: Tr output products without a fly-wheel diode are also offered. (Model: NR1  Y-16T05DTZ701)

\* 3: Four-axis pulse train output is supported only by the SX bus.

##### NR2 series

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

#### ■ Specifications

##### • General specifications

| Item                               | Specification                                                                                                                                                                                                            |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicable standards               | IEC 61131-2/Ed2, EN 50081-2, UL508 *                                                                                                                                                                                     |
| Physical environment               | <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             | <b>NR1</b> □□                                                                                             |                                                                                                                                                                                                                                | <b>NR2D</b> □(digital I/O)                                                                                                                                   |
| Power supply method   | External power supply                                                                                     |                                                                                                                                                                                                                                | DeviceNet communication cable                                                                                                                                |
| Rated input voltage   | 24V DC                                                                                                    |                                                                                                                                                                                                                                | 24V DC                                                                                                                                                       |
| Input voltage range   | 21.6 to 26.4V DC, (LonWORKS-based product: 20.4 to 27.6V DC)                                              |                                                                                                                                                                                                                                | 11 to 25V DC                                                                                                                                                 |
| Dropout tolerance     | 1ms (at 21.6V), LonWORKS-based product (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 <b>NR1LY-08R07DT</b> ) |                                                                                                                                                                                                                                | 7A, 0.4ms or less                                                                                                                                            |
| Dielectric strength   | 1500V AC, 1 minute<br>(Between power supply input terminal and frame ground)                              |                                                                                                                                                                                                                                | 500V AC, 1 minute<br>(Between power supply input terminal and I/O terminal)                                                                                  |
| Insulation resistance | 10MΩ or more (500V DC megger)<br>(Between input terminal and frame ground)                                |                                                                                                                                                                                                                                | 10MΩ or more (500V DC megger)<br>(Between power supply input terminal and I/O terminal)                                                                      |
| Power consumption     | OPCN-1                                                                                                    | <b>NR1</b> □ <b>X-1606DT</b> : 1.4W or less<br><b>NR1</b> □ <b>Y-08R07DT</b> : 3W or less<br><b>NR1</b> □ <b>X-16T05DT</b> : 1.4W or less<br><b>NR1</b> □ <b>X-16T65DT</b> : 1.4W or less<br><b>NR1SF-HP4DT</b> : 3.5W or less | <b>NR2DX-3206DT</b> : 2.5W or less<br><b>NR2DY-32T05DT</b> : 2.5W or less<br><b>NR2DW-32T65DT</b> : 2.5W or less<br><b>NR2DY-16R07DT</b> : 4.5W or less      |
|                       | LonWORKS                                                                                                  | <b>NR1LX-1606DT</b> : 1.6W or less<br><b>NR1LY-08R07DT</b> : 3W or less<br><b>NR1LW-11R80DT</b> : 1.6W or less                                                                                                                 | <b>NR2JAX-08VMRDT</b> : 4.8W or less<br><b>NR2JAX-08IMRDT</b> : 4.8W or less<br><b>NR2JAX-04VMRDT</b> : 5.6W or less<br><b>NR2JAX-04IMRDT</b> : 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<br>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. *<br>T-link: 5ms/5ms |
| No. of points per common | 16 points/common<br>(Mixture model: 8 points/common)                              |
| Isolation                | Photocoupler                                                                      |
| Dielectric strength      | 1500V AC, 1 minute<br>(Between input terminals and frame ground)                  |
| Insulation resistance    | 10MΩ or more (500V DC megger)<br>(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<br>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<br>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<br>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<br>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                 | <b>NR1SF-HP4DT</b>     |                                                                                                |
| No. of control axes  | 4 axes                 |                                                                                                |
| Speed command        | Command signal         | Pulse train command                                                                            |
|                      | Max. command frequency | 250kHz<br>(Conditions: Shielding twist pair cable: 2m or less)                                 |
|                      | Output type            | Open collector, sink output                                                                    |
|                      | Max. load current      | 50mA (24V DC)                                                                                  |
|                      | Insulation method      | Photocoupler                                                                                   |
| Feedback pulse input | 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)<br>Original point LS ( x 4 ch)<br>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                                                                                   |
| Occupied words       | Common configuration   | 2 points (Extension can be used to the Common extension bar)                                   |
|                      |                        | 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,<br>PI (Pulse input): 4 points *1 | DI: 5 points,<br>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 impedance               | 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<br>24V DC: 50mA/point  |
| Min. load current                  | 5V DC: 1mA                                       |                                       |
| Output delay time                  | OFF to ON 10ms or less<br>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<br>OFF voltage range: 0 to 5V                            |
| Input delay time<br>ON/OFF filtering time | 3ms/3ms                                                                                |
| No. of points per common                  | 16 points/common<br>(Mixture model: 8 points/common) x 2 circuits                      |
| Isolation                                 | Photocoupler                                                                           |
| Dielectric strength                       | 1500V AC, 1 minute<br>(Between input terminals and communication terminals)            |
| Insulation resistance                     | 10MΩ or more (500V DC megger)<br>(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<br>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<br>Between output terminals and communication terminals                 |
| Insulation resistance          | 10MΩ or more with a 500V DC megger<br>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<br>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<br>Between output terminals and communication terminals                 |
| Insulation resistance         | 10MΩ or more with a 500V DC megger<br>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                     | NR2JAX-08VMDT                                                                                                                                                                           |         |           |               |
| No. of input points      | 8 points                                                                                                                                                                                |         |           |               |
| Analog input range       | 0 to 5V                                                                                                                                                                                 | 1 to 5V | 0 to 10V  | -10 to +10V   |
| Input impedance          | 1MΩ                                                                                                                                                                                     |         |           |               |
| Max. input voltage       | ±15V                                                                                                                                                                                    |         |           |               |
| Input filter             | Approx. 100μs or less (Hardware: Primary delay time constant)                                                                                                                           |         |           |               |
| Resolution               | 1.25mV                                                                                                                                                                                  | 1.25mV  | 1.25mV    | 1.25mV        |
| Digital value (INT type) | 0 to 4000                                                                                                                                                                               |         | 0 to 8000 | -8000 to 8000 |
| Measurement accuracy     | ±0.1% of F.S.R (Ta=23°C ±5°C)                                                                                                                                                           |         |           |               |
|                          | ±0.3% of F.S.R (Ta=0 to 55°C)                                                                                                                                                           |         |           |               |
| Sampling period          | 4ms or less / 8 points                                                                                                                                                                  |         |           |               |
| Response time            | 4ms or less / 8 points + transmission periods (ms)                                                                                                                                      |         |           |               |
| Occupied words           | Input: 8 words                                                                                                                                                                          |         |           |               |
| Isolation method         | Between analog input terminals and FG: Isolation<br>Between analog input terminals and communication terminals: Isolation<br>Between analog input terminals and channels: Not isolation |         |           |               |
| Dielectric strength      | 500V AC, 1 minute,<br>(Between analog input terminals and FG (Shorted current: 5mA))                                                                                                    |         |           |               |
| Insulation resistance    | 10MΩ or more (500V DC megger)<br>(Between analog input terminals and FG)                                                                                                                |         |           |               |
| External connections     | External power supply, analog input connection: Detachable screw terminals (M3) 38 poles<br>Communication connection: Detachable screw terminals (M3) 3 poles                           |         |           |               |

##### • Analog current input type

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

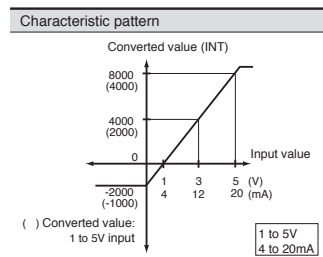
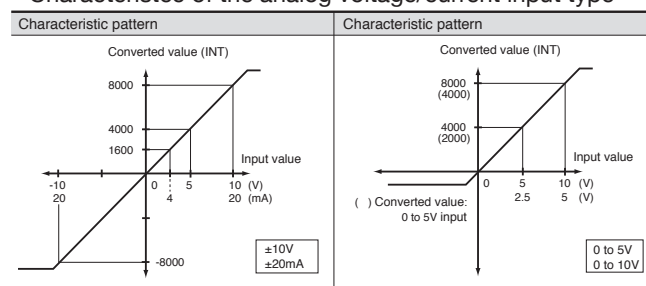
##### • Analog voltage output type

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

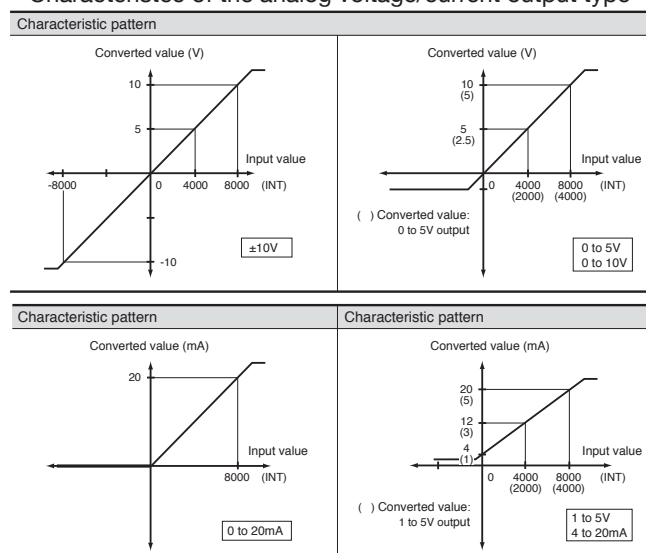
##### • Analog current output type

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

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



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





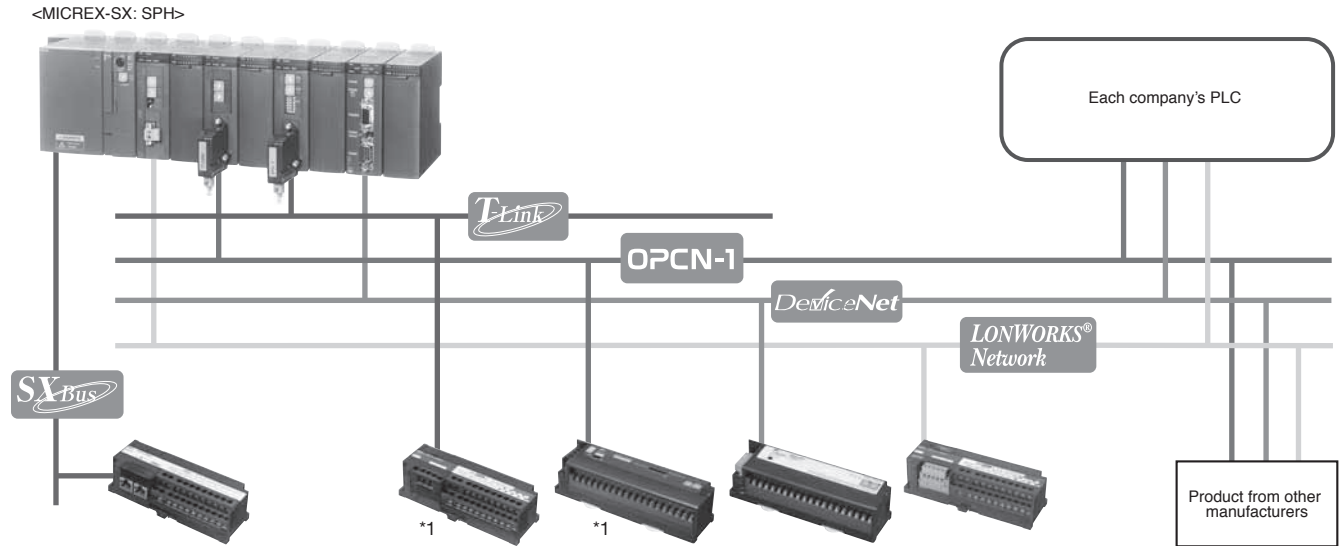
# Programmable Controllers **MICREX-SX series SPH** Communication Module

• Communication specifications

| Item                        | Specification                                                                                                                                                                    | DeviceNet                                                                 | T-link                            | SX bus                                    | LONWORKS                                        |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------|-------------------------------------------|-------------------------------------------------|
| Transmission line format    | OPCN-1<br>Bus configuration<br>(multi-drop)                                                                                                                                      | Bus configuration<br>(multi-drop, T-branching)                            | Bus configuration<br>(multi-drop) | Bus configuration<br>(ring)               | Free topology<br>(bus-structure/star-structure) |
| Max. signal point           | 127 words (2032 /master)                                                                                                                                                         | 127 words (2032 points)/master<br>(When configurator is not used)         | 128 words (2048 points)           | 512 words (8192 points)                   | 228 bytes                                       |
| Transmission speed/distance | 125kbps/1km<br>250kbps/800m<br>500kbps/480m<br>1Mbps/240m<br>(Changes with the switch)                                                                                           | 125kbps/500m<br>250kbps/250m<br>500kbps/100m<br>(Changes with the switch) | 500kbps/1km                       | 25Mbps/25m                                | 78kbps/500 to 2700m                             |
| No. of connected stations   | 31 stations                                                                                                                                                                      | 64 node                                                                   | 32 stations                       | 254 stations<br>(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.

Programmable Controllers

**MICREX-SX series SPH**

**Communication Module**

**Bit-level Communication Module**

**AS-i Master Module: NP1L-AS2**

■ **Features**

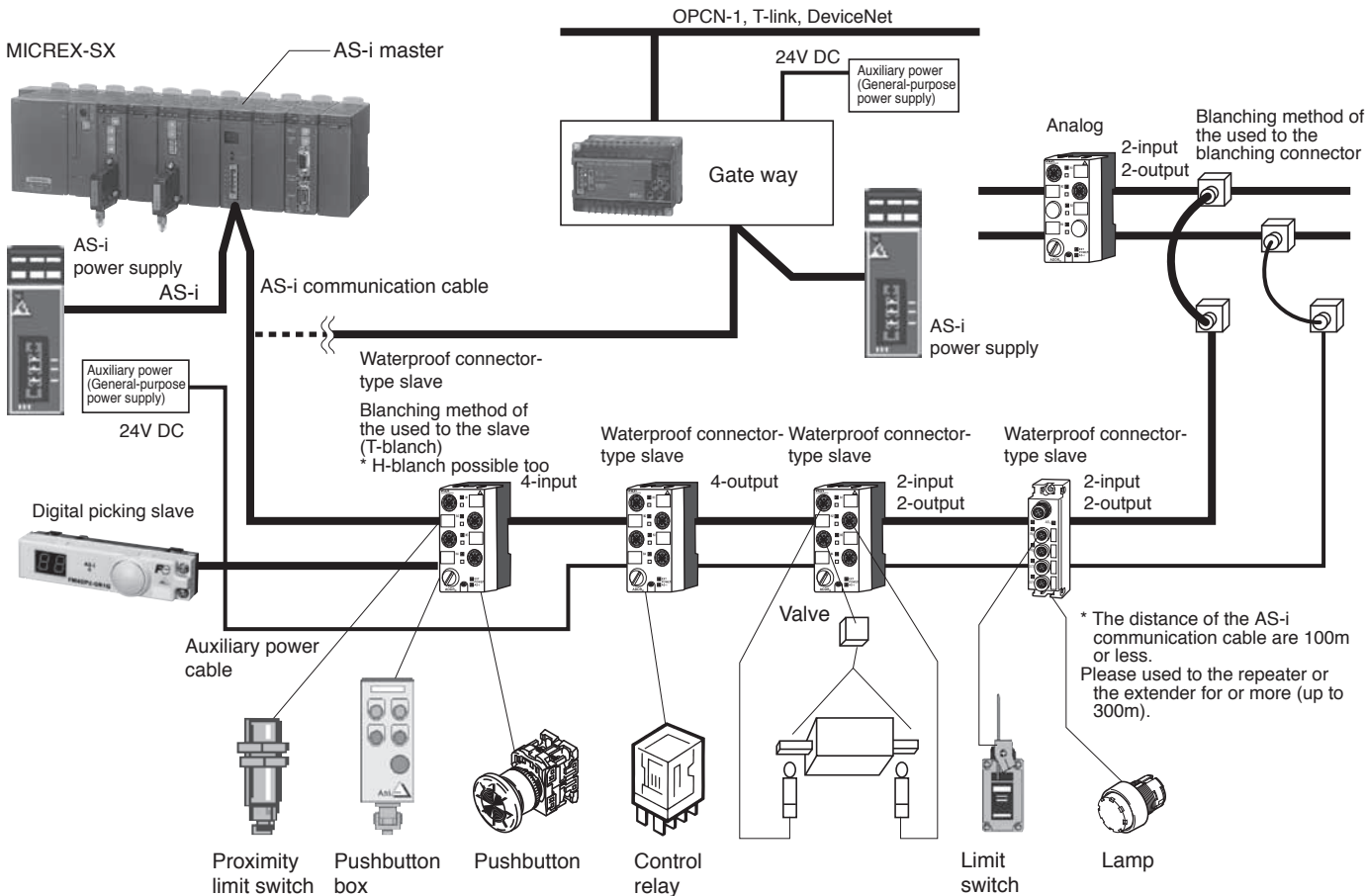
- The **NP1L-AS2** is based on the AS-i communication protocol Version 2.1.
- Up to 12 units can be connected in a single system configuration.
- Can be connected to diverse types of actuators and sensors conforming to the AS-i Standards.
- Line length: Total 100m
- Up to 62 slave stations can be connected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



