e-Front runners

Integrated Controllers MICREX-SX Series

Programmable Controllers

PROGRAMMABLE CONTROLLER SPH

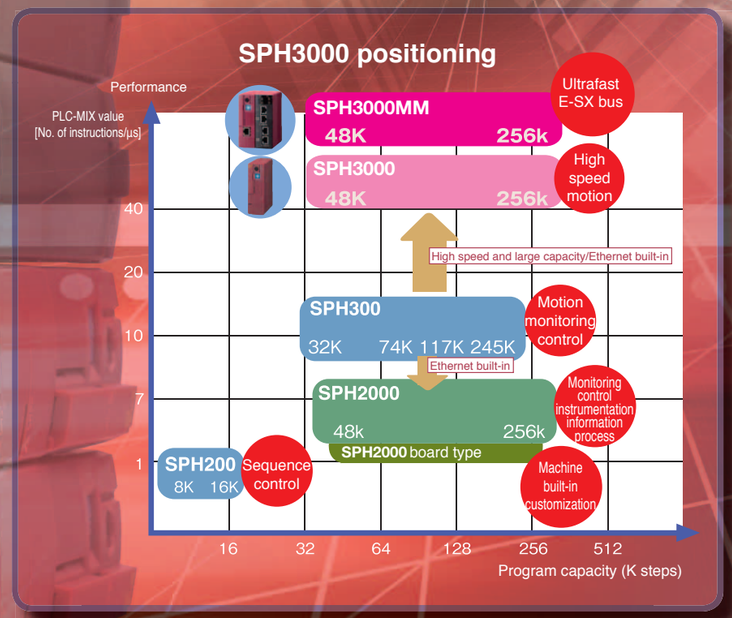
Fuji Electric Co., Ltd.

LEH982g

MICREX-SX Series

SPH

Control, operation and Supervisory Integrated Controllers



Realizes High-Speed Advanced Machine Control

I/O control with a program capacity of up to 256K steps and up to 65,536 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.

Evolution from the SX bus to the E-SX bus

SPH3000MM

The E-SX bus has been released that is evolved from the SX bus, a system bus.
4,096 words of the direct connection I/O capacity or 8 times of the previous capacity, 2,048 word/ms of the refresh performance or 16 times of the previous performance, and 100 Mbps/100 m of the transmission speed and the station-to-station distance 4 times of the previous values allow the application to further complicated and large-scale devices and facilities.

Realization of high speed / the machine control to be heightened

An opening point

Realization of the general programming support

SPH3000 which plans control and fusion of information / the communication

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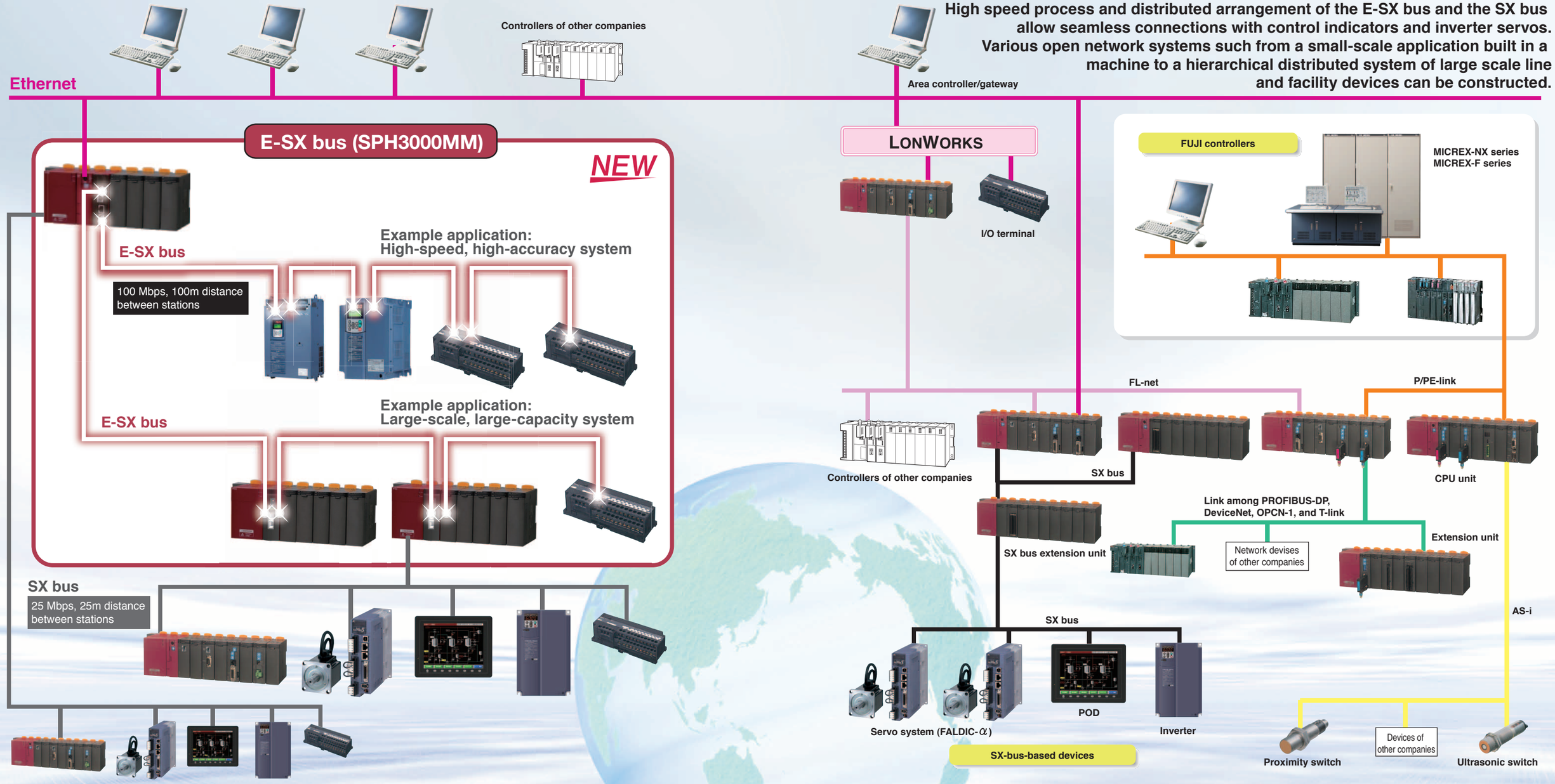
PROGRAMMABLE CONTROLLER

SX Bus Diverse Network Systems Enabling Seamless Access

SPH

High speed process and distributed arrangement of the E-SX bus and the SX bus allow seamless connections with control indicators and inverter servos. Various open network systems such from a small-scale application built in a machine to a hierarchical distributed system of large scale line and facility devices can be constructed.



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.

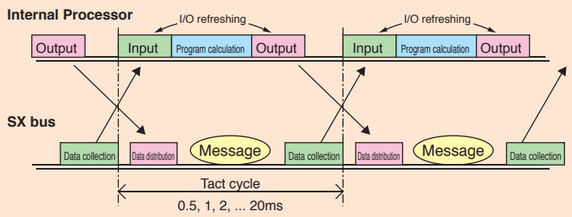
1ms I/O refreshing

- 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.
- SPH3000MM, SPH300, and SPH2000/SPH3000 allow the setting of tact time of minimum 0.25 ms, minimum 0.5 ms, and minimum 1 ms, respectively.