**S-LINK Master Module: NP1L-SL1**

■ **Features**

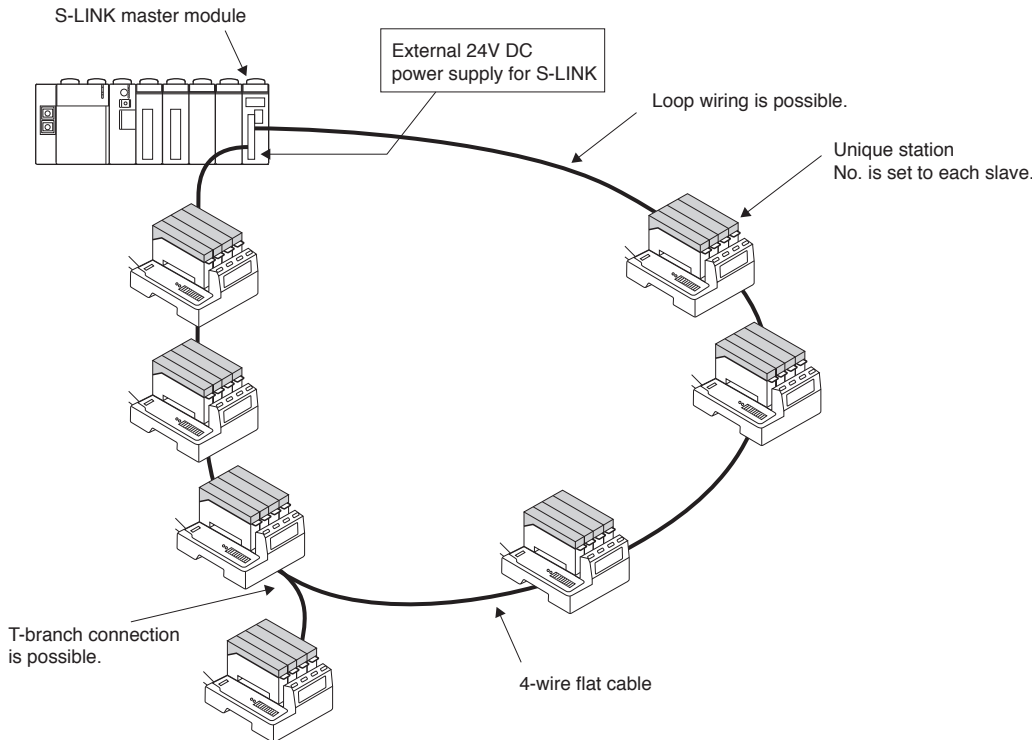
- Connected to the S-LINK (bit) level serial transmission provided by SUNX.
- 128-point I/O control can be performed for each master station. There is no limitation on the number of master connections.



■ **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<br>64 points: 2.5 to 5.2ms<br>96 points: 3.6 to 7.4ms<br>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**



Programmable Controllers

**MICREX-SX series SPH**

**Communication Module**

Remote Terminal Master/Slave Module: NP1L-RM1

- Features**

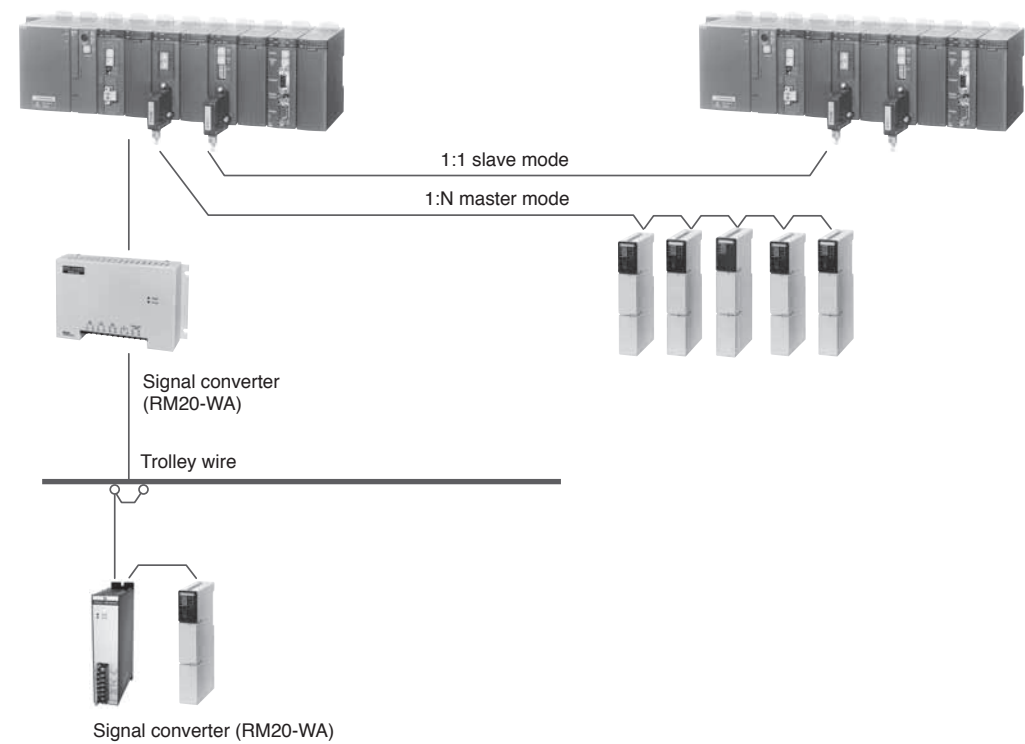
  - Connectable to Fuji Electric's RM20 and RM21 remote terminal series.
  - Data can be transmitted up to 5km between master/slave modules and remote terminals.
  - The use of a signal converter makes it possible to use existing, unoccupied cables and trolley lines.



**■ 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<br>1:N or N:N mode: Max. 128 units or 1024 points                                                                                                                                   |
| No. of connectable remote terminals               |                           | 1:1 mode: 1 slave/1 master<br>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)<br>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)<br>1.2 mm dia.: 3.5km (max. 128 remote stations)<br>2mm²: 5.0km (max. 64 remote stations)<br>2 to 5km: Varies with the cable and connection configuration. |
| External wire connections                         |                           | Terminal block 6 poles<br>(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**



**SX Bus Optical Link Module: NP1L-OL1/OL2**  
**SX Bus Optical Converter Unit: NP2L-OE1**

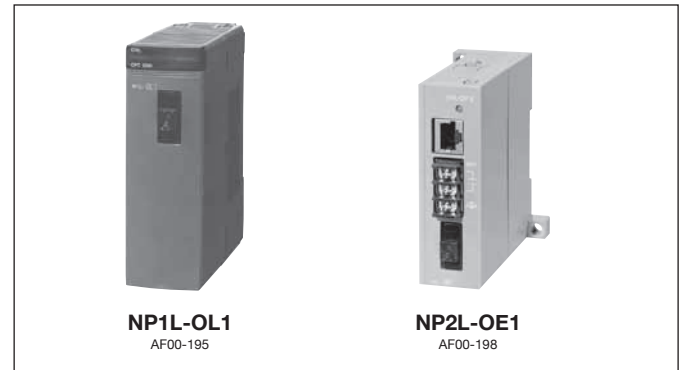
■ **Features**

**NP1L-OL1/OL2**

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

**NP2L-OE1**

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



■ **Transmission specifications**

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

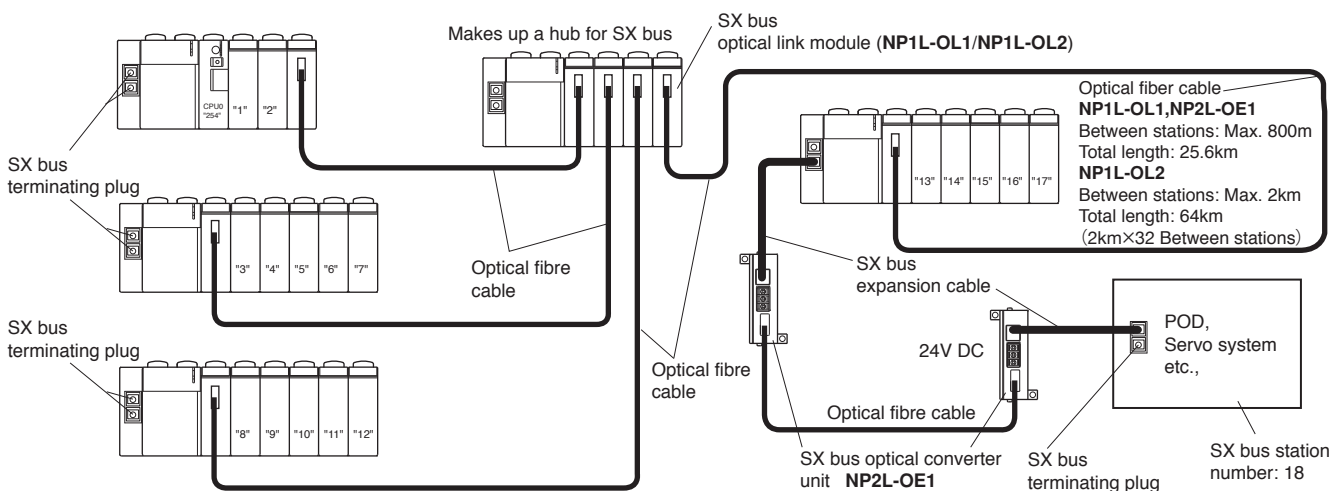
\* 1 Minimum bending radius depends on what type of optical-fibre cable is used. Above table shows the values when the HG-20/08 from Sumitomo Electric Industries, Ltd. is used.

\* 2 As an external power supply, use a switching power supply (conforming to the UL standard) with "reinforced insulation" of 24V DC 1A or more for each unit.

\* 3 When 24V DC is directly turned ON, the rush current is 50Ao-p, 70μs (reference value). This value depends on power conditions.

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

■ **System configuration**





Programmable Controllers

**MICREX-SX series SPH**

**Communication Module**

SX Bus Electric Repeater Unit: NP2L-RP1

- Features**

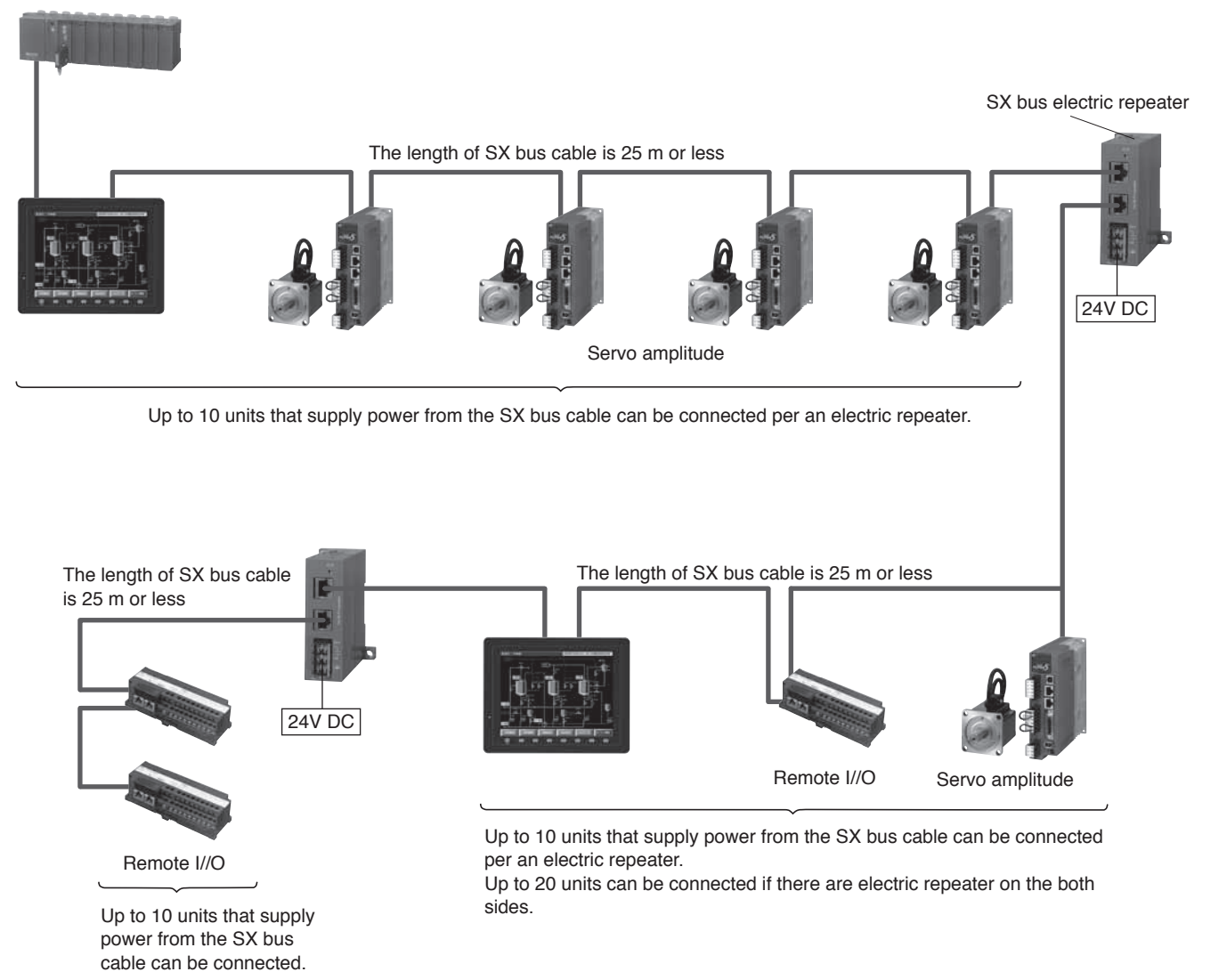
- SX bus connection using another 25m electric cable is enabled by correcting the signal waveforms of the SX bus electric cable.
  - Up to three units can be used in one SX system, increasing the total extension length of the SX bus electric cable to a maximum of 100m.



**■ 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<br>When connecting servo and inverter: 24V to 26.4 V DC      |
| Current consumption            | Up to 1470mA     | Current consumption: Approx. 70mA<br>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**



## Optical T-link and P/PE-link systems

The optical T-link and P/PE-link systems ensure superior network configuration with distinguished noise resistance by making use of an optical converter and optical fiber cables.

The optical T-link and P/PE-link systems combine the following features:

- System configurations, such as redundant optical lines, can be established.
- Since an electric transmission system and an optical transmission system can be mixed, you can build an economical system by adopting optical transmission systems only for the required portions.
- Optical link systems as shown in the table below can be configured according to your application.

## Configuration examples

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

(Note 1) The cable symbols shown in the figure above are as follows:

- : Optical fiber cable (main)
- ..... : Optical fiber cable (redundancy backup)
- : Cable for a T-link or cable for a P-link

(Note 2) Connect a terminal resistor for a T-link (100 Ω) or for a P-link (75 Ω) to each unit marked with ▽ in the figure.

(Note 3) When a cable for a T-link or for a P/PE-link is not connected to an optical converter, connect a terminal resistor to the converter.

## T-link Optical Converter : FNC160A-C20

### ■ Features

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



### ■ Specifications

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

## P/PE-link Optical Converter : FNC360A-C20

### ■ Features

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



### ■ Specifications

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

# 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.<br>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.                                                                                                                                                          |

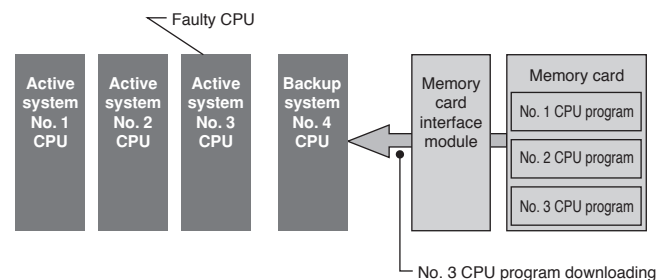
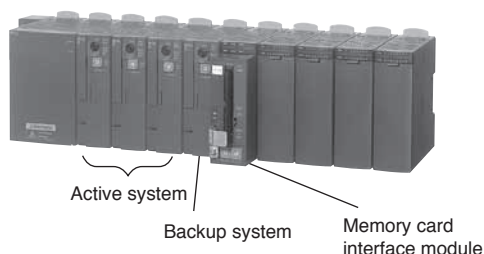
##### ■ Memory card selection reference

| 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)<br>10,000 times or more (indoor)                                          | Make sufficient consideration for the removal count.                                                                                                                                  |                                                                                                      |
| Vibration/shock             | Vibration: 147m/s <sup>2</sup> -p (max.) in operation<br>Shock: 490m/s <sup>2</sup> (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/512K/1024K/2048K/4096Kbytes): Made by FUJISOKU, LTD.

##### ■ System configuration



Programmable Controllers

**MICREX-SX series SPH**

**Function Module**

**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<br>Cannot be mounted on a T-link base board or other remote I/O module. |
| Occupied words               | 0 word                                                                                                               |
| Internal current consumption | 24V DC, 26mA or less                                                                                                 |
| Mass                         | Approx. 120g                                                                                                         |



**Multiuse Communication Module: NP1F-MU1**

■ **Features**

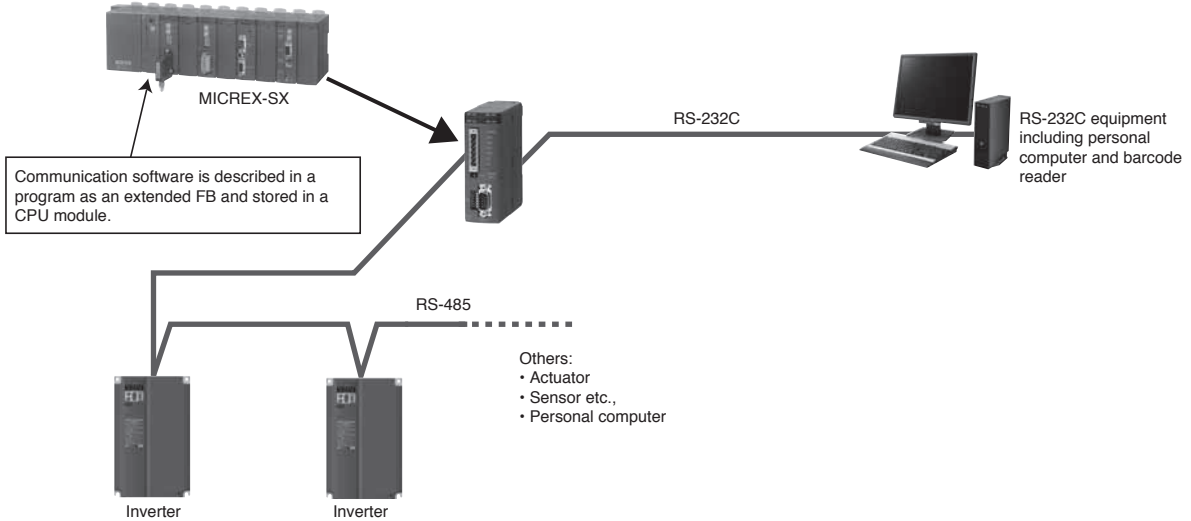
- High-speed communication (RS-485: max. 460.8 kbps) with actuators and sensors can be implemented.
- Optimal communication with devices of various manufacturers can be implemented by freely creating a communication protocol. Protocols can be created by modifying the sample FB.
- Microcomputer circuit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

■ **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                                                     |                                                                                 |

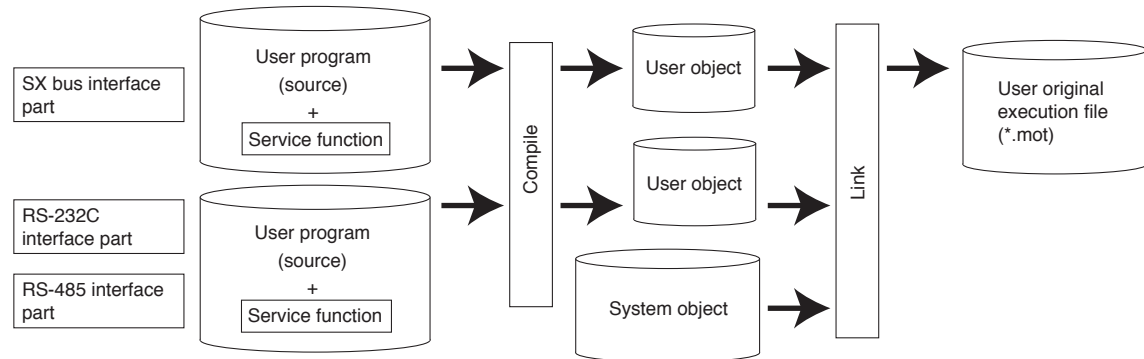


■ **System configuration**



■ **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.



# Programmable Controllers

## MICREX-SX series SPH

### Function Module

#### Flowmeter F/AD Conversion Module: NP1F-PI4

##### ■ Features

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

##### ■ Specifications

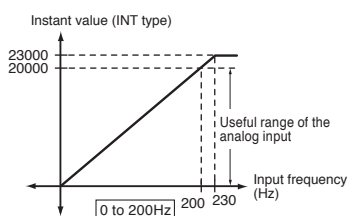
| Item                                              | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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                                | <div> <div>Contact input (relay/transistor)</div> <div>Detection level; ON: 200Ω or less, OFF: 100 kΩ or more</div> <div>Contactor capacity; when the sensor power supply is 13.5V: 15V DC, 15mA or more</div> <div>when the sensor power supply is 24V: 30V DC, 30mA or more</div> </div>                                                                                                                                                                                                                    |
|                                                   | <div> <div>Voltage/current pulse</div> <div>Detection level 3Vp-p</div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 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                               | <div>Integrated value update cycle + tact cycle (ms)</div> <div>Instant value update cycle + tact cycle</div>                                                                                                                                                                                                                                                                                                                                                                                                 |
| Power supply for transmission machine (Ta = 25°C) | <div> <div>* 1</div> <div>           1) Output voltage: 13.5V DC ±15% and/or 24V DC ±15%<br/>           2) Permissible current; when 13.5V DC: 35mA or less, when 24V DC: 24mA or less<br/>           3) Short-circuit limitation current; when 13.5V DC: approx. 40mA, when 24V DC: approx. 28mA<br/>           4) Ripple noise: approx. 250mV (p-p) or less<br/>           5) Suddenly change of the load: 3V (0-P) or less (condition of the suddenly change of the load: 0 to 40mA)         </div> </div> |
| 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)<br>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)<br>10MΩ or more with 500V DC megger (between pulse input terminals and channels)                                                                                                                                                                                                                                                                                                                                                      |
| Internal current consumption                      | <div> <div>* 2</div> <div>390mA or less (When the sensor power supply used.)</div> <div>200mA or less (When the sensor power supply unused.)</div> </div>                                                                                                                                                                                                                                                                                                                                                     |
| Non use output treatment                          | Opening.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Use cable                                         | Use the twisted pair wire with the shield. (Wiring length: 500m or less)                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Mass                                              | Approx. 330g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| External connection                               | Detachable terminal block (M3 x 20 poles)                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

\* 1 An ambient air temperature during short circuit should be 40°C or less.

\* 2 This can be reduced according to the used number of channels and the used number of sensor power supplies. For more information, refer to User's Manual FEH431.

##### ■ Characteristic diagram

In the case of the input frequency range: 0 to 200Hz, and the instant value unit (INT type): 0 to 23000.



## High-speed Counter Module: NP1F-HC □

### ■ Features

#### NP1F-HC2 □

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

becomes possible to standardize the external power supply at DC 24 V and to improve pulse input connectivity.

- The pulse input filter of **NP1F-HC2MR1** is set so that connection with the inverter FRENIC5000 VG7 of Fuji Electric is optimized.

#### NP1F-HC8

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



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

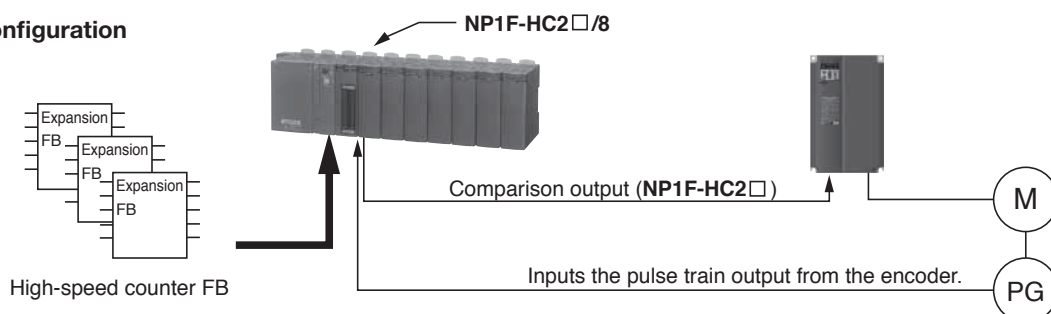
### ■ Performance specifications

| 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 7FFFFH)              |
|                              | 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



Programmable Controllers

**MICREX-SX series SPH**

**Positioning Control Module**

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

- Features**

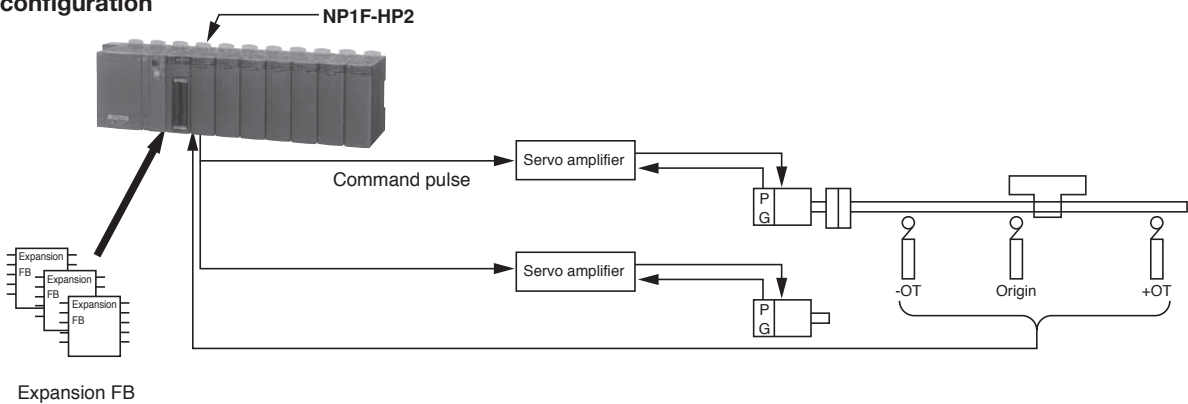
- Combined with the servo amplifier motor of the pulse train command input type or the stepping motor driver allows high-precision positioning.
  - Use of an expansion FB facilitates embedding necessary functions including axis-independent single-function positioning to multi-axis simultaneous start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



**■ 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    | 250kHz                                                            |
|                                            | Frequency resolution | 16 bits /20 bits                                                  |
|                                            | Output type          | Open collector output (forward pulse + reverse pulse)             |
| Control function                           |                      | Pulse generation mode                                             |
| Combination actuator                       |                      | Servo system prepared pulse train command input or stepping motor |
| Occupied word                              |                      | Input: 8 words/Output: 8 words (total: 16 words)                  |
| Internal current consumption               |                      | 24V DC 95mA or less                                               |
| External power supply                      |                      | 24V DC 35mA or less                                               |
| Mass                                       |                      | Approx. 180g                                                      |

**■ System configuration**



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

### ■ Features

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

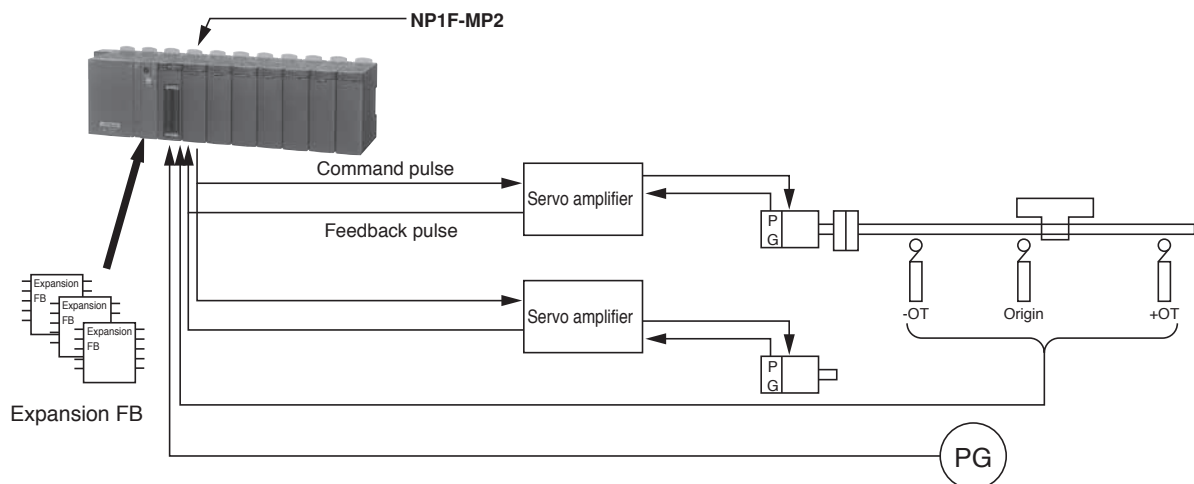


**NP1F-MP2**  
AF97-518

### ■ Performance specifications

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

### ■ System configuration





# Programmable Controllers

## MICREX-SX series SPH

### Positioning Control Module

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

##### ■ Features

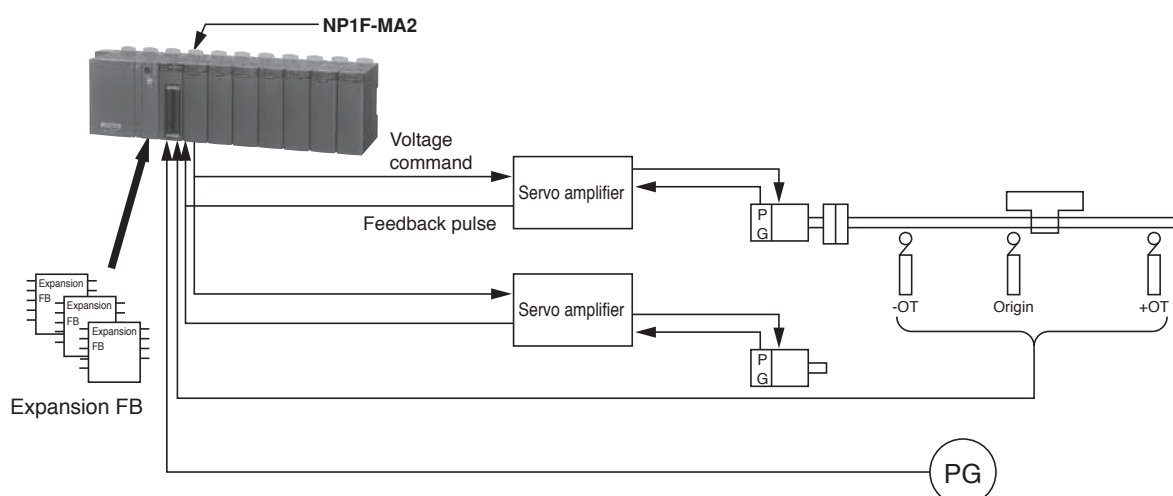
- Combined with the servo amplifier motor of the pulse train command input type or the stepping motor driver allows high-precision positioning.
- Use of an expansion FB facilitates embedding necessary functions including axis-independent single-function positioning to multi-axis simultaneous start positioning (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 <sup>32</sup> -1 pulse /command (at pulse generation mode)                                                      |
| Speed command                              | Command voltage | Analog speed command (0 to ±10.24V)                                                                                    |
|                                            | Signal type     | Analog voltage command                                                                                                 |
| Feedback pulse                             | Input frequency | 500kHz                                                                                                                 |
|                                            | Input type      | Open collector input or differential signal (90° phase difference, phase A, phase B and phase Z)                       |
| Manual pulse unit                          | Input frequency | 500kHz                                                                                                                 |
|                                            | Input type      | Open collector input or differential signal (90° phase difference, phase A, phase B, or forward pulse + reverse pulse) |
| Control functions                          |                 | Pulse occurrence mode, positioning command mode, positioning control mode                                              |
| Combination actuator                       |                 | Servo system prepared analog speed command input                                                                       |
| Occupied words                             |                 | Input: 14 words / Output: 8 words (total: 22 words)                                                                    |
| Internal current consumption               |                 | 24V DC 150mA or less                                                                                                   |
| Mass                                       |                 | Approx. 200g                                                                                                           |