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

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

● Operating Timing



Tact period

SPH3000MM E-SX bus

Tact period		0.25ms	0.375ms	0.5ms	1ms	1.5ms	2ms
Maximum I/O size (number of I/O stations)	4 stations	67word	256word	512word	2048word	2048word	4096word
	16 stations	—	—	256word	1024word	1024word	1024word
	32 stations	—	—	—	512word	2048word	2048word
	64 stations	—	—	—	—	512word	1024word

SPH3000MM/SPH3000 SX bus

Tact period	0.25ms	0.375ms	0.5ms	1ms	1.5ms	2ms
Maximum I/O size	—	—	64word	128word	256word	512word

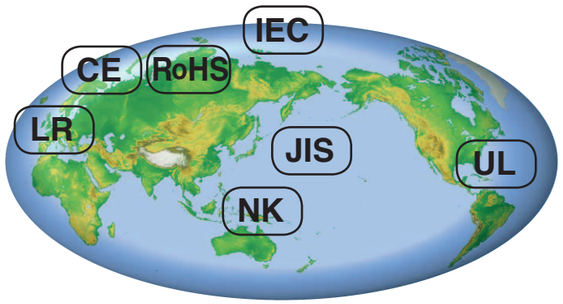
Controller Conforms to International Standard

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

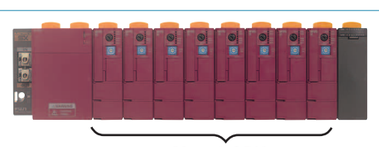
- Conforms to the CE marking, UL standards and RoHS directive (conforming one after another) as well as IEC standard.
- It also complies with the NK marine standard (Japan) and the LR (specifications of Lloyd's Register of Shipping, UK).

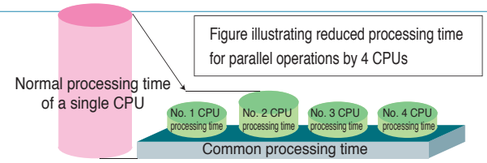


Multi-CPU System Applicable to Up to 8 CPUs

Parallel processing with up to 8 CPUs (SPH300/SPH2000/SPH3000/SPH3000MM)

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.)

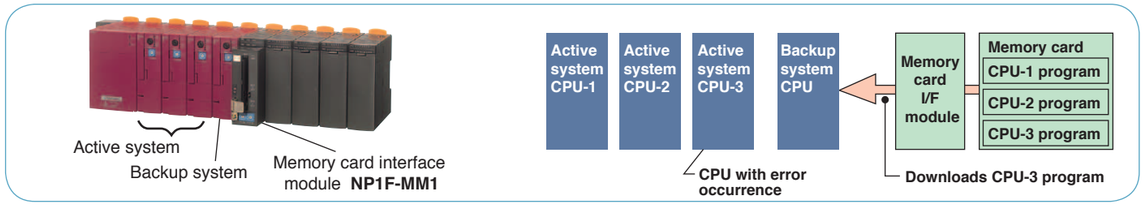
- The same program is stored in CPUs for the active and backup systems, allowing constant data value equalization.

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.

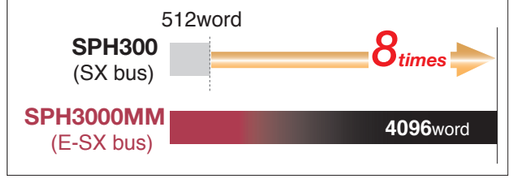


Note 1: The model that supports SPH2000 is NP1PM-256H.
Note 2: For the redundancy configuration buildup with the DC power supply, contact our sales section.

Comparison of functions and performances between the E-SX bus and the SX bus

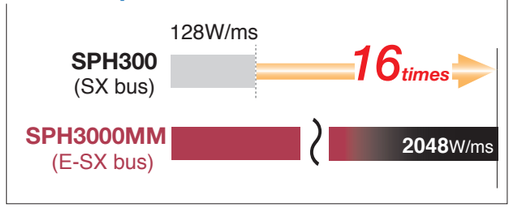
Function and performance	SPH3000	SPH3000MM	
System bus	SX bus	SX bus	E-SX bus
Direct connection I/O capacity	512words	512 words	4096words
Refresh performance	128words/ms	128 words/ms	2048words/ms
Transmission rate	25Mbps	25 Mbps	100Mbps
Tact fluctuation	100µs	100µs	±1µs or less
Synchronization between stations	None	None	Provided (±1µs or less)
Distance (between stations/total distance)	25m/25m	25m/25m	100m/1km
Continued operation at disconnection(loop back)	None	None	Provided

■Direct connection I/O capacity

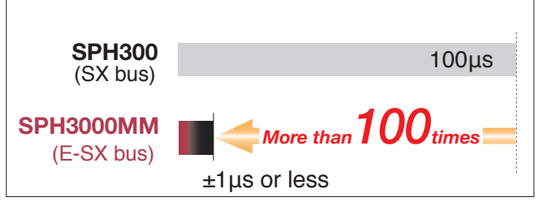


■Transmission rate

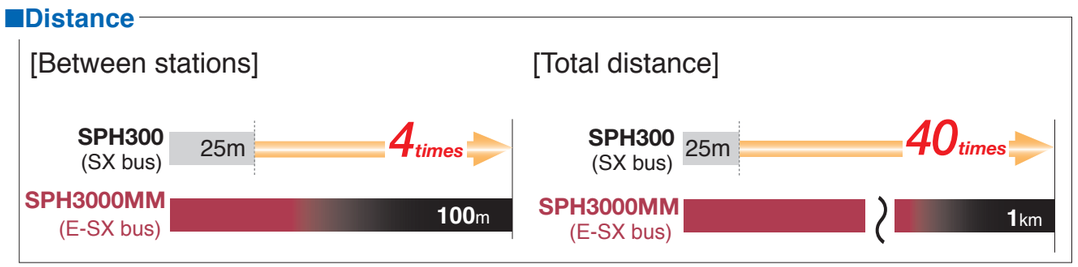
■Refresh performance



■Tact accuracy



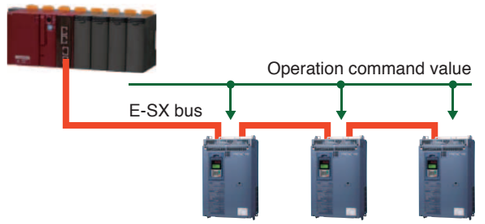
■Distance



Synchronization control of E-SX bus

Synchronization in the bus

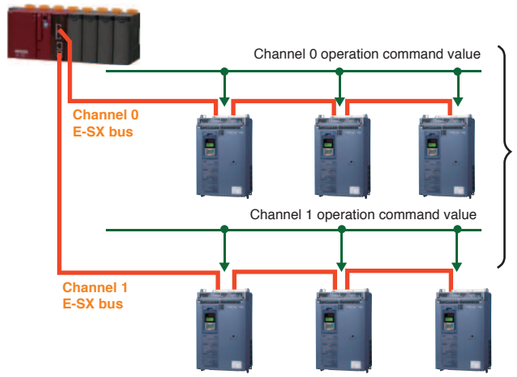
Data output timing is synchronized in the E-SX bus.



Synchronization performance ±1µs or less

Synchronization between buses

Data output timing is synchronized between channels of the E-SX bus.

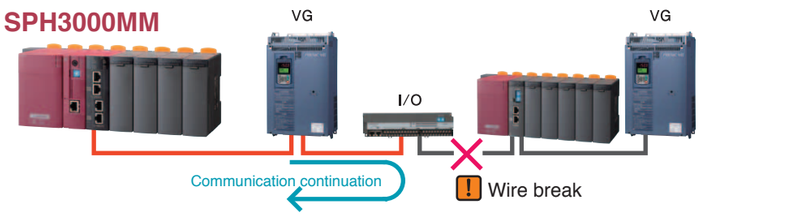


Synchronization performance ±3µs or less

Connection function of the E-SX bus

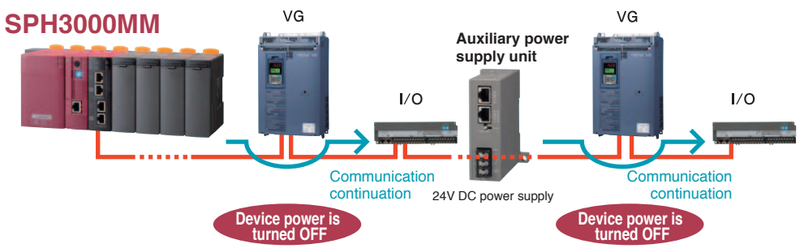
Loopback function

Communication is continued by the signal repeater function even when a wire is broken.



Signal bypass function

Even when a power of some devices is not turned on, the communication is continued by the auxiliary power unit.