##### ■ System configuration



# 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.

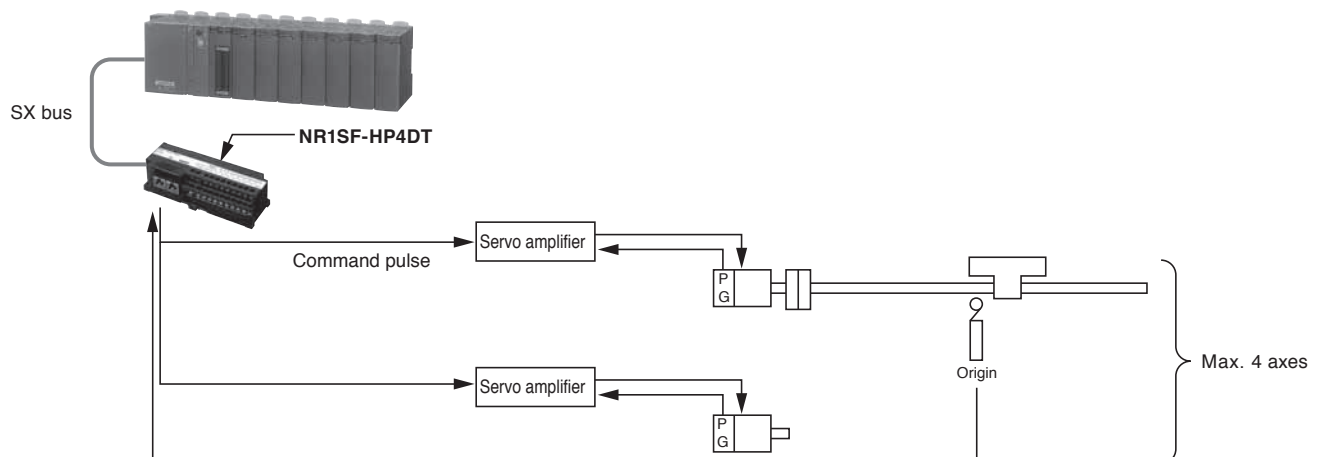


NR1SF-HP4DT

##### ■ Performance specifications

| Item                         |                          | Specification                                                                        |
|------------------------------|--------------------------|--------------------------------------------------------------------------------------|
| Type                         |                          | NR1SF-HP4DT                                                                          |
| No. of control axes          |                          | 4 axes                                                                               |
| Speed command                | Command signal           | Pulse train command                                                                  |
|                              | Max. command frequency   | 250kHz (condition: 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              | Forward pulse (CW) + Reverse pulse (CCW)                                             |
| Feedback pulse input         |                          | None                                                                                 |
| External pulse               |                          | None                                                                                 |
| DI signal                    | No. of points            | 8 points (2 points / axis)<br>Origin LS (x 4 CH)<br>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 | Position command |             |
| 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).<br>Counts the feedback pulse and detects the current feedback value (multiplied by 4).                                                                                                                                                  | ○        | ○                | ○                | ○                | ○                | ○                | ○           |
| 6   | Phase-Z position detect<br>(Origin return operation)           | Detects the command position at the phase-Z rising edge (or falling edge).<br>Detects the deviation amount at the phase-Z rising edge (or falling edge).<br>Detects the current feedback position at the phase-Z rising edge (or falling edge).                                                                           | ○        | ○                | ○                |                  |                  |                  | ○           |
| 7   | Interrupt position detect<br>(Interrupt positioning operation) | Detects the command position at the rising edge (or falling edge) of the external interrupt signal.<br>Detects the deviation value at the rising edge (or falling edge) of the external interrupt signal.<br>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/<br>deceleration computation          | Computes trapezoidal acceleration/deceleration.                                                                                                                                                                                                                                                                           | ○        | ○                |                  | ○                |                  |                  | ○           |
| 10  | Deceleration point automatic<br>computation                    | Automatically computes the deceleration point.                                                                                                                                                                                                                                                                            | ○        | ○                |                  | ○                |                  |                  | ○           |
| 11  | Continuous frequency change                                    | Continuously updates the command frequency of the pulse generator.                                                                                                                                                                                                                                                        | ○        | ○                |                  | ○                |                  |                  | ○           |
| 12  | Command pulse count additional<br>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.<br>Immediately stops the pulse output.<br>Immediately clears the speed command voltage to 0V.                                                                                                                                                            | ○        | ○                |                  |                  |                  |                  | ○           |
| 15  | Over travel<br>( Plus or minus error detection)                | Carries out deceleration and stop when a +/-OT error is detected.<br>Immediately stops the pulse output.<br>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.<br>Immediately stops the pulse output.<br>Performs exponential deceleration and stop.                                                                                                   | ○        | ○                |                  | ○                |                  |                  | ○           |
| 17  | External pulse count                                           | Counts the external input pulse for manual pulse unit operation or synchronous operation.                                                                                                                                                                                                                                 |          | ○                | ○                | ○                | ○                | ○                |             |
| 18  | Positioning data first read                                    | Up to four items of positioning data per axis can be registered in the FIFO buffer. The registered positioning data is executed sequentially. It is also possible to make additional settings in the FIFO buffer during operation.                                                                                        |          | ○                |                  | ○                |                  |                  |             |
| 19  | Positioning data write                                         | Sets additional positioning data during continuous frequency change processing.                                                                                                                                                                                                                                           |          | ○                |                  | ○                |                  |                  |             |
| 20  | External input signal detect                                   | Detects the input status of all DI signals.                                                                                                                                                                                                                                                                               | ○        | ○                | ○                | ○                | ○                | ○                | ○           |
| 21  | External output signal setting                                 | All DO signals can be switched with the CPU module.                                                                                                                                                                                                                                                                       | ○        | ○                | ○                | ○                | ○                | ○                | ○           |

## Functional Extension FB Software

### ■ Easily realizes functional extension by software

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

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

### ■ Diagnostic FB

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

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

Expansion FB which implement the fault diagnostic functions  
The following diagnostic and data sampling FBs are available:

- Sequence/time diagnostic FB
- Time diagnostic FB
- Upper/lower limit diagnostic FB
- Data sampling FB

### ■ PID FB

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

Extension FB realizing the temperature regulation system operation function

- ON/OFF control FB
- PID FB with auto-tuning

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

# Programmable Controllers

## MICREX-SX series SPH

### Programming Support Tool Expert (D300win)

#### Programming Support Tool

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

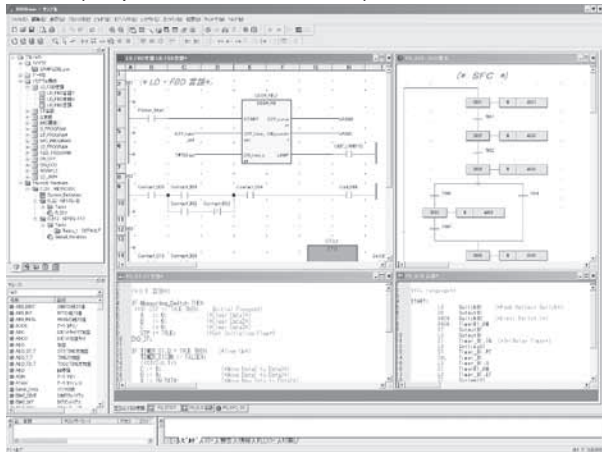
##### ■ Features

- 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.

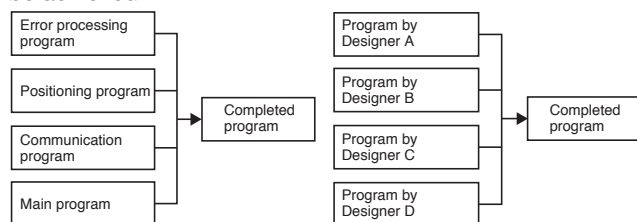
##### • Supported representations

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



##### • Structured programming

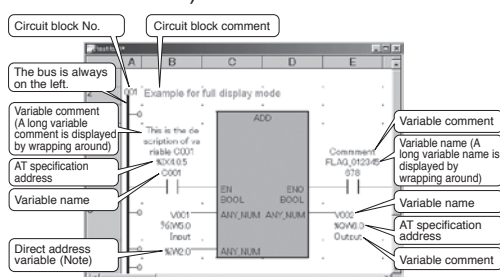
Programming in units of POU or worksheets allows the use of the structured design method by which a program is created by dividing it by functionality or process. This method enables multiple designers to divide the program design among them so that substantial reduction in the program creation time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



##### • Ladder programming using key operations (grid fixed method)

Ladder programming can be performed using familiar key operations:

- Standard display mode (variable only)
- Extended display mode (variable + AT specification address)
- All display mode (variable name + AT specification address + variable comment)

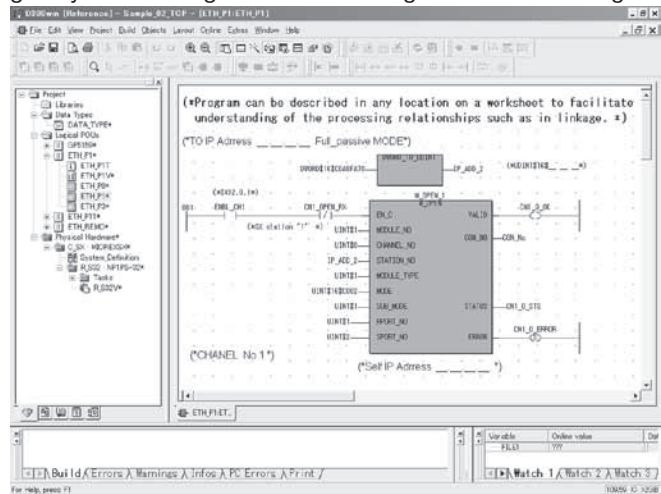


Note: If a direct address variable (= no variable name) is used, no variable comment is displayed, even if it is registered.

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

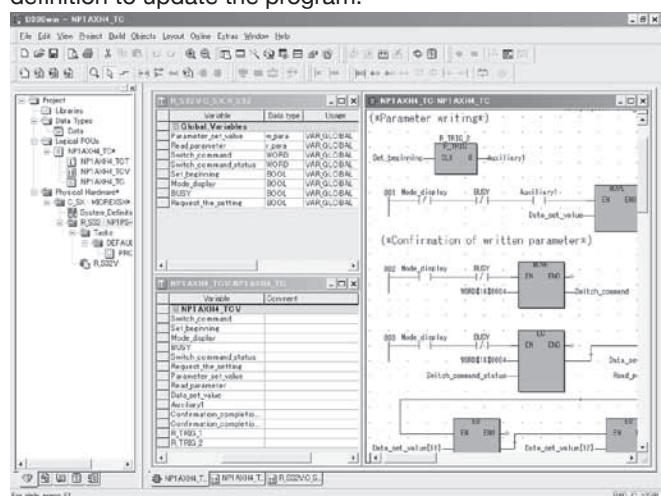
Programs can be described in any location on a worksheet to facilitate understanding of the processing relationships such as in linkage between the interlock condition and the sequence processing section/computing section, allowing efficient programming.

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



##### • Programming with variables (labels)

Differing from conventional programming, the Expert (D300win) Programming Support Tool uses label programming (addresses are automatically assigned) in which the address section is described like conventional comments, enabling program coding without being conscious of memory addressing. After the programming, any changes in address assignment can be accommodated by merely changing the corresponding label definition to update the program.





# Programmable Controllers

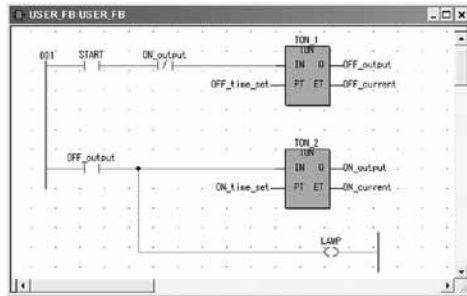
## MICREX-SX series SPH

### Programming Support Tool Expert (D300win)

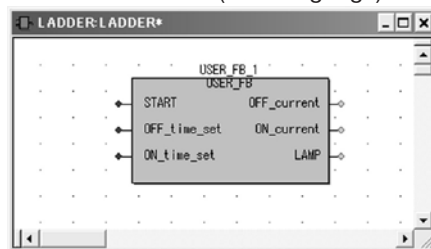
#### • Integrates user-original circuits into an FB

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)

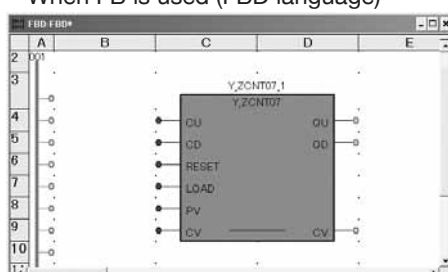
```

1 IF CV
2 THEN IF NOT (TRIG_U)
3 THEN IF CV < DINT#2147483647
4 THEN CV := CV + DINT#1;
5 QD := QD+1;
6 END_IF;
7 TRIG_U := TRUE;
8 END_IF;
9 ELSE TRIG_U := FALSE;
10 END_IF;
11 IF CV
12 THEN IF NOT (TRIG_D)
13 THEN IF CV > DINT#-2147483640
14 THEN CV := CV - DINT#1; END_IF;
15 TRIG_D := TRUE;
16 END_IF;
17 ELSE TRIG_D := FALSE;
18 END_IF;
19 IF RESET
20 THEN CV := DINT#0; END_IF;
21 IF LOAD
22 THEN CV := PV; END_IF;
23 IF CV < DINT#0
24 THEN QD := TRUE;
25 ELSE QD := FALSE;
26 END_IF;
27 IF CV >= PV
28 THEN QD := TRUE;
29 ELSE QD := FALSE;
30 END_IF;

```



#### • When FB is used (FBD language)



#### • Simulation function

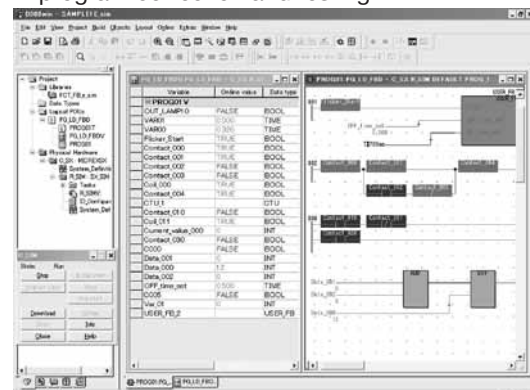
This tool enables program logic test using the software PLC function for simulation built in Expert (D300win), without using the actual unit.

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.



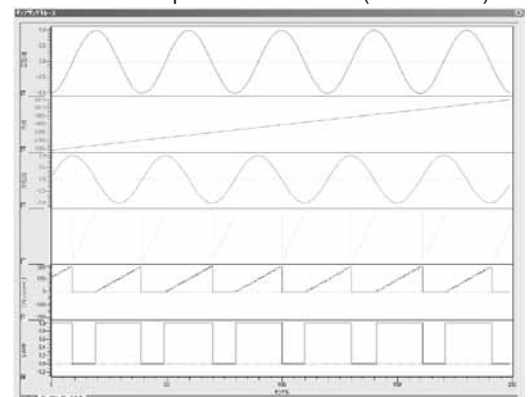
#### • Error & jump check function

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.

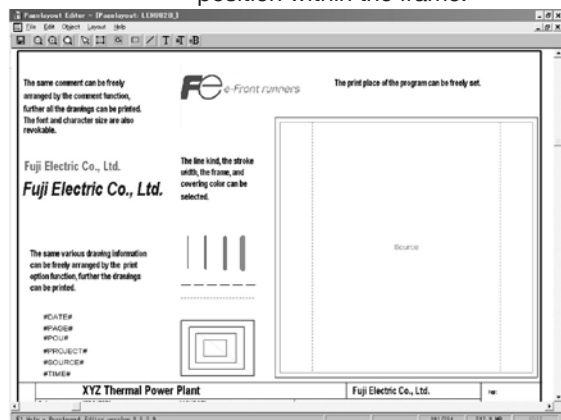
**Frame creation:** Program list can be printed with frames. The frames can be freely designed facilitating reproduction of a conventionally used drawing sheet.

**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.

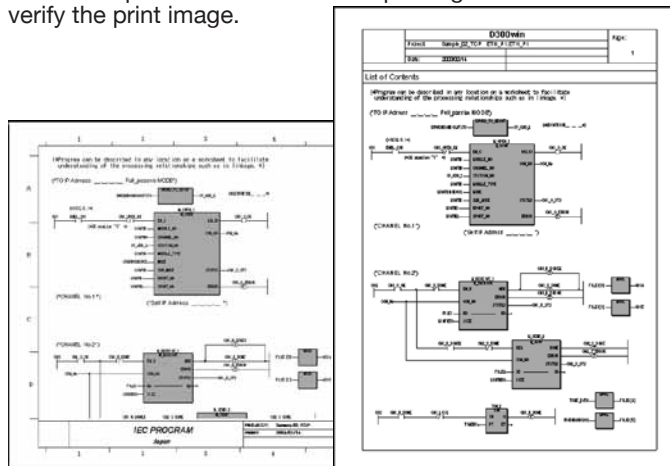
**Page:** Page number can be placed in a specified position within the frame.

**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.

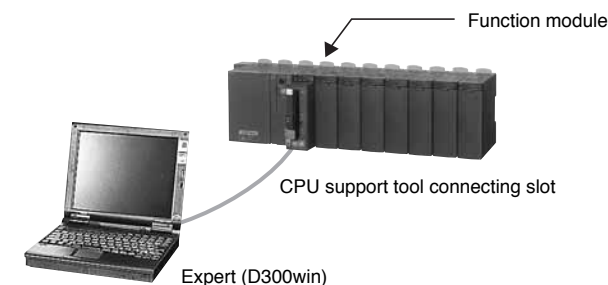
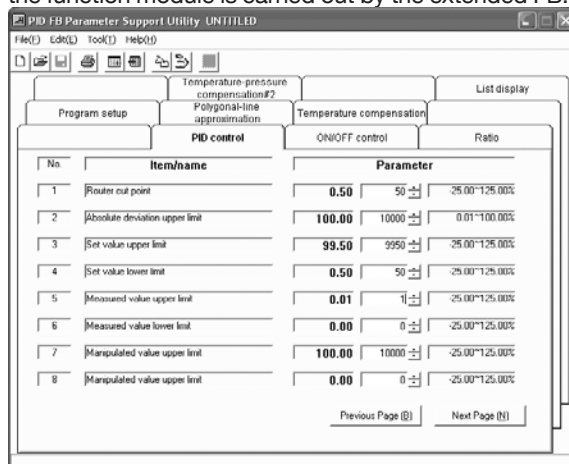
#### • Function module support

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 or SPH3000 can be performed at high speed using a commercial USB cable.

• **Data access to the user ROM**

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

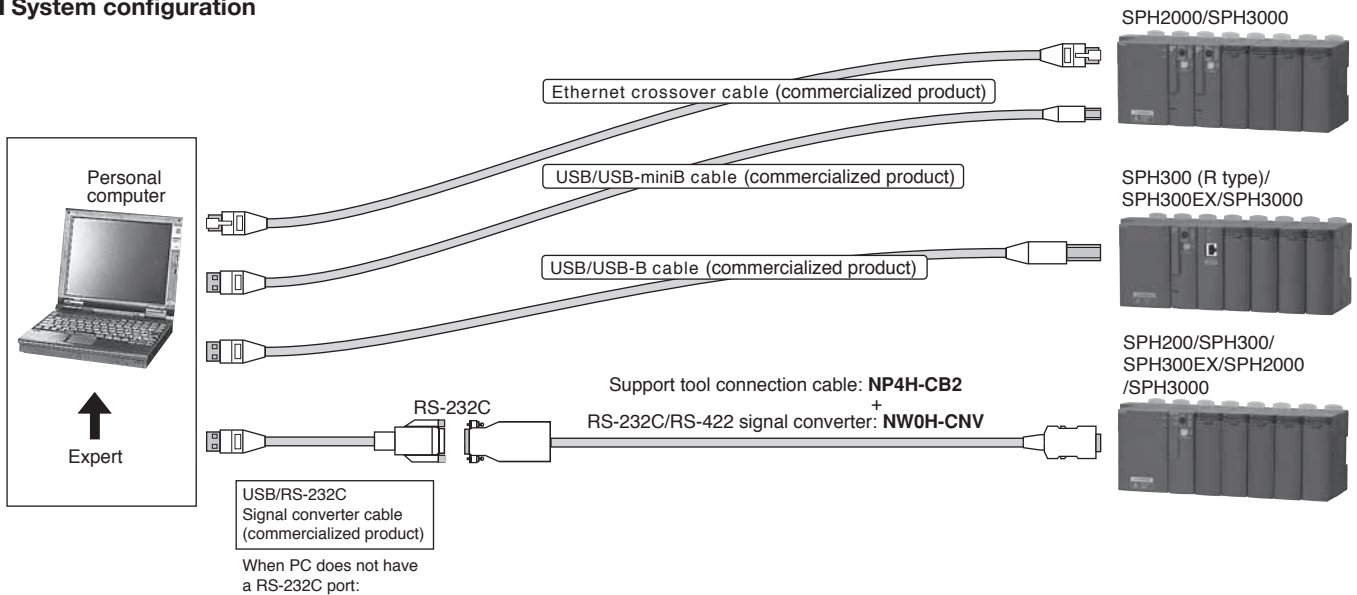
• **Password function**

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

■ **Operating environment**

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

■ **System configuration**



# Programmable Controllers



# Programmable Controllers

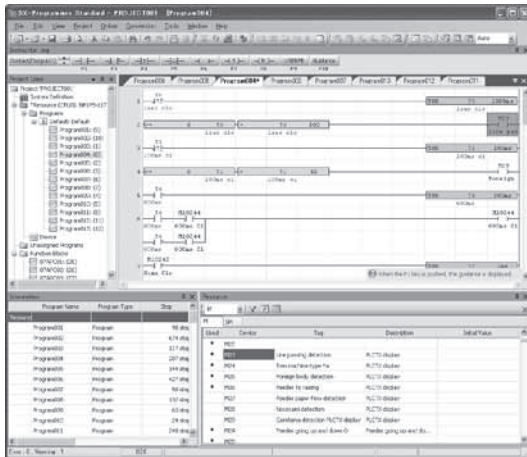
## MICREX-SX series SPH

### Programming Support Tool Standard

#### • Device Editor

Device information is displayed on a single screen, for example, in the form of a list of the operating states of devices, enabling you to save time in memory management.

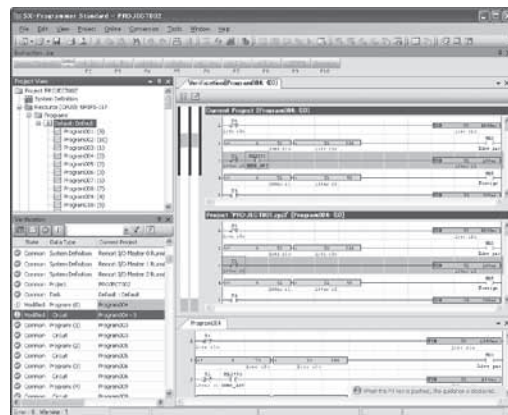
- Key operations are similar to those in Excel.
- All addresses can be displayed.
- The Device Editor not only displays the operating state of devices but also enables you to edit programs.



#### • Collation function

With the collation function, you can display the details of different points in programs and edit by referring to the collation results.

- You can quickly check different points with the aid of a filter display of collation results.
- You can edit a program while checking different points.
- With the Update button, programs can be promptly updated to the latest comparison results after editing.



#### • Data access to the user ROM

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

#### • Password function

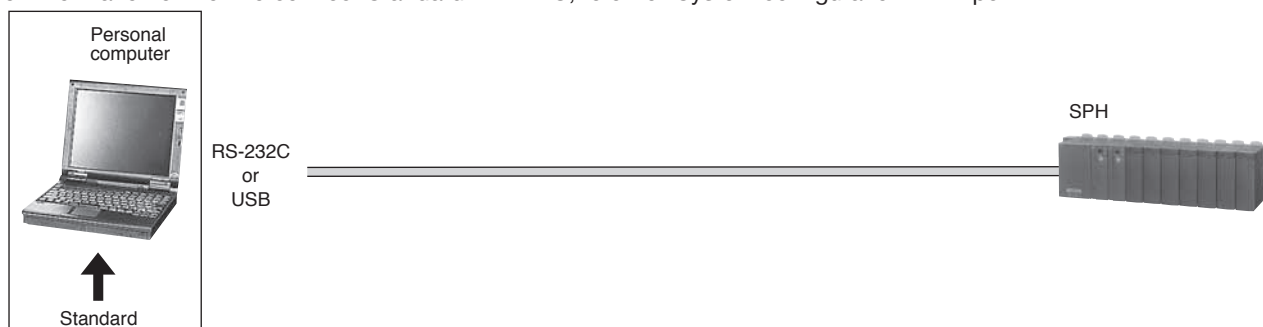
By setting an access authentication password for on-line functions, operation of the PLC can be limited to three levels, i.e., level 1, level 2, and level 3.

#### ■ Operating environment

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

#### ■ System configuration

For information on how to connect Standard with PLC, refer to “System configuration” in Expert.



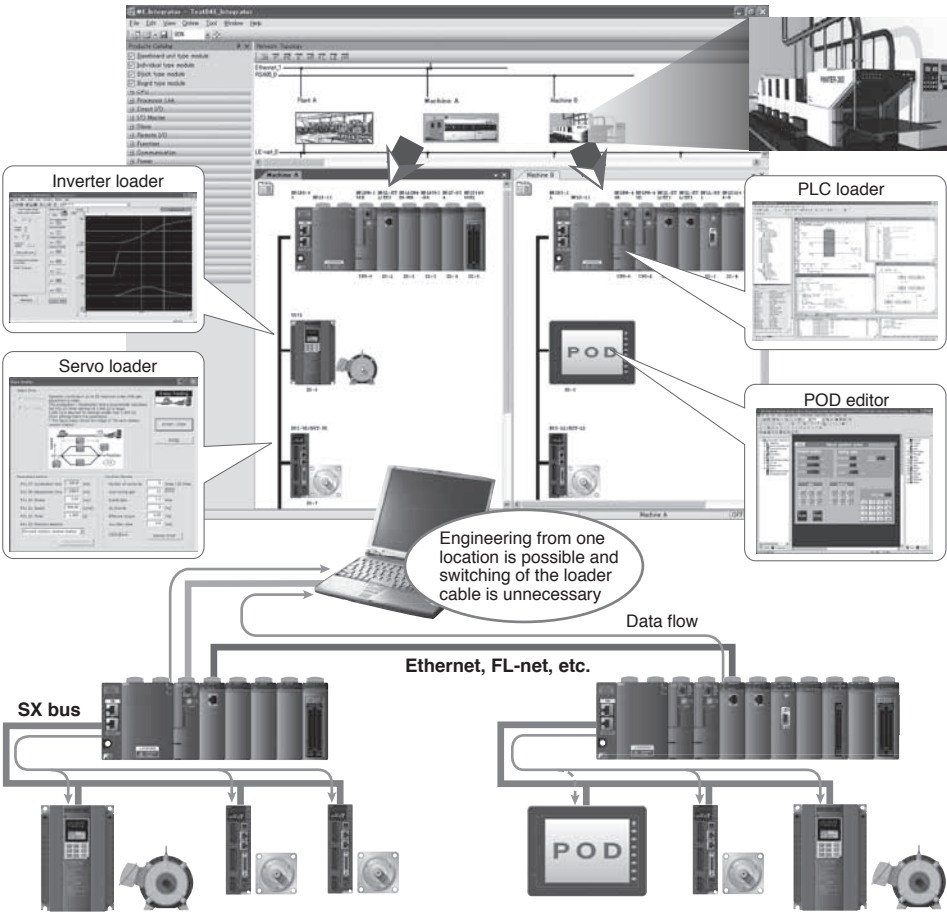


Programmable Controllers  
**MICREX-SX series SPH**  
Fuji Integrated Support Tool @E.Integrator

Fuji Integrated Support Tool:  
NP4N-ITGR

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

- Features**
  - **Easy**
    - Relieved from cable switch work
    - Transparent connection with the network
    - Relieved from tool select operation
  - **Economy**
    - Enhanced efficiency of content management
    - Enhanced engineering efficiency of all processes
  - **Evolution**
    - Pursuit of further convenience



**■ Supported devices**

| Support Tool                                  | Function & Description                                                                                      | Model       | Version (or Later) |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------|--------------------|
| Fuji Integrated Support Tool<br>@E.Integrator | FA system integrated management tool that integratedly manages the support tools for PLC, POD, INV, and SV. | NP4N-ITGR   | V1.0.0.0           |
| PLC loader                                    | Support tool for PLC. Edits the MICREX-SX program and monitors the state.                                   | NP4H-SEDBV3 | V3.4.4.0           |
| SX-Programmer                                 |                                                                                                             | NP4H-SWN    | V2.3.5.1           |
| POD editor                                    | Support tool for POD.<br>Edits and operates the POD screen.                                                 | V-SFT-5     | V5.3.0.0           |
| Inverter loader                               | Support tool for vector inverter VG7.                                                                       | WPS-VG7-PCL | V2.1.0.1           |
| PC Loader for FRENIC5000VG7                   | Adjusts parameters and monitors the state.                                                                  |             |                    |
| Servo loader                                  | Support tool for ALPHA5.                                                                                    | -           | V1.8               |
| 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<br>Microsoft .NET Framework 2.0<br>Microsoft .NET Framework 2.0 Japanese Language Pack *2 |

**Operating environment combining @E.Integrator with each support tool**

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

\*1 Apply the latest service pack to your operating system.

\*2 If the Japanese Language Pack is not installed when using a Japanese OS, some messages will be displayed in English.

Programmable Controllers  
**MICREX-SX series SPH**  
**OPC-Coordinated Library SX Communication Middleware**

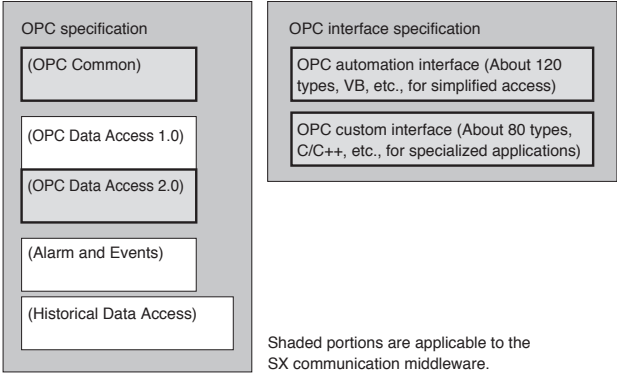
**OPC-Coordinated Library SX Communication Middleware**

■ **Features**

• **OPC-coordinated library**

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

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



■ **Operating environment**

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

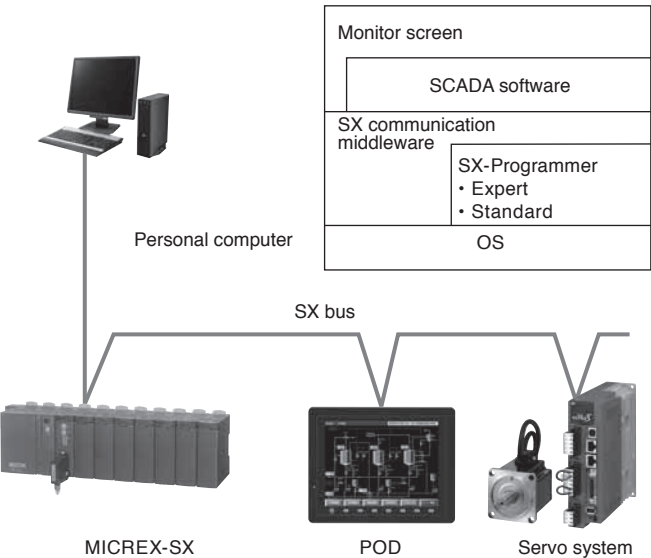
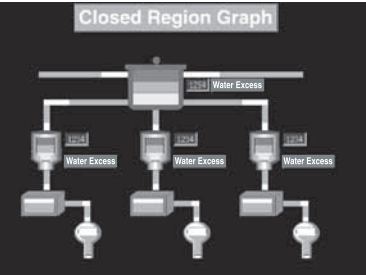
■ **Sample application system**

The example at right is a centralized monitor system for line equipment configured using SPH as a controller.