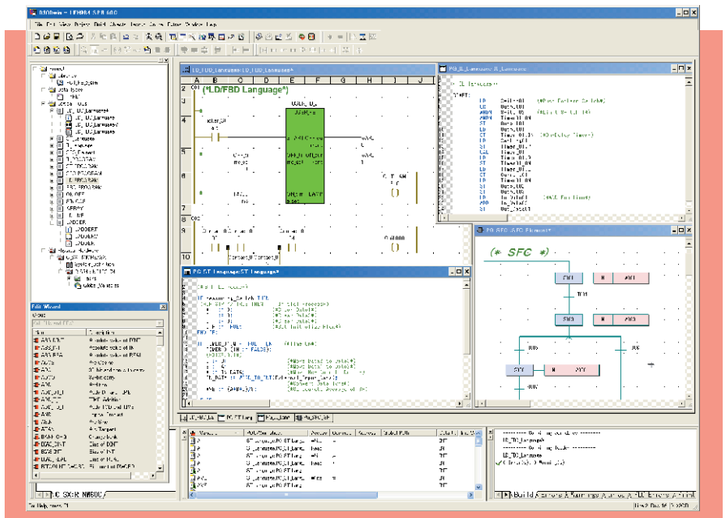
Two Types of Programming Support Tools in Accordance with Development Style

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

SX-Programmer

Expert (D300win)

Development Efficiency Oriented Support Tools



Usage

Improvement of software development efficiency

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

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

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

Features

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

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

Supported representations

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

Excellent documentation function

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

Simulation function

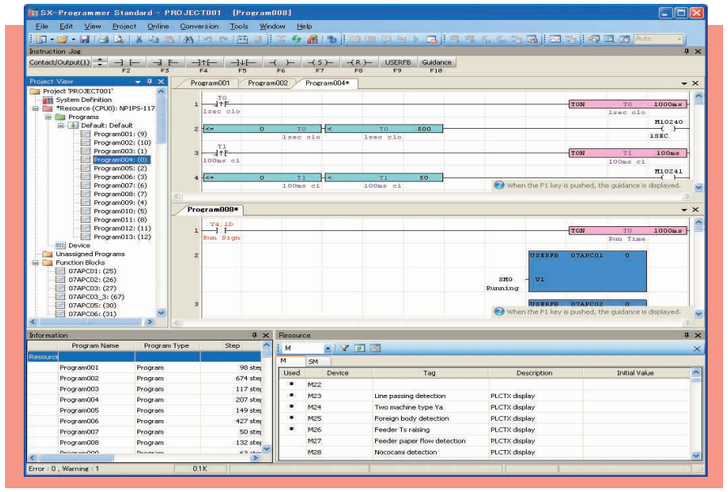
- The simulation function allows the user to conduct test runs of programs using the Expert (D300win) built-in PLC function in place of a real machine.

Programmable Operation Display (POD) cooperation function

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

Standard

Operability Oriented Support Tools



Usage

Ladder operation for on-site maintenance personnel

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

Utilization of programming resources

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

Features

Multi-language support

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

Intuitive screen operation

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

Simulation function

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

Resume function

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

Device editor and collation function

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

SX Bus Meets Diverse Demands for System Extension

Basic SX Bus Configuration

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

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

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

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

Classification of System Configuration

Limit of modules connected in single configuration

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

Note: For details informastions, refer to the each manuals.
* Each remote I/O master module has, in addition to the normal mode, the following two modes:
Extension mode: Function to extend the total number of input/output words of devices that can be connected to one master module unit from a maximum of 128 words (2048 points) to a maximum of 512 words (8192 points) (extended to a maximum of 510 words for the PROFIBUS-DP master). However, the total number of input/output words for one CPU unit is a maximum of 512 words, which is equal to a total of the number of input/output words of the SX bus and that of the remote I/O master module.
I/O extension mode: Function to extend, in addition to the extension mode, the total number of input/output words of devices that can be connected to one CPU unit from a maximum of 512 words (8192 points) to a maximum of 4096 words (65536 points). This mode is used when the total number of input/output words exceeds 512 words by connecting multiple remote I/O master modules to one CPU unit (Note that, by using this function, the input/output response time becomes longer in proportion to the number of mounted remote I/O master modules).

Module classification

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

No. of connectable base boards/units

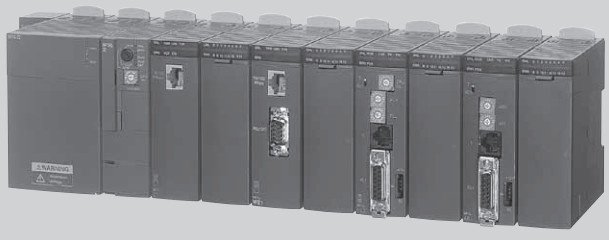
Unit for supplying SX bus transmission power	Unit for receiving SX bus transmission power
• Base board (power ON) • SX bus optical converter (external 24V connected) • SX bus electrical repeater (external 24V connected)	• I/O terminal • SX bus optical converter (external 24V not connected) • MONITOUCH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

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

Other connection notes

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

Contents



KD03-041A

■ 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	
	Contamination degree	2 (Free from conductive dust)	
	Corrosion immunity	Free from corrosive gases. Not stained with organic solvents	
	Operating altitude	2000m or less above sea level (Transport condition: 70kPa or more)	
Mechanical service condition	Vibration	Half amplitude: 0.15mm, Constant acceleration: 19.6m/s^2 two hours for each of three axes, total six hours.	
	Shock	Acceleration peak: 147m/s^2 three times for each of three axes	
Electrical service condition	Electrostatic discharge	Contact discharge: ± 6kV Aerial discharge: ± 8kV	IEC 61000-4-2
	Radiated, radio-frequency, electromagnetic field	80 to 1000MHz (10V/m) 1.4 to 2.0GHz (3V/m) 2.0 to 2.7GHz (1V/m)	IEC 61000-4-3
	Fast transient burst	Power supply line and I/O signal line (AC unshielded line): ±2 kV Communication line and I/O signal line (Except for AC shielded line): ±1 kV	IEC 61000-4-4
	Surge	AC power supply: Common mode ±2 kV, normal mode: ±1 kV DC power supply: Common mode ±0.5 kV, normal mode: ±0.5 kV	IEC 61000-4-5
	Radio frequency electromagnetic field radiation interference	150kHz to 80MHz, 10V	IEC 61000-4-6
	Power frequency magnetic field	50Hz, 30A/m	IEC 61000-4-8
	Square wave impulse noise	± 1.5kV rise time 1ns, pulse width 1μs 50Hz	JEM-TR 177
Construction		Open Type device (Built-in control panel type)	
Cooling		Self-cooling	

Power Supply Module: NP1S- □□

■ Features

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

NP1S-22/NP1S-42

NP1S-91

KD03-057A

■ Power supply specifications

Item	Specification			
Type	**NP1S-22***	**NP1S-42**	**NP1S-81***	**NP1S-91***
Rated input voltage	100 to 120V AC / 200 to 240V AC	24V DC	200 to 240V AC	100 to 120V AC
Voltage tolerance	85 to 132V AC / 170 to 264V AC	19.2 to 30V DC	170 to 264V AC	85 to 132V AC
Rated frequency	50/60Hz	—	50/60Hz	
Dropout tolerance	1 cycle or less (Rated voltage, rated load)	10ms or less (Rated voltage, rated load)	1 cycle or less (Rated voltage, rated load)	
AC waveform distortion factor	5% or less	—	5% or less	
Ripple factor tolerance	—	Three-phase full-wave rectification can be used 5% or less	—	
Leakage current	0.25mA or less			
Inrush current	22.5Ao-p or less (Ta=25℃ notrepeated)	150Ao-p or less 2ms or less	22.5Ao-p or less (Ta=25℃ not repeated)	
Power consumption	110VA or less	45W or less	50VA or less	40VA or less
Rated output voltage	24V DC (22.8 to 26.4V DC)			
Output current	0 to 1.46A		0 to 0.625A	
Isolation method	Transducer			
Dielectric strength	2300Vrms AC, 1 second, between power input terminals and ground	510Vrms AC, 1 second, between power input terminals and ground	2300Vrms AC, 1 second, between power input terminals and ground	1400Vrms AC, 1 second, between power input terminals and ground
Insulation resistance	10MΩ or more (500V DC megger)			
No. of occupied slots	2 slots		1 slot (specialized for the 3-slot and 6-slot basis)	
Alarm output	Relay NC contact output (Monitoring of output voltage: 24V DC, 0.3A or less)		None	
Multiple power supply	Compatible (Up to 3 units mountable on the base board.)			
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 bellow;
  The SPH3000/SPH3000MM 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/SHP3000MM)
  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)