- The monitor screen makes status display and data collection of each I/O device.
- The operation screen sets production command data for each line.

■ **Sample application monitor screen**

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



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

# Programmable Controllers

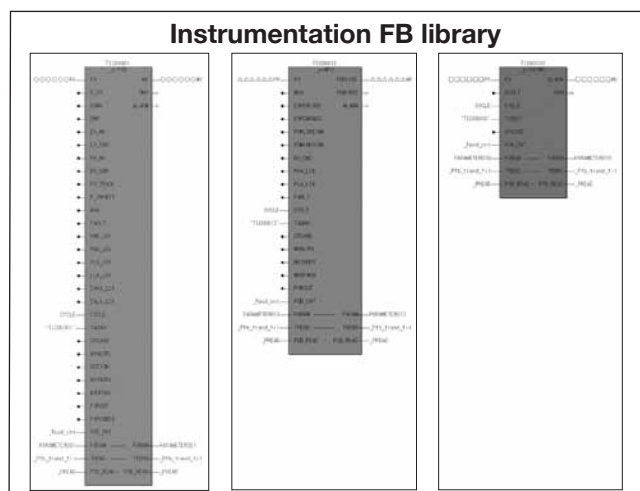
## MICREX-SX series SPH

### SX Instrumentation Package

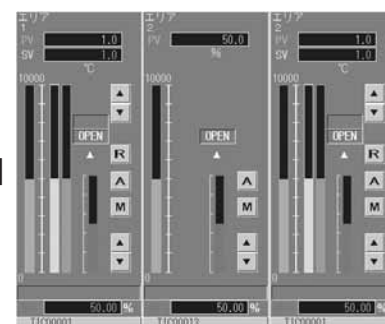
#### SX Instrumentation Package: NP4N-IPAC

##### ■ Features

- **Remarkably improved application development efficiency**
  - An instrument screen is easily generated from an application program using the instrumentation FB.
  - Abundant instrumentation FBs allow you to support various areas.
  - Programming support tool is compliant with IEC61131-3, allowing you to select a language suitable for componentizing and processing control programs. As languages, LD, IL, FBD, ST, and SFC are supported.
- **System configuration with general-purpose PLC and touch panel**
  - One CPU can afford loop control, sequence control, and data processing.
  - Touch panel can afford operation, tuning, and monitoring.
  - Instrumentation system can be configured with reasonable cost.



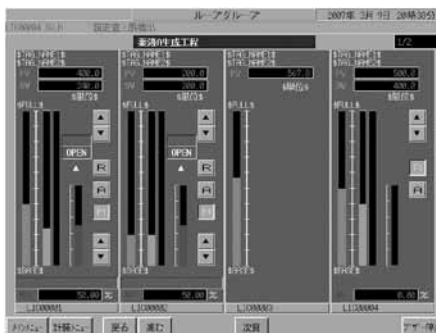
Easily Generated



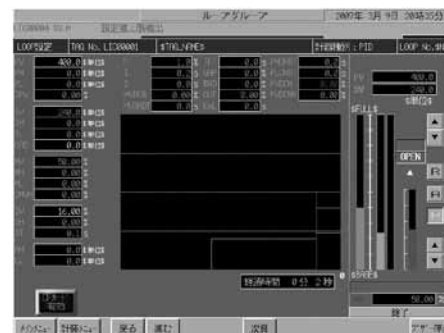
##### • Abundant instrument FB libraries



Overview

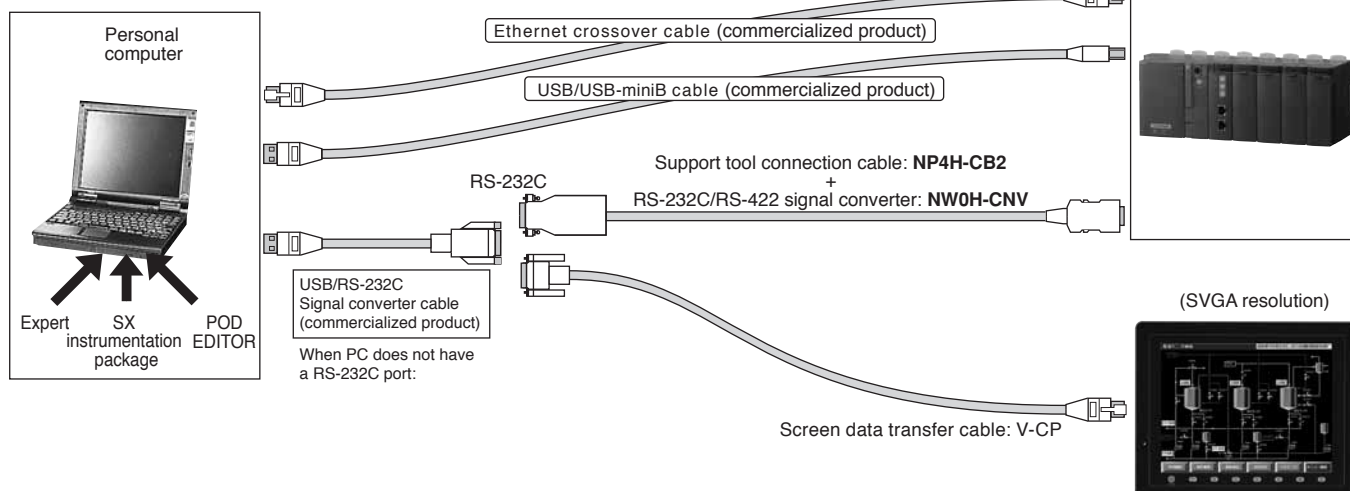


Group monitoring



Loop tuning

##### ■ System configuration



**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<br>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<br>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<br>Calendar setting<br>Buzzer ON/OFF<br>Inverter connection function *2<br>(Display / Set up function code data, monitor operation, and display alarm information) |

Note 1: The device address representation used supports both SX-Programmer Expert (D300win) and Standard. (Loader type setting)

Note 2: Applicable to an inverter connected to the RS-485 interface of board controller.

■ **System configuration**

Handy monitor



SPH



Connection cable (accessory)

# 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-32R/NP1PS-74R**.

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

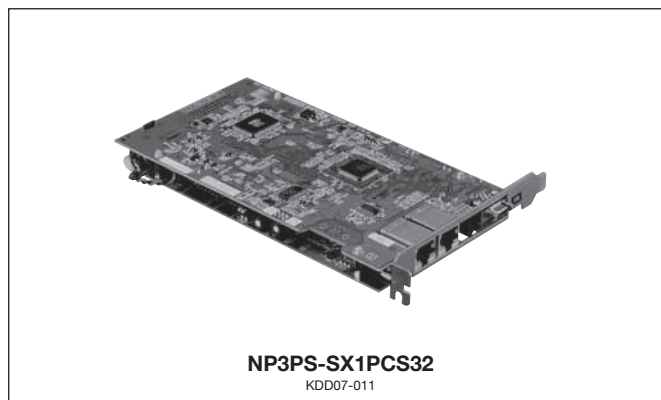
For details on performance and specifications, refer to “CPU Module: **NP1PS- □ □**” on this catalog.

#### ■ 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.



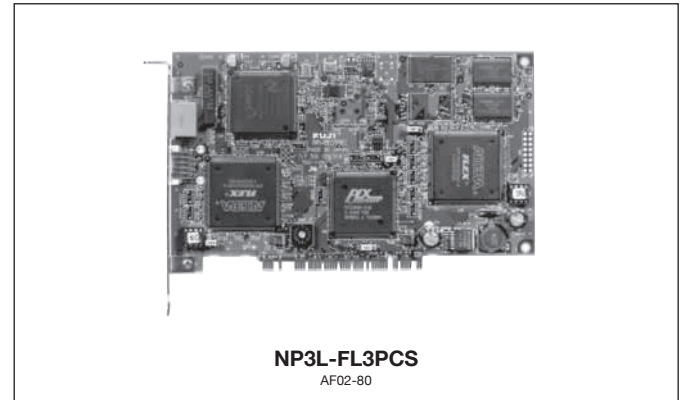
**PCI-Bus-Based FL-net (OPCN-2) Ver. 2.0 Board:  
 NP3L-FL3PCS**

■ **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 development language | Microsoft Visual Basic<br>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.

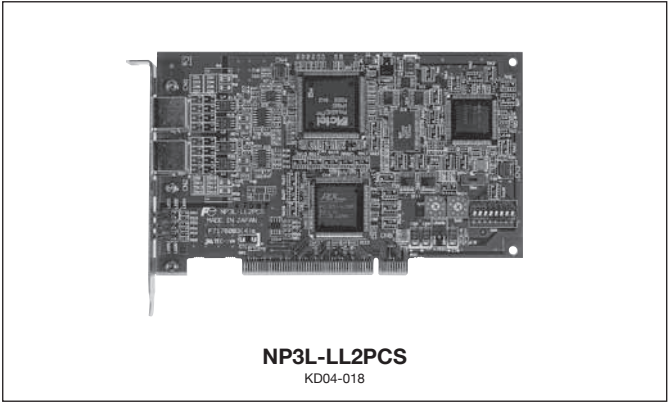
■ **Performance specifications**

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).

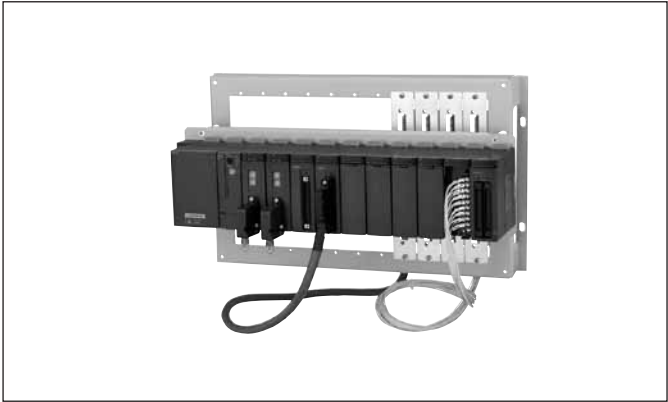


- Since this board uses the loop 2 mode, LE-net loop 2 modules can be connected to the same system.

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.

**Renewal Tool**

This renewal tool (I/O terminal conversion unit) makes the MICREX-F F250, F120-F150S, and F120H/F80H series I/O units usable with MICREX-SX series units as they are.



■ **Features**

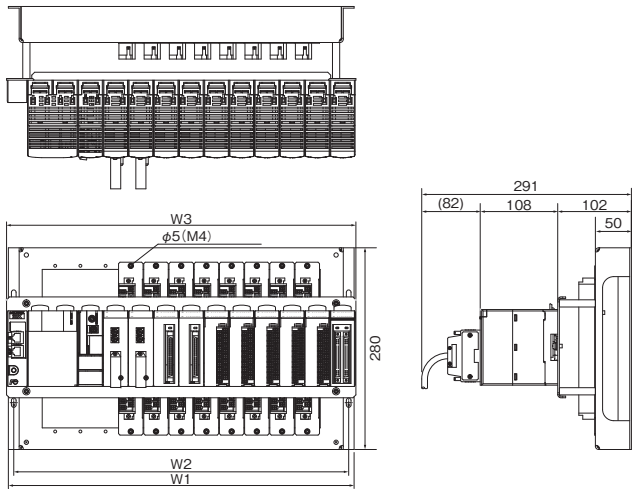
- Significantly reduced I/O wiring work  
Since I/O wiring is usable as it is, wiring work and checking can be omitted, and wiring work time can be significantly reduced to 1/5.
- Speedy board modifications on site  
The dimensions of the frame of the renewal tool are the same as those of the MICREX-F series base board. You do not have to perform any on-site additional work such as drilling.

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

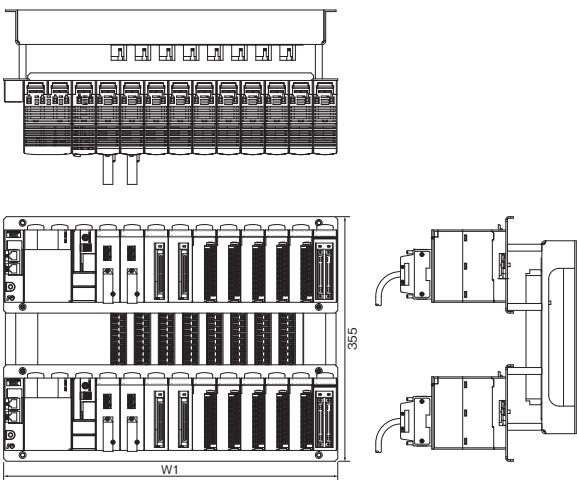
| Item                                       | Type           | Specification outline                                                        |
|--------------------------------------------|----------------|------------------------------------------------------------------------------|
| Frame set (SPH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

Frame set (SPH mounting board + base unit)

- base unit (mounting 1 SX base unit)



- base unit (mounting 2 SX base unit)



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

(mm)

# Programmable Controllers

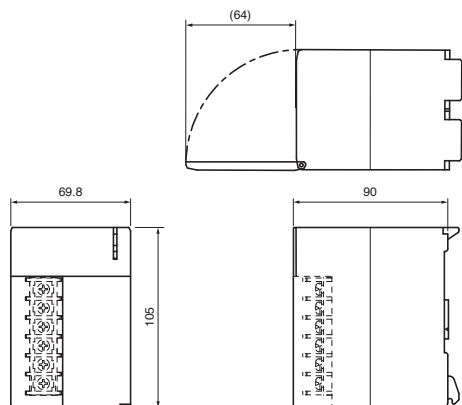
## MICREX-SX series SPH

### Dimensions

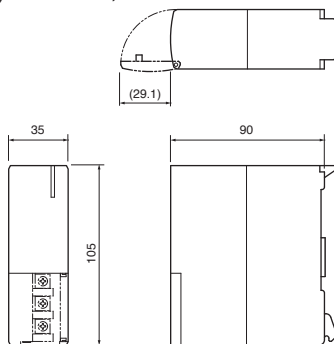
#### ■ Dimensions

(1) Power supply module

1) NP1S-22, NP1S-42

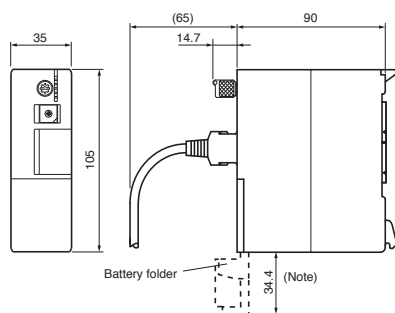


2) NP1S-91, NP1S-81



(2) CPU module

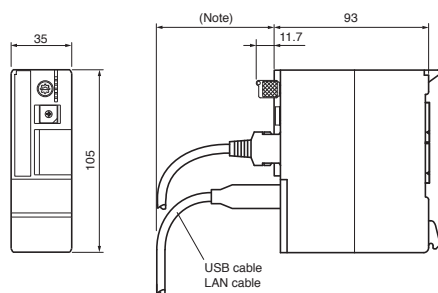
1) SPH200 NP1PH-16, NP1PH-08



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

2) SPH300/SPH2000/SPH3000

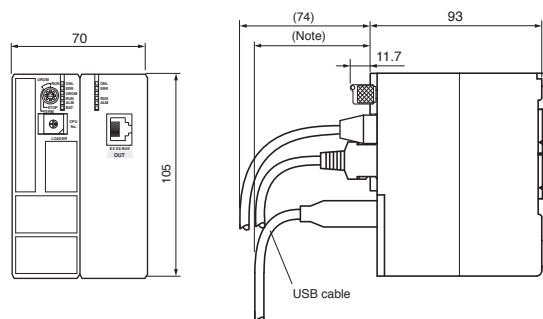
NP1PS-32/32R, NP1PS-74R, NP1PS-117R,  
NP1PS-245R, NP1PM-48R/48E, NP1PM-256E,  
NP1PM-256H, NP1PU-048E/256E



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

3) SPH300EX

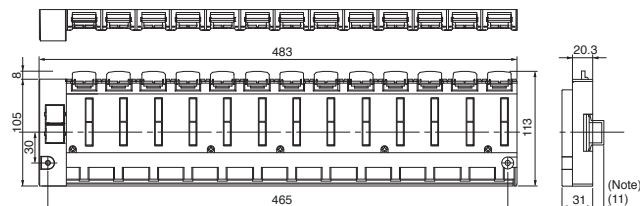
NP1PS-74D



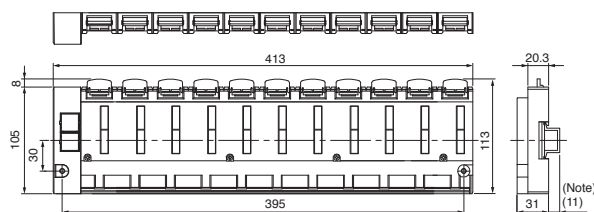
Note: For bend radius, check the specification for the loader cable you use.