■ Performance specifications

		SPH300					SPH300EX	
Type		**NP1PS-32**	**NP1PS-32R**	**NP1PS-74R**	**NP1PS-117R**	**NP1PS-245R**	**NP1PS-74D**	
Control system		Stored program, Cyclic scanning system (default task), periodic task, event task						
Input / Output connection method		Direct connection I/O (SX bus), remote I/O (DeviceNet, OPCN-1, and other remote I/O links)						
I/O control system		SX bus: Tact synchronization refresh. Remote I/O link: Refresh at 10-ms fixed intervals (not synchronized with scan)						
CPU		32-bit OS processor, 32-bit execution processor						
Programming language		IL language (Instruction List), ST language (Structured Text), LD language (Ladder Diagram) FBD language (Function Block Diagram), SFC elements (Sequential Function Chart) To IEC 61131-3						
Instruction execution speed	Sequence instruction	20ns or more/instruction						
	Applied instruction	40ns or more/instruction						
NO. of I/O points		8,192 points						
User memory		97 Kwords		277 Kwords	491 Kwords	1,003 Kwords	277×2+6 Kwords	
	Program memory	65,536 words		151,552 words	239,616 words	501,760 words	151,552×2 words	
		32,768 steps		75,776 steps	119,808 steps	250,880 steps	75,776×2 steps	
	Data memory	33,792 words		132,096 words	263,168 words	525,312 words	132,096×2+6,144 words	
Available basic data type *1		BOOL, INT, DINT, UINT, UDINT, REAL, TIME, DATE, TOD, DT, STRING, WORD, DWORD						
No. of tasks		Default tasks (Cyclic scanning): 1, Periodic tasks: 4, Event tasks: 4 (Total of 4 tasks when Periodic task is used)						
No. of POUs in program		2000 (including POUs in the library)						
Interface *2	User ROM card	—	○ CF CARD	○ CF CARD	○ CF CARD	○ CF CARD	○ CF CARD	
	USB *3	—	○	○	○	○	○	
	Ethernet *4	—	—	—	—	—	—	
Diagnostic function		Self-diagnosis (memory check, ROM sum check), System configuration supervising, Module fault monitoring						
Security function		Set limits to download/upload of the projects, reference, and clear etc,. by the password.						
Calendar		Up to 31 Dec. 2069 23:59:59 27sec/month (when active) When multi-CPU system is used, time is synchronized.						
Battery backup *6		Backup range: Data memory, calendar IC memory Battery used: Lithium primary battery Backup time (at 25°C) NP1PS-32/32R: 5 years, NP1PS-74R/117R: Approx. 1.3 years NP1PS-245R: Approx. 0.7 years NP1PS-74D: Approx. 0.65 years Replacement time (at 25°C): within 5 minutes						
Memory backup by flash ROM (contained in CPU module)		Application programs, system definitions, and ZIP files can be saved in the flash memory built in the CPU.						
Memory backup by user ROM card (optional)		Application programs, system definitions, zip files, compressed projects and User's data can be saved in user ROM card (compact flash card).						
No. of occupied slots		1 slot					2 slots	
Internal current consumption		24V DC 200mA or less						
Mass		Approx. 200g			Approx. 220g		Approx. 410g	

Note: * 1 This depends on each instruction.
* 2 O: Standard equipment, –: No equipment
* 3 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**).

- 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/SPH3000MM of the USB and user ROM versions with separate formats are offered.
- Large-capacity battery (optionally available)
  By adding the optional large capacity battery to SPH300 (74K/117K/245K step), the memory backup time can be extended to maximum 3.5 years (25˚C).

SPH200 **SPH300** **SPH300EX** **SPH2000**

SPH2000				SPH200			
NP1PM-48R	**NP1PM-48E**	**NP1PM-256E**	**NP1PM-256H**	**NP1PH-08**	**NP1PH-16**	Type	
Stored program, Cyclic scanning system (default task), periodic task, event task						Control system	
Direct connection I/O (SX bus), remote I/O (DeviceNet, OPCN-1, and other remote I/O links)						Input / Output connection method	
SX bus: Tact synchronization refresh. Remote I/O link: Refresh at 10-ms fixed intervals (not synchronized with scan)						I/O control system	
32-bit RISC processor				16-bit OS processor, 16-bit execution processor		CPU	
IL language (Instruction List), ST language (Structured Text), LD language (Ladder Diagram) FBD language (Function Block Diagram), SFC elements (Sequential Function Chart) To IEC 61131-3						Programming language	
30ns or more/instruction				70ns or more/instruction		Sequence instruction	Instruction execution speed
40ns or more/instruction				140ns or more/instruction		Applied instruction	
8,192 points						NO. of I/O points	
193 Kwords		2,561 Kwords		29 Kwords	57 Kwords	User memory	
98,304 words		524,288 words		16,384 words	32,768 words	Program memory	
49,152 steps		262,144 steps		8,192 steps	16,384 steps		
99,328 words		2,098,176 words		13,312 words	25,600 words	Data memory	
BOOL, INT, DINT, UINT, UDINT, REAL, TIME, DATE, TOD, DT, STRING, WORD, DWORD						Available basic data type *1	
Default tasks (Cyclic scanning): 1, Periodic tasks: 4, Event tasks: 4 (Total of 4 tasks when Periodic task is used)						No. of tasks	
2000 (including POUs in the library)						No. of POUs in program	
○ CF CARD	○ CF CARD	○ CF CARD	○ CF CARD	ROM for SPH200	ROM for SPH200	User ROM card	Interface *2
○	○	○	○	—	—	USB *3	
—	○	○	○ *5	—	—	Ethernet *4	
Self-diagnosis (memory check, ROM sum check), System configuration supervising, Module fault monitoring						Diagnostic function	
Set limits to download/upload of the projects, reference, and clear etc,. by the password.						Security function	
Up to 31 Dec. 2069 23:59:59 27sec/month (when active) When multi-CPU system is used, time is synchronized.				Up to 31 Dec. 2069 23:59:59 27sec/month (when active)		Calendar	
Backup range: Data memory, calendar IC memory Battery used: Lithium primary battery Backup time (at 25°C) Replacement time (at 25°C): within 5 minutes				Backup range: Application programs, system definitions, ZIP files, data memory, calendar IC memory Battery used: Lithium primary battery Backup time (at 25˚C): 5 years Replacement time (at 25˚C): Within 5 minutes		Battery backup *6	
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 user ROM card.		Memory backup by flash ROM (contained in CPU module)	
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, and ZIP files can be saved in the user ROM card.		Memory backup by user ROM card (optional)	
1 slot						No. of occupied slots	
24V DC 200mA or less				24V DC 85mA or less		Internal current consumption	
Approx. 220g				Approx. 170g		Mass	

* 4 The Ethernet interface is 10Base-T/100Base-TX.
* 5 Ethernet interface is for equalization only during redundancy, so it is not available for general-purpose communications.
* 6 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**.)