(3) Base board

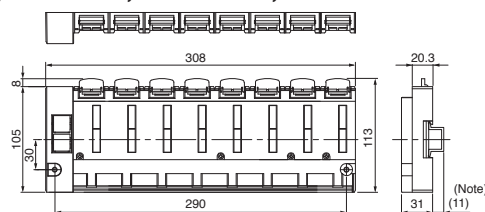
1) NP1BP-13, NP1BS-13, NP1BP-13S, NP1BS-13S,  
NP1BS-13D, NP1BP-13D



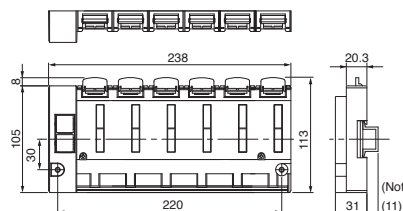
2) NP1BS-11, NP1BS-11S, NP1BS-11D



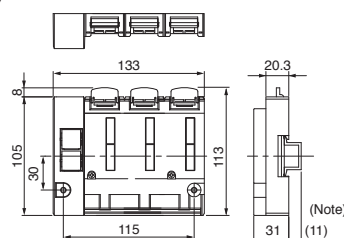
3) NP1BS-08, NP1BS-08S, NP1BS-08D



4) NP1BS-06



5) NP1BS-03



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

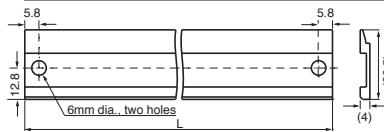
# Programmable Controllers

## MICREX-SX series SPH

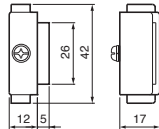
### Dimensions

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

| Type                                                              | L (mm) |
|-------------------------------------------------------------------|--------|
| For NP1BP-13/NP1BS-13/NP1BP-13S/NP1BS-13S/<br>NP1BS-13D/NP1BP-13D | 476.5  |
| For NP1BS-11/NP1BS-11S/NP1BS-11D                                  | 406.5  |
| For NP1BS-08/NP1BS-08S/NP1BS-08D                                  | 301.5  |
| For NP1BS-06                                                      | 231.5  |
| For NP1BS-03                                                      | 126.5  |

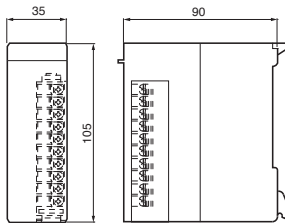


#### (5) Base board mounting stud **NP8B-STK1**



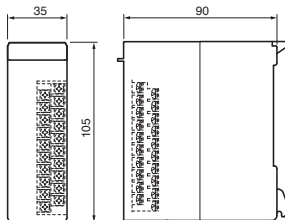
#### (6) I/O module

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

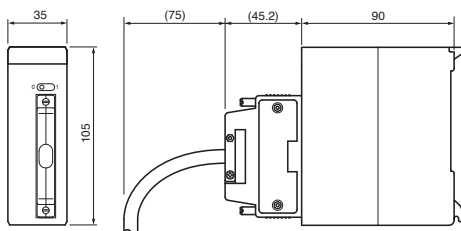


Note: Transistor sink 8-point output type (NP1Y08T0902) and SSR 8-point output type (NP1Y08S) are equivalent to the 16-point module below.

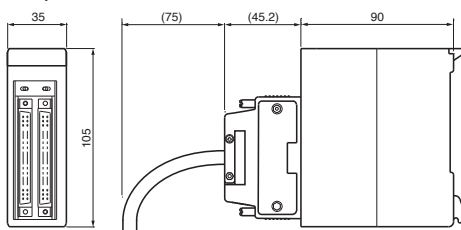
##### 2) 16-point module (digital) / Analog input module / Analog output module (**NP1AY□2-MR, NP1AX□4-MR, NP1AX08V-MR, NP1AX08V-MR**)



##### 3) 32-point module

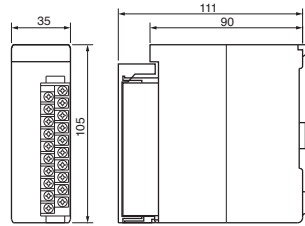


##### 4) 64-point module



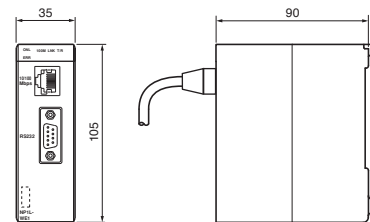
#### 5) Terminal block protrusion module

(Resistance temperature sensor input module **NP1AXH4-PT, NP1AXH6G-PT**,  
Thermocouple input module **NP1AXH4-TC, NP1AXH8G-TC**,  
Analog I/O module **NP1AXH8□-MR, NP1AXH8□G-MR, NP1AYH8□-MR, NP1AYH8□G-MR, NP1AYH4□-MRC NP1AWH6□-MR**),  
Distributor module **NP1AXH4DG-MR**,  
Flow meter F/AD conversion module **NP1F-PI4**



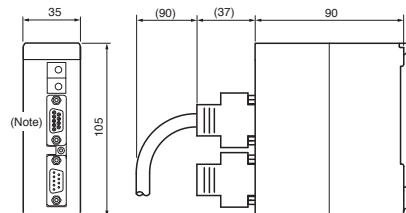
#### (7) Communication module

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



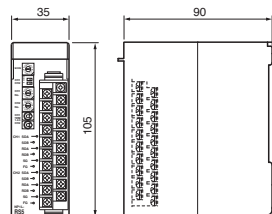
Note: This differs by type, whether or not connectors and switches exist, but outside dimensions are the same for all types.

##### 2) General purpose communication module **NP1L-RS1/2/3/4**, PROFIBUS-DP master module **NP1L-PD1**, PROFIBUS-DP slave module **NP1L-PS1** PROFIBUS-DP interface module **NP1L-RP1**

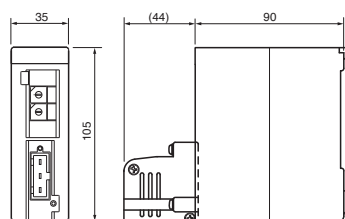


Note: This differs by type, whether or not connectors and switches exist, but outside dimensions are the same for all types.

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



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

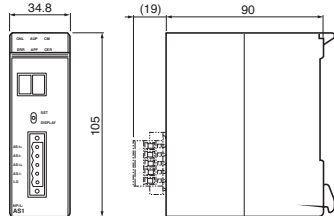


Note: This differs by type, whether or not connectors and switches exist, but outside dimensions are the same for all types.

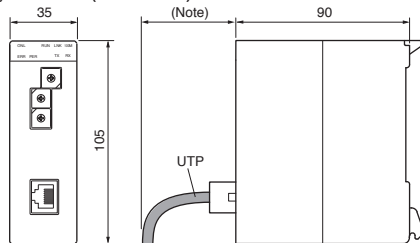


# Programmable Controllers **MICREX-SX** series SPH Dimensions

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

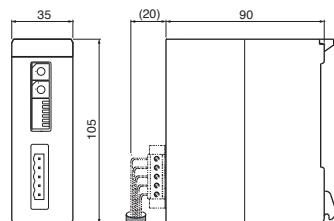


5) FL-net (OPCN-2) module **NP1L-FL3**

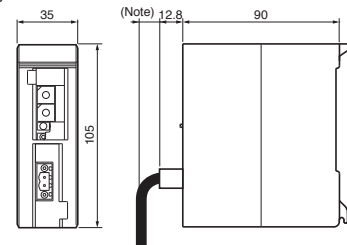


Note: For AUI and UTP cables, you need to take connector dimensions and cable bend into consideration. (For bend radius, check the specification for the cable you use.)

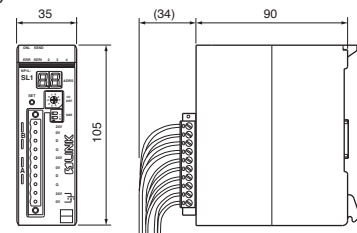
6) DeviceNet master module **NP1L-DN1**,  
DeviceNet slave module **NP1L-DS1**,  
DeviceNet interface module **NP1L-RD1**



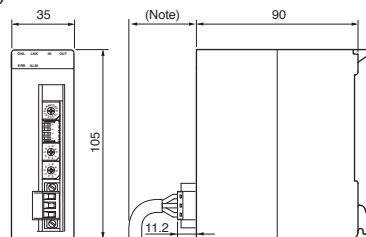
7) LONWORKS interface module **NP1L-LW1**



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

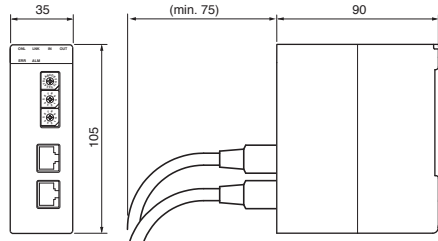


9) LE-net module **NP1L-LE1**

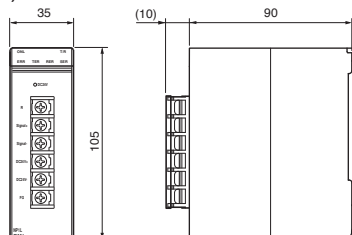


Note: Consider the bend of the cable you use.

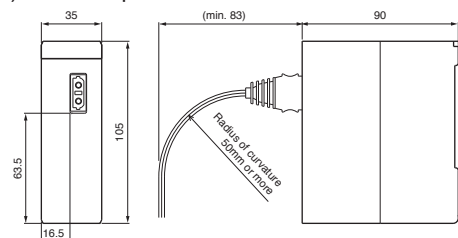
10) LE-net loop 2 module **NP1L-LL2**



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

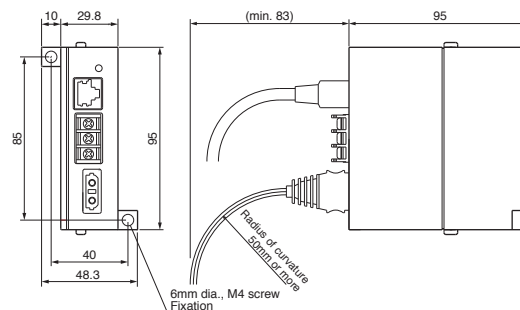


12) SX bus optical link module **NP1L-OL1**

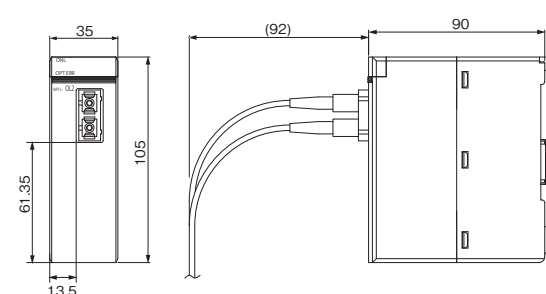


13) SX bus optical link converter

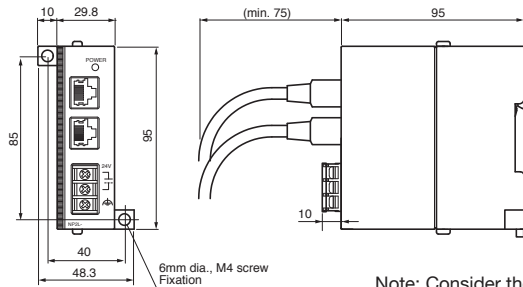
**NP2L-OE1**



**NP2L-OE2**

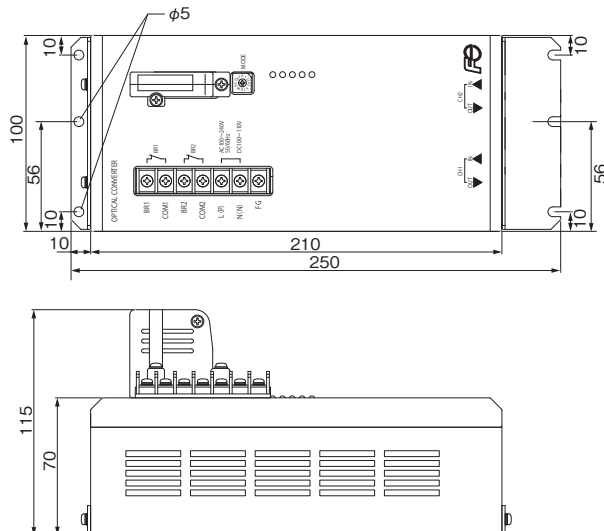


14) SX bus electrical repeater **NP2L-RP1**



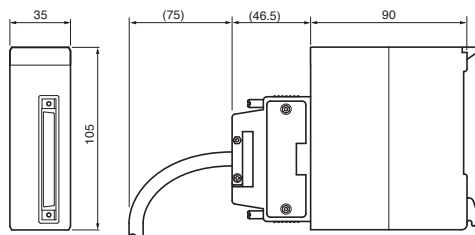
Note: Consider the bend of the cable you use.

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

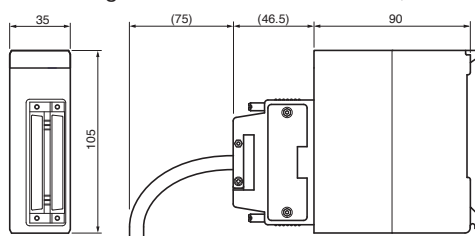


(8) Positioning control module / Unit

1) High-speed counter module **NP1F-HC2, NP1F-HC2MR, NP1F-HC2MR1, NP1F-HC8**  
 Multi channel high-speed counter module **NP1F-HC8**

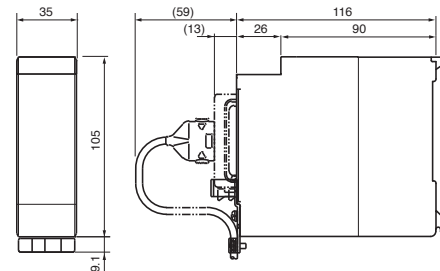


2) Positioning control module **NP1F-MA2, NP1F-MP2, NP1F-HP2**

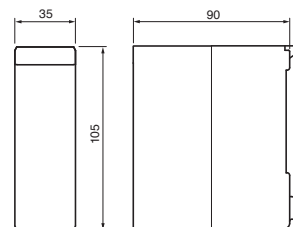


(9) Function module / Unit

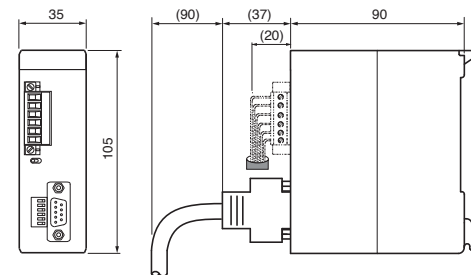
1) Memory card interface module **NP1F-MM1**



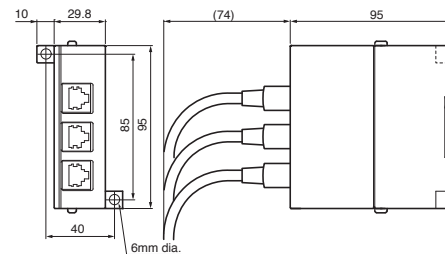
2) Dummy module **NP1F-DMY**



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



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



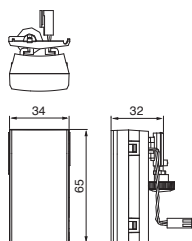
# Programmable Controllers

## MICREX-SX series SPH

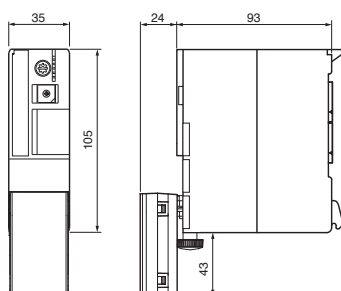
### Dimensions

(10) Opution

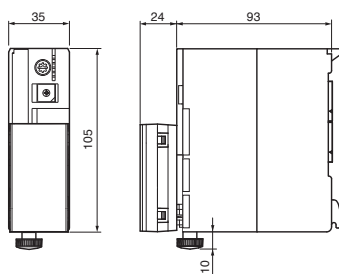
1) Battery box **NP8P-BTS**



• Dimension at lower installation

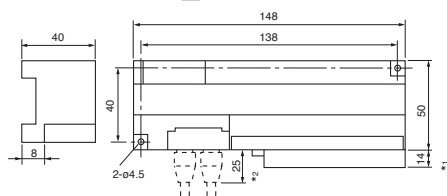


• Dimension at upper installation



(11) I/O Terminal

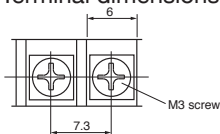
1) NR1 series **NR1** □



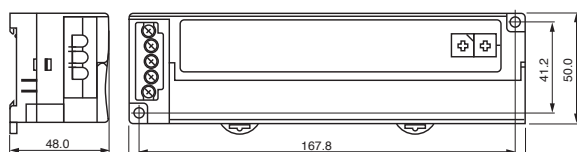
\*1) When the extension terminal block is mounted.