SPH3000MM

SPH3000

■ Performance specifications

			SPH3000		SPH3000MM	
Type			NP1PU-048E	NP1PU-256E	NP1PU2-048E	NP1PU2-256E
Control system			Stored program, Cyclic scanning system (default task), periodic task, event task			
Input / Output connection method			Direct connection I/O (SX bus), remote I/O (DeviceNet, OPCN-1, and other remote I/O links)			
I/O control system			SX bus: Tact synchronization refresh. Remote I/O link: Refresh at 10-ms fixed intervals (not synchronized with scan)			
CPU			32-bit RISC processor		32-bit RISC processor×3	
Programming language			SX bus: Tact synchronization refresh. Remote I/O link: Refresh at 10-ms fixed intervals (not synchronized with scan)			
Instruction execution speed	Sequence instruction		9ns or more/instruction			
	Applied instruction		8ns or more/instruction			
NO. of I/O points			8,192 points		139,264 points	
	SX bus		8,192 points			
	E-SX bus0/E-SX bus1		—		65,536 points	
User memory			353 Kwords	2,561 Kwords	1234.5 Kwords	5650.5 Kwords
	Program memory		98,304 words	524,288 words	196,608 words	1,048,576 words
			49,152 steps	262,144 steps	98,304 steps	524,288 steps
		SX bus	98,304 words	524,288 words	—	
			49,152 step	262,144 step	—	
		E-SX bus0/E-SX bus1	—		98,304 words	524,288 words
			—		49,152 steps	262,144 steps
	Data memory		263,168 words	2,098,176 words	1,067,520 words	4,737,536 words
		SX bus	263,168 words	2,098,176 words	132,608 words	132,608 words
		E-SX bus0/E-SX bus1	—	2,098,176 words	467,456 words	2,302,464 words
Available basic data type *1			BOOL, INT, DINT, UINT, UDINT, REAL, TIME, DATE, TOD, DT, STRING, WORD, DWORD			
No. of tasks			SX bus Default tasks (Cyclic scanning): 1, Periodic tasks: 4, Event tasks: 4 (Total of 4 tasks when Periodic task is used)		E-SX bus 0/E-SX bus1 Default tasks (Cyclic scanning): 1, Periodic tasks: 4, Event tasks: 4 (Total of 4 tasks when Periodic task is used)	
No. of POUs in program			2000 (including POUs in the library)			
Interface	User ROM card		○ SD memory card			
	USB	*2	○			
	Ethernet	*3	○			
Diagnostic function			Self-diagnosis (memory check, ROM sum check), System configuration supervising, Module fault monitoring			
Security function			Set limits to download/upload of the projects, reference, and clear etc,. by the password.			
Calendar			Up to 31 Dec. 2069 23:59:59 27sec/month (when active) When multi-CPU system is used, time is synchronized.			
Battery backup			Backup range: Data memory, calendar IC memory Battery used: Lithium primary battery Backup time (at 25°C) NP1PU-048E/256E: 5 years, NP1PU2-048E/256E: 5 years Replacement time (at 25°C): within 5 minutes			
Memory backup by flash ROM (contained in CPU module)			Application programs, system definitions, and ZIP files can be saved in the flash memory built in the CPU.			
Memory backup by user ROM card (optional)			Application programs, system definitions, zip files, compressed projects and User's data can be saved in user ROM card (compact flash card).			
No. of occupied slots			1 slot		2 slots	
Internal current consumption			24V DC 200mA or less		24V DC 360mA or less	
Mass			Approx. 220g		Approx. 420g	

Note: * 1 This depends on each instruction.
* 2 Specification of USB
Applicable standard of USB: USB1.1
USB-miniB type (**NP1PU-048E/256E, NP1PU2-048E/256E**).
* 3 The Ethernet interface is 10Base-T/100Base-TX.

■ Performance specifications (User memory)

			SPH300					SPH300EX
Type			**NP1PS-32**	**NP1PS-32R**	**NP1PS-74R**	**NP1PS-117R**	**NP1PS-245R**	**NP1PS-74D**
User memory			97 Kwords		277 Kwords	491 Kwords	1,003 Kwords	277×2+6 Kwords
	Program memory		65,536 words		151,552 words	239,616 words	501,760 words	151,552×2 words
			32,768 steps		75,776 steps	119,808 steps	250,880 steps	75,776×2 steps
	Data memory		33,792 words		132,096 words	263,168 words	525,312 words	132,096×2+6,144 words
		I/O memory	512 words					512×2 words
		Non-retain memory	8,192 words		32,768 words	131,072 words	262,144 words	32,768×2 words
		Retain memory	4,096 words		16,384 words	32,768 words	130,048 words	16,384×2 words
		User FB memory	4,096 words		16,384 words	32,768 words	66,560 words	16,384×2 words
		System FB memory	16,384 words		65,536 words			65,536×2 words
		Edge detection	1,024 points		4,096 points			4,096×2 points
		Counter	256 points		1,024 points			1,024×2 points
		Integrating timer	128 points		512 points			512×2 points
		Timer	512 points		2,048 points			2,048×2 points
		Others	8,192 words		32,768 words			32,768×2 words
		System memory	512 words					512×2 words
		Common memory	—					6,144 words

			SPH2000				SPH200	
Type			**NP1PM-48R**	**NP1PM-48E**	**NP1PM-256E**	**NP1PM-256H**	**NP1PH-08**	**NP1PH-16**
User memory			353 Kwords		2,561 Kwords		29 Kwords	57 Kwords
	Program memory		98,304 words		524,288 words		16,384 words	32,768 words
			49,152 steps		262,144 steps		8,192 steps	16,384 steps
	Data memory		263,168 words		2,098,176 words		13,312 words	25,600 words
		I/O memory	512 words					
		Non-retain memory	98,304 words		1,703,936 words		4,096 words	8,192 words
		Retain memory	40,960 words		237,568 words		2,048 words	4,096 words
		User FB memory	40,960 words		73,728 words		2,048 words	4,096 words
		System FB memory	81,920 words				4,096 words	8,192 words
		Edge detection	5,120 points				256 points	512 points
		Counter	1,280 points				64 points	128 points
		Integrating timer	640 points				32 points	64 points
		Timer	2,590 points				128 points	256 points
		Others	40,960 words				2,048 words	4,096 words
		System memory	512 words					
		Common memory	—					

Note: Area sizes of the non-retain memory, the retain memory, the user FB memory and the system FB memory can be changed.

■ Performance specifications (User memory)

					SPH3000		3000MM	
Type					**NP1PU-048E**	**NP1PU-256E**	**NP1PU2-048E**	**NP1PU2-256E**
User memory					353 Kwords	2,561 Kwords	1234.5 Kwords	5650.5 Kwords
	Program memory				98,304 words	524,288 words	196,608 words	1,048,576 words
					49,152 steps	262,144 steps	98,304 steps	524,288 steps
		SX bus			98,304 words	524,288 words	—	
					49,152 steps	262,144 steps	—	
		E-SX bus 0			—		98,304 words	524,288 words
					—		49,152 steps	262,144 steps
		E-SX bus 1			—		98,304 words	524,288 words
					—		49,152 steps	262,144 steps
	Data memory				263,168 words	2,098,176 words	1,067,520 words	4,737,536 words
		SX bus			263,168 words	2,098,176 words	132,608 words	
			I/O memory		512 words			
			Non-retain memory		98,304 words	1,703,936 words	65,536 words	
			Retain memory		40,960 words	237,568 words	65,536 words	
			User FB memory		40,960 words	73,728 words	—	
			System FB memory		81,920 words		—	
				Edge detection	5,120 points		—	
				Counter	1,280 points		—	
				Integrating timer	640 points		—	
				Timer	2,560 points		—	
				Others	40,960 words		—	
			System memory		512 words			
			Common memory		—		512 words	
		E-SX bus 0			—		467,456 words	2,302,464 words
			I/O memory		—		4,096 words	
			Non-retain memory		—		98,304 words	1,703,936 words
			Retain memory		—		40,960 words	237,568 words
			User FB memory		—		172,032 words	204,800 words
			System FB memory		—		147,456 words	
				Edge detection	—		10,240 points	
				Counter	—		6,144 points	
				Integrating timer	—		1,024 points	
				Timer	—		6,144 points	
				Others	—		45,056 words	
			System memory		—		4,608 words	
		E-SX bus 1			—		467,456 words	2,302,464 words
			I/O memory		—		4,096 words	
			Non-retain memory		—		98,304 words	1,703,936 words
			Retain memory		—		40,960 words	237,568 words
			User FB memory		—		172,032 words	204,800 words
			System FB memory		—		147,456 words	
				Edge detection	—		10,240 points	
				Counter	—		6,144 points	
				Integrating timer	—		1,024 points	
				Timer	—		6,144 points	
				Others	—		45,056 words	
			System memory		—		4,608 words	

Note: Area sizes of the non-retain memory, the retain memory, the user FB memory and the system FB memory can be changed.