\*2) When the SX bus-adapted unit is connected.

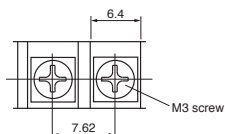
<Terminal dimensions>



2) NR2 series **NR2** □

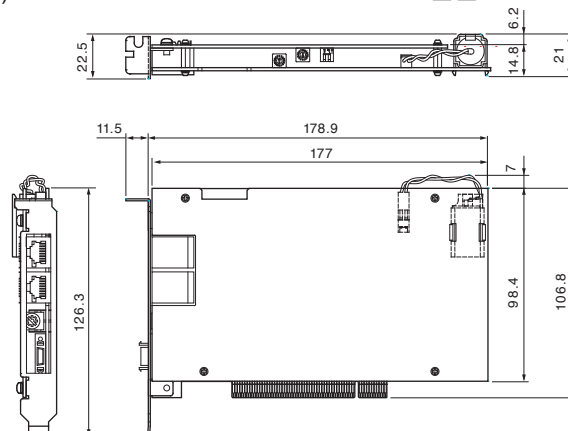


<Terminal dimensions>

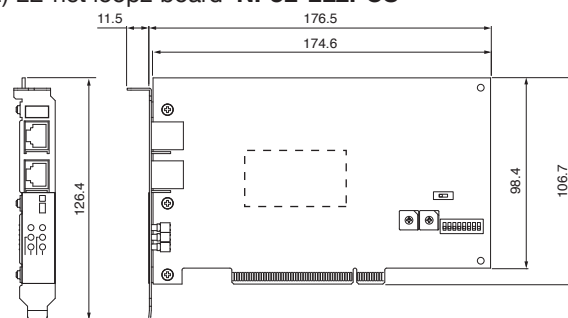


(12) PCI-bus-based board

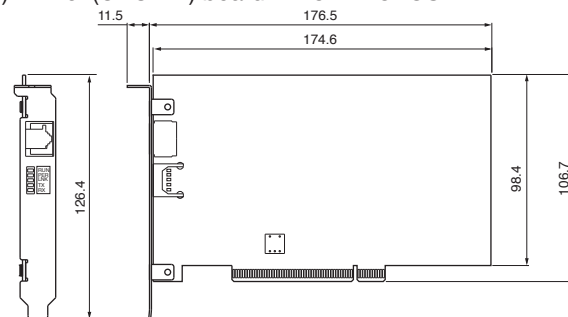
1) SPH300 CPU board **NP3PS-SX1PCS** □ □



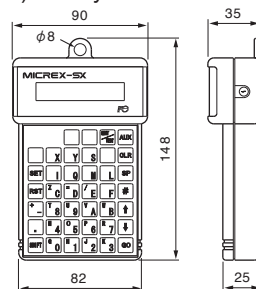
2) LE-net loop2 board **NP3L-LL2PCS**



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



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



# Programmable Controllers

## MICREX-SX series SPH

### Ordering Information

#### ■ Types/Ordering codes

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

Standards

○

Certificated

—

Exceptions

Standards | ○ Certificated | — Exceptions

\*1 Connectors (solder type) for digital input, output, I/O-mixed, and positioning modules are separately available (**NP8V-CN**).

\*2 Conformance to CE marking is confirmed on individual SX Series models. When exporting the final product with the SX Series built in to the EU, be sure to verify the standard conformance corresponding to the final product.

\*3 For vibration countermeasures, the modules must be fixed in units of base board. For further information, contact your Fuji sales representative.

\*4 The SX bus cable corresponds to the arbitrariness length. Please contact our sales section.

\*5 The model NPS-22 A is UL-certified (cUL certification is not obtained).

\*6 The model NP1S-91 A is UL Recognition-certified (cUL certification is not obtained).

\*7 The model NP1S-81 A is UL Recognition-certified (cUL certification is not obtained).

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

Programmable Controllers

**MICREX-SX series SPH**

Ordering Information

| Names                       | Types (Ordering codes) | Specifications, Names                                                                                                                                                             |                | Standards |    |    |    |   |
|-----------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|----|----|----|---|
|                             |                        |                                                                                                                                                                                   |                | CE        | UL | LR | NK |   |
| Digital output module *1    | NP1Y08T0902            | Tr sink, 12 to 24V DC, 8 points, 2.4A/point, 4A/common                                                                                                                            | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1Y16T09P6            | Tr sink, 12 to 24V DC, 16 points, 0.6A/point, 4A/common                                                                                                                           | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1Y32T09P1-A          | Tr sink, 24V DC, 32 points, 0.12A/point, 3.2A/common, Pulse train output 20kHz x 4ch (Built-in), Optional Connector                                                               | Connector      | ○         | ○  |    |    |   |
|                             | NP1Y32T09P1            | Tr sink, 12 to 24V DC, 32 points, 0.12A/point, 3.2A/common, Optional Connector                                                                                                    | Connector      | ○         | ○  | ○  | ○  |   |
|                             | NP1Y64T09P1            | Tr sink, 12 to 24V DC, 64 points, 0.12A/point, 3.2A/common, Optional Connector                                                                                                    | Connector      | ○         | ○  | ○  | ○  |   |
|                             | NP1Y16T10P2            | Tr sink, 48V DC, 16 points, 0.2A/point, 1.6A/common                                                                                                                               | Screw terminal | ○         | ○  |    |    |   |
|                             | NP1Y08U0902            | Tr source, 12 to 24V DC, 8 points, 2.4A/point, 4A/common                                                                                                                          | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1Y16U09P6            | Tr source, 12 to 24V DC, 16 points, 0.6A/point, 4A/common                                                                                                                         | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1Y32U09P1            | Tr source, 12 to 24V DC, 32 points, 0.12A/point, 3.2A/common, Optional Connector                                                                                                  | Connector      | ○         | ○  | ○  | ○  |   |
|                             | NP1Y64U09P1            | Tr source, 12 to 24V DC, 64 points, 0.12A/point, 3.2A/common, Optional Connector                                                                                                  | Connector      | ○         | ○  | ○  | ○  |   |
|                             | NP1Y08S                | SSR, 100 to 240V AC, 8 points: all points are independent, 2.2A/points                                                                                                            | Screw terminal |           |    |    | ○  | ○ |
|                             | NP1Y08R-04             | Ry, 110V DC, 240V AC, 8 points, 30V DC/ 264V AC: 2.2A/point, 4A/common                                                                                                            | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1Y16R-08             | Ry, 110V DC, 240V AC, 16 points, 30V DC/ 264V AC: 2.2A/point, 8A/common                                                                                                           | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1Y08R-00             | Ry, 110V DC, 240V AC, 8 points, 30V DC/ 264V AC: 2.2A/point, independent                                                                                                          | Screw terminal |           |    |    | ○  | ○ |
| Digital I/O mixed module *1 | NP1W0806T              | 24V DC 8 points source input, 12 to 24V DC 8 points Tr sink output                                                                                                                | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1W1606U              | 24V DC 8 points sink input, 12 to 24V DC 8 points Tr source output                                                                                                                | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1W3206T              | 24V DC 16 points source input, 12 to 24V DC Tr sink 16 points output, Optional Connector                                                                                          | Connector      | ○         | ○  | ○  | ○  |   |
|                             | NP1W3206U              | 24V DC 16 points sink input, 12 to 24V DC Tr source 16 points output, Optional Connector                                                                                          | Connector      | ○         | ○  | ○  | ○  |   |
|                             | NP1W6406T              | 24V DC 32 points source input, 12 to 24V DC Tr sink 32 points output, Optional Connector                                                                                          | Connector      | ○         | ○  | ○  | ○  |   |
|                             | NP1W6406U              | 24V DC 32 points interactive input, 12 to 24V DC Tr source 32 points output, Optional Connector                                                                                   | Connector      | ○         | ○  |    |    |   |
| Analog input module         | NP1AX04-MR             | Standard type multi-range input 4ch, resolution: 10 bits                                                                                                                          | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AXH4-MR             | High speed type multi-range input 4ch, resolution: 14 bits                                                                                                                        | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AX08V-MR            | Standard type multi-range input 8ch, resolution: 10 bits (voltage type)                                                                                                           | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AX08I-MR            | Standard type multi-range input 8ch, resolution: 10 bits (current type)                                                                                                           | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AXH8V-MR            | High speed type multi-range input 8ch, resolution: 14 bits (voltage type)                                                                                                         | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AXH8I-MR            | High speed type multi-range input 8ch, resolution: 14 bits (current type)                                                                                                         | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AXH8VG-MR           | High speed type multi-range input 8ch, between channels insulated, resolution: 16 bits (voltage type)                                                                             | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AXH8IG-MR           | High speed type multi-range input 8ch, between channels insulated, resolution: 16 bits (current type)                                                                             | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AXH4-PT             | Resistance thermometer element input (Pt100Ω/JPt100Ω) 4ch, accuracy: ± 0.3% (ambient temperature: 18 to 28°C), ± 0.7% (ambient temperature: 0 to 55°C)                            | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AXH6G-PT            | High accuracy resistance thermometer element input (Pt100Ω/JPt100Ω) 6ch, accuracy: ± 0.05 to ± 0.07% (ambient temperature: 18 to 28°C), ± 0.239% (ambient temperature: 0 to 55°C) | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AXH4-TC             | Thermo-couple input module 4ch, resolution: 14 bits accuracy: ± 0.3% (ambient temperature: 18 to 28°C), ± 0.7% (ambient temperature: 0 to 55°C)                                   | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AXH8G-TC            | High accuracy thermo-couple input module 8ch, accuracy: ± 0.05 to ± 0.26% (ambient temperature: 18 to 28°C), ± 0.3 to ± 0.6% (ambient temperature: 0 to 55°C)                     | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AXH4DG-MR           | Distributor module, 4ch,between channels high dielectric strength insulated, resolution: 16 bits accuracy: ± 0.1% of F.S.R. (ambient temperature: 25°C)                           | Screw terminal |           |    |    |    |   |
| Analog output module        | NP1AY02-MR             | Standard type multi-range output 2ch, resolution: 10 bits                                                                                                                         | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AYH2-MR             | High speed type multi-range output 2ch, resolution: 14 bits                                                                                                                       | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AYH4V-MR            | High speed type multi-range output 4ch, resolution: 14 bits (voltage type)                                                                                                        | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AYH4I-MR            | High speed type multi-range output 4ch, resolution: 14 bits (current type)                                                                                                        | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AYH4VG-MR           | High speed type multi-range output 4ch, between channels insulated, resolution: 14 bits (voltage type)                                                                            | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AYH4IG-MR           | High speed type multi-range output 4ch, between channels insulated, resolution: 14 bits (current type)                                                                            | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AYH8V-MR            | High speed type multi-range output 8ch, resolution: 14 bits (voltage type)                                                                                                        | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | NP1AYH8I-MR            | High speed type multi-range output 8ch, resolution: 14 bits (current type)                                                                                                        | Screw terminal | ○         | ○  | ○  | ○  |   |
|                             | 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-FL3               | FL-net module Ver. 2.0 (10/100Mbps)                                                                                                                                               |                | ○         | ○  |    |    |   |
|                             | NP1L-LW1               | LonWorks interface module (78kbps) Accessories: Connector for cable connected                                                                                                     |                |           | ○  |    |    |   |
|                             | NP1L-PL1               | P-link module Accessories: P/PE-link connector                                                                                                                                    |                |           | ○  |    |    |   |
|                             | NP1L-PE1               | PE-link module Accessories: P/PE-link connector                                                                                                                                   |                |           | ○  |    |    |   |
|                             | NP1L-LE1               | LE-net module                                                                                                                                                                     |                | ○         | ○  | ○  | ○  |   |
|                             | NP1L-LL2               | LE-net loop2 module                                                                                                                                                               |                | ○         | ○  | ○  | ○  |   |

Standards ☐ 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.

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

Standards | ○ Certificated | Exceptions

\*1 Connectors (solder type) for digital input, output, I/O-mixed, and positioning modules are separately available (**NP8V-CN**).

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\*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.

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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 (1 piece)                                                                                                 |                                                                                                 | —  | —            | —            | — |
|                 |                                 | NP8B-ST                                                              | Base board mounting stud (DIN rail type(2 pieces))                                                                                |                                                                                                 | —  | —            | —            | — |
|                 |                                 | NP8V-CN                                                              | I/O, positioning control module connector (solder type)                                                                           |                                                                                                 | —  | —            | —            | — |
|                 |                                 | NP8P-KY                                                              | CPU mode selection key switch                                                                                                     |                                                                                                 | —  | —            | —            | — |
|                 |                                 | FTC120T                                                              | T link / OPCN-1 connector                                                                                                         |                                                                                                 | —  | —            | —            | — |
|                 |                                 | FTC120P                                                              | P/P/E link connector                                                                                                              |                                                                                                 | —  | —            | —            | — |
|                 |                                 | FRT120A100                                                           | T link / OPCN-1 terminating resistor                                                                                              |                                                                                                 | —  | —            | —            | — |
| FRT220A75       | P/P/E 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,<br>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,<br>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,<br>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,<br>Tr sink output 24V DC, 8 points, detachable terminals         | ○  | ○            |              |   |
|                 |                                 | LONWORKS                                                             | NR1SF-HP4DT                                                                                                                       | Pulse train output Pulse train command: 250kHz 4 axes (2 points/1 axes)                         | ○  |              |              |   |
|                 |                                 |                                                                      | NR1LX-1606DT                                                                                                                      | No polarity, input 24V DC, 16 points (included the 4 pulse input points), detachable terminals  |    |              |              |   |
|                 |                                 |                                                                      | NR1LY-08R07DT                                                                                                                     | Ry output 240V AC / 110V DC, 8 points, detachable terminals                                     |    |              |              |   |
|                 | Optional                        | NR1LW-11R80DT                                                        | Source input 24V DC, 9 points (included the 4 pulse input points),<br>Ry output 240V AC / 110V DC, 2 points, detachable terminals |                                                                                                 |    |              |              |   |
|                 |                                 | 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,<br>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                | ○  |              |              |   |
|                 | CPU board                       | NR2JAY-04IMRDT                                                       | Multi-range output 8ch, resolution: 13 bits (current type), detachable terminals                                                  | ○                                                                                               |    |              |              |   |
| NP3PS-SX1PCS32  |                                 | PCI bus based on SPH300 CPU board Program memory capacity: 32K steps | Accessories:                                                                                                                      | ○                                                                                               |    |              |              |   |
| NP3PS-SX1PCS74  |                                 | PCI bus based on SPH300 CPU board Program memory capacity: 74K steps | Driver (CD version), Data backup battery,<br>SX bus terminating plug 2 pieces<br>CPU mode selection key switch, Name and use seal | ○                                                                                               |    |              |              |   |
| Interface board |                                 | NP3L-LL2PCS                                                          | PCI bus based on LE-net loop2 board                                                                                               | Accessories:<br>Driver (CD version)                                                             |    | ○            | ○            |   |
|                 |                                 | NP3L-FL3PCS                                                          | PCI bus based on FL-net board Ver. 2.0 (10/100Mbps based on)                                                                      | Accessories:<br>Driver (CD version), Name and use seal                                          |    |              |              |   |
|                 |                                 |                                                                      |                                                                                                                                   | Standards                                                                                       | ○  | Certificated | — Exceptions |   |

\*2 Conformance to CE marking is confirmed on individual SX Series models. When exporting the final product with the SX Series built in to the EU, be sure to verify the standard conformance corresponding to the final product.

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

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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.

## **Fuji Electric Co., Ltd.**

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