SPH2000 Redundant System

Models to be used: NP1PM-256H

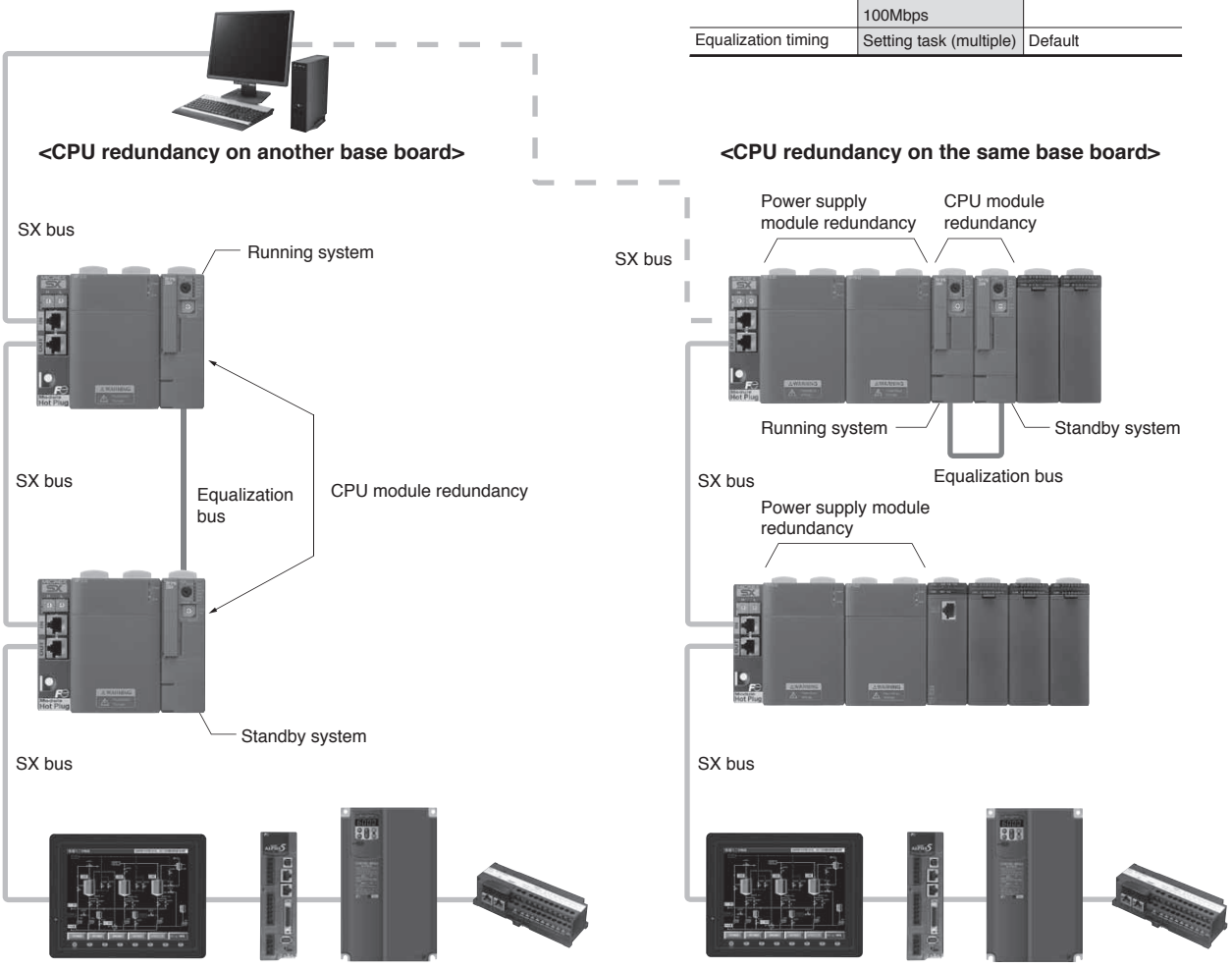
■ Features

- Mass equalization data
  Up to 320K words of data can be equalized.
- High-speed transmission through dedicated equalization bus
  100Mbps dedicated equalization bus transmits the equalization data.
  Also, as a connection cable, a commercially available LAN cable (shielded category 5, cross connect cable) is used.
- Module exchangeable during running CPU
  Failed CPU module can be exchanged without stopping the system by using hot pluggable base board.
- Redundant multi-CPU system enabled
  Up to 4 multi-CPUs can be used for redundancy in multi-CPU (distributed processing) systems.
- Easy equalization setting
  Equalization area can be set up on a per-FB instance basis in addition to on a per-variable basis.
- System configuration with standard modules enabled
  Standard modules allow you to construct systems such as power supplies, base boards and I/O modules.

Comparing SPH redundancy performance

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

■ System configuration example

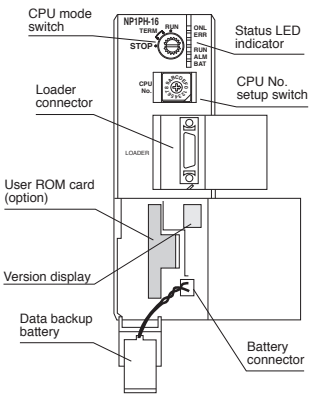


<Operation overview>

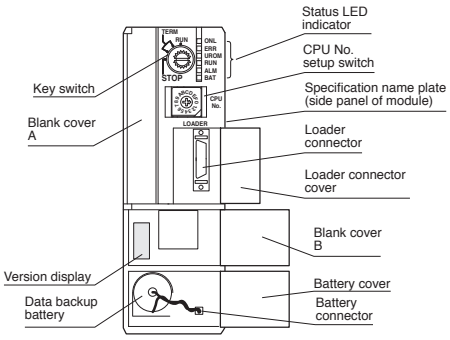
- CPU module redundancy
  SPH2000 supports “1:1 redundancy” which allows you to equalize the data and continue operation without stopping the system. Data equalization rate is up to 320k words/250ms (equalization bus transmission rate: 100Mbps) using dedicated “equalization bus”.
- Power supply module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

■ Outer view

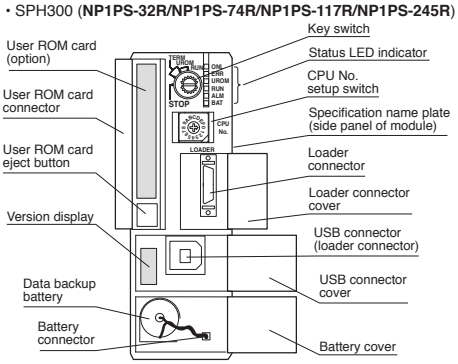
• SPH200 (**NP1PH-08/NP1PH-16**)



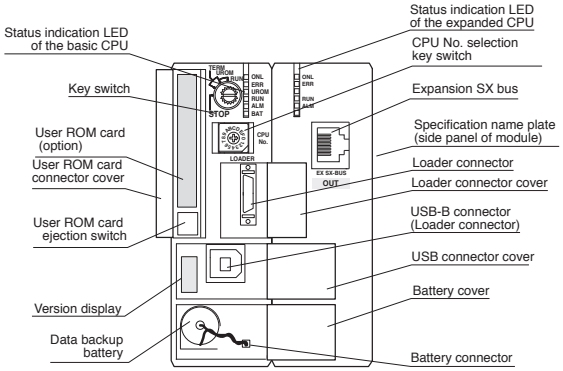
• SPH300 (**NP1PS-32**)



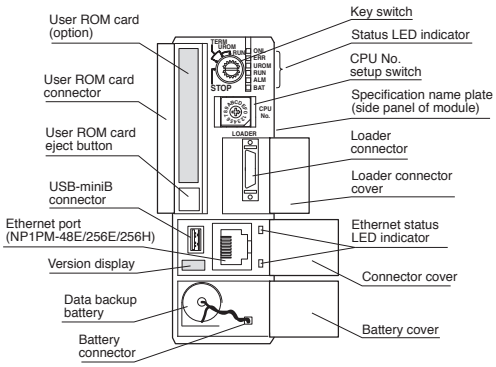
• SPH300 (**NP1PS-32R/NP1PS-74R/NP1PS-117R/NP1PS-245R**)



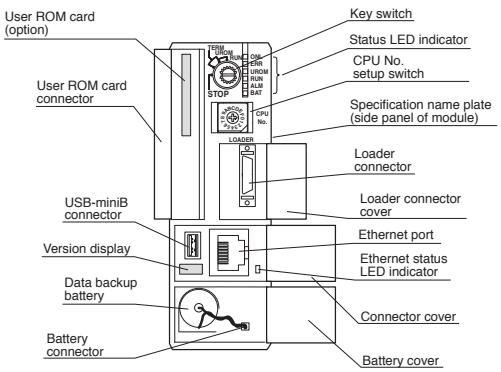
• SPH300EX (**NP1PS-74D**)



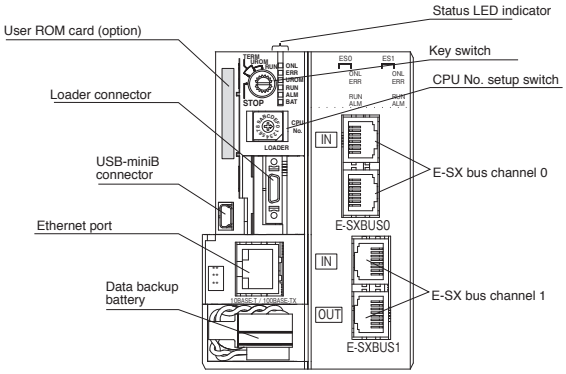
• SPH2000 (**NP1PM-48R/NP1PM-48E/NP1PM-256E/NP1PM-256H**)



• SPH3000 (**NP1PU-048E/NP1PU-256E**)

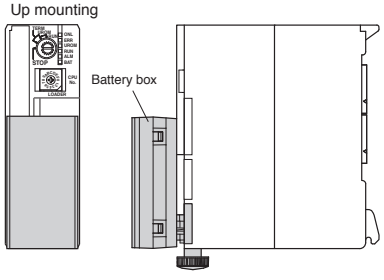


・SPH3000MM (**NP1PU2-048E/NP1PU2-256E**)

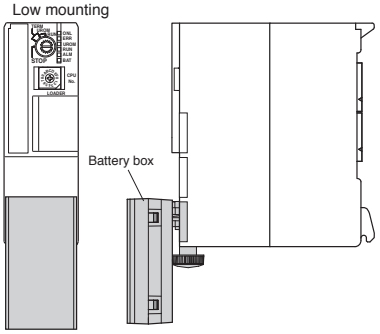


• Mounting of the battery box (optional)

Up mounting



Low mounting



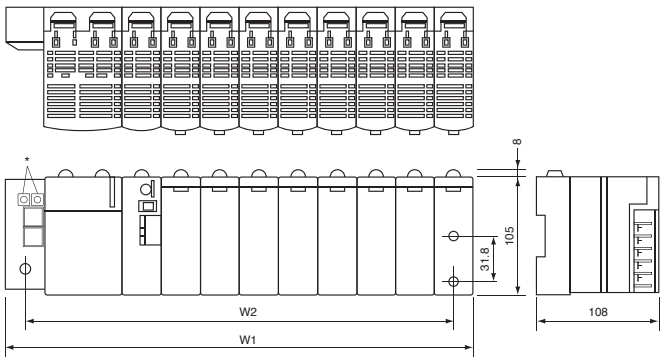
Note: 1) Note that, if the battery box is up-mounted, the loader cannot be connected.
2) No battery box can be mounted on SPH200 (NP1PH-08/NP1PH-16), SPH300 (NP1PS-32/ NP1PS-32R), SPH2000 (NP1PM-48R/NP1PM-48E/ NP1PM-256E/NP1PM-256H), and SPH3000 (NP1PU-048E/ NP1PU-256E), SPH3000MM (NP1PU2-048E/NP1PU2-256E).

Base Board: NP1B □ - □□

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

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

■ Dimensions, mm



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

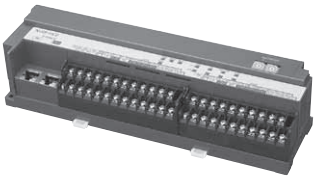
Note) When the connector is mounted, depth is max. 195.3 mm.
The bracket is already mounted on the base board.

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

E-SX bus product


Digital input unit


Analog input unit


High-speed counter


Inter-face module


Auxiliary power supply unit

■ Digital input/output unit

It is a separate mounting type I/O unit that can be directly connected to the E-SX bus.

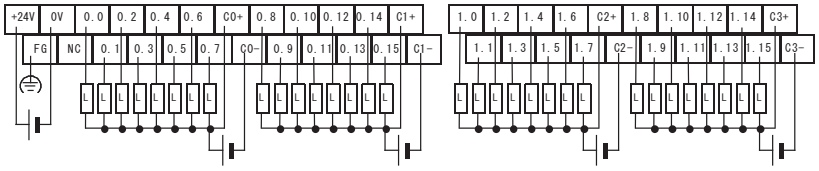
• Digital input unit

Item	Specifications
Type	**NU2X3206-W**
Input method	Sink/source in common use 32-point (8-point common x 4 circuits)
Input voltage	Rating: 24V DC, Maximum acceptable: 30V DC, Acceptable ripple rate: 5% or less
Power supply method	E-SX bus cable (24V DC)
Rated current	7mA (at 24V DC)
Operating voltage	OFF to ON: 15 to 30V ON to OFF: 0 to 5V
Input delay time	OFF to ON: 25µs or less (hard filter time) + (soft filter time) ON to OFF: 75µs or less (hard filter time) + (soft filter time)
Isolation method	Photocoupleer insulation
External wire connection	Removable M3 screw terminal block
Internal current consumption	Operating: 260mA or less, Bypassing: 93mA
Dimension (W×H×D) [mm]	240 x 65 x 60 (except DIN rail mounting protrusions)
Mass	Approx. 430g

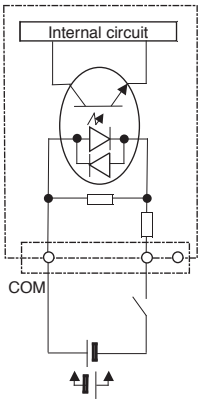
• Digital output unit

Item	Specifications
Type	**NU2Y32T09P6**
Output method	Transistor sink 32 points (8-point common x 4 circuits)
Output voltage	Rating: 24V DC, Allowable: 10.8V to 30V DC
Power supply method	E-SX bus cable (24V DC)
Max. load current	0.6A/ point 4A/ common
Response time	OFF to ON: 10µs or less ON to OFF: 200µs or less
Output protection	Overload protection: Built-in fuse (common unit 4 fuses) Surge suppression: Varistor (total 32 points)
Isolation method	Photocoupler
External wire connection	Removable M3 screw terminal block
Internal current consumption	Operating: 300mA or less, Bypassing: 93mA
Dimension (W×H×D) [mm]	240 x 65 x 60 (except DIN rail mounting protrusions)
Mass	Approx. 410g

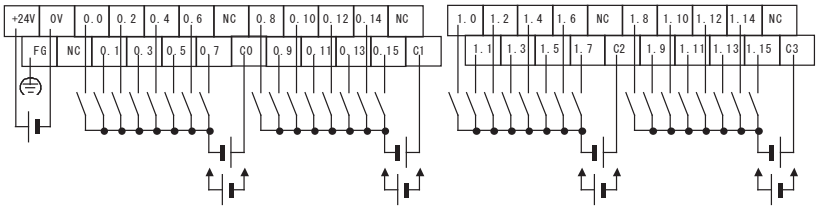
• Example external connection of digital input



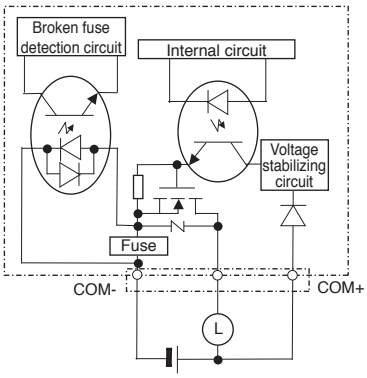
• Internal circuit diagram of digital input



• Example external connection of digital output

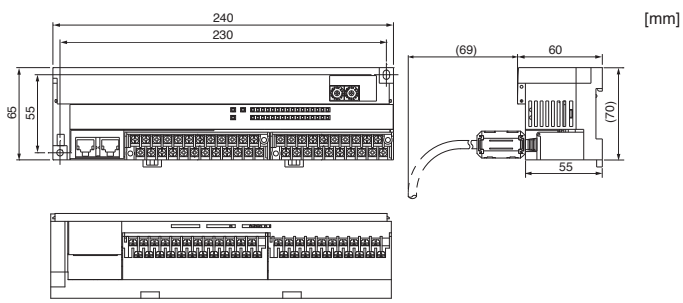


• Internal circuit diagram of digital output



• Dimesions (digital I/O unit, high-speed counter unit)

[mm]



■ Analog input/output unit

It is a separate mounting type analog unit that can be directly connected to the E-SX bus.

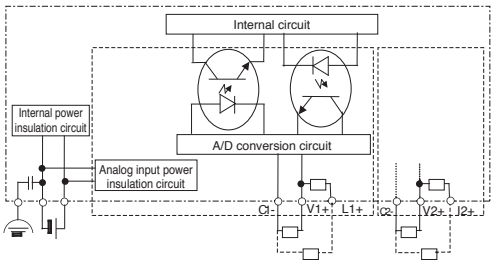
• Analog input unit

Item	Specifications			
Type	**NU2AXH2-MR**			
Input	Multi-range 2 channels			
Power supply method	E-SX bus cable (24V DC)			
Signal range	0 to 10V 0 to 5V 1 to 5V	-5 to 5V -10 to 10V	-20 to +20mA	0 to 20mA 4 to 20mA
Digital output value (INT type)	0 to 20000	-20000 to +20000		0 to 20000
Resolution	15bit			
Measurement accuracy	± 0.1% of F.S.R. (Ta = 23°C ±5°C), Setting moving average for 8 data or more			
Converting speed	25µs/2 channels			
Isolation method	Between analog input terminal and FG: Photo coupler and transformer insulated Between analog input terminal and channel: Transformer insulated			
Extemal wire connection	Removable M3 screw terminal block			
Intemal current consumption	Operating: 300mA or less, Bypassing: 93mA			
Dimension (W×H×D) [mm]	165 x 65 x 60 (except DIN rail mounting protrusions)			
Mass	Approx. 360g			

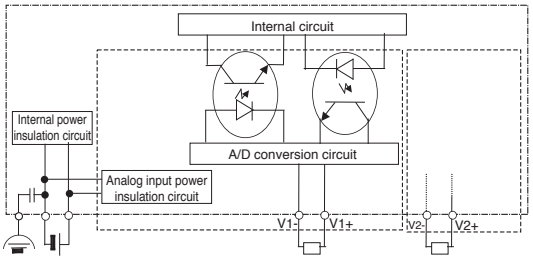
• Analog output unit

Item	Specifications				
Type	**NU2AYH2V-MR**				
Output	Voltage multi-range 2 channels				
Power supply method	E-SX bus cable (24V DC)				
Signal range	-10 to +10V	-5 to +5V	0 to 10V	0 to 5V	1 to 5V
Digital output value (INT type)	-20000 to +20000		0 to 20000		
Max. resolution	0.5mV	0.25mV	0.5mV	0.25mV	0.2mV
Measurement accuracy	±0.1% of F.S.R. (Ta=23°C±5°C)				
Converting speed	25µs/2 channels				
Isolation method	Between analog output terminal and FG: Photo coupler and transformer insulated Between analog output terminal and channel: Transformer insulated				
Extemal wire connection	Removable M3 screw terminal block				
Intemal current consumption	Operating: 300mA or less, Bypassing: 93mA				
Dimension (W×H×D) [mm]	165 x 65 x 60 (except DIN rail mounting protrusions)				
Mass	Approx. 350g				

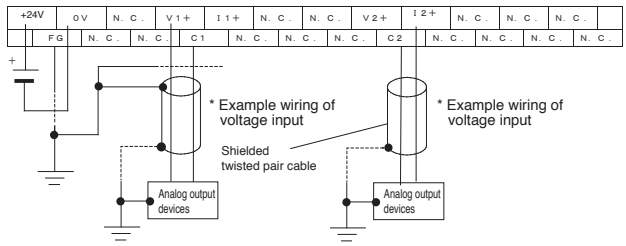
• Internal circuit diagram of analog input



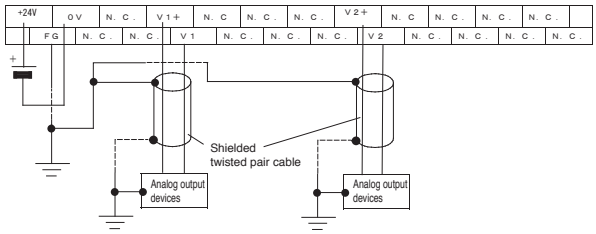
• Internal circuit diagram of analog output



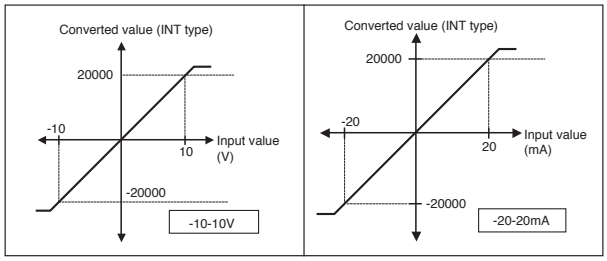
• Example external connection of analog input



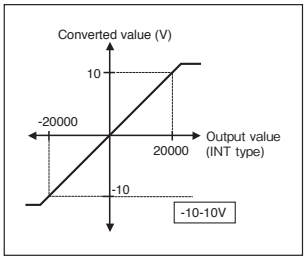
• Example external connection of analog output



• Analog input unit characteristic diagram

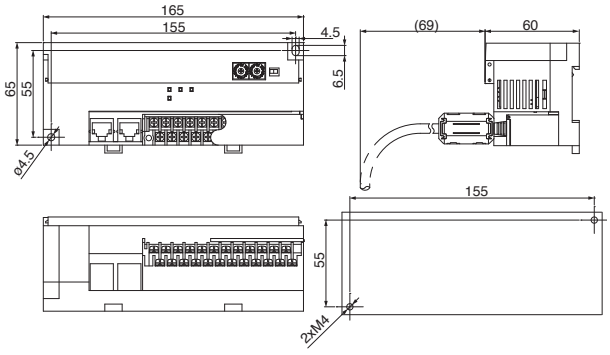


• Analog output unit characteristic diagram



• Outline drawing (analog input/output units)

[mm]

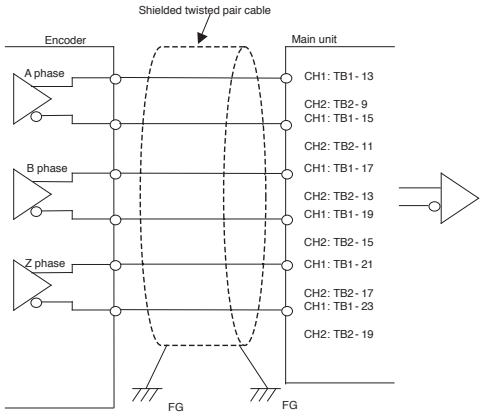


■ High-speed counter unit (under development)

It is a separate mounting type high-speed counter that can be directly connected to the E-SX bus.

Item	Specifications			
Type	**NU2F-HC2**			
Input	90-degree phase difference, 2-phase signal, 2-channel			
Power supply method	E-SX bus cable (DC24V)			
Signal type	Line driver	Open collector	Open collector	Open collector
Rated voltage	5V DC	5V DC	12V DC	24V DC
Response frequency	1MHz	250KHz		
Max. input frequency	4Mbps	1Mbps		
Counting range	Signed 32-bit binary (-2147483648 to + 2147483647)			
Counting operation mode	Linear/ring operation, gate operation, preset operation Latch operation, Z-phase detection operation			
Isolation method	Photocoupleer insulation			
Extemal wire connection	Removable M3 screw terminal block			
Intemal current consumption	Operating: 250mA or less, Bypassing: 80mA or less			
Dimension (W×H×D) [mm]	240 x 65 x 60 (except DIN rail mounting protrusions)			
Mass	Approx. 500g			

• Line driver input section wiring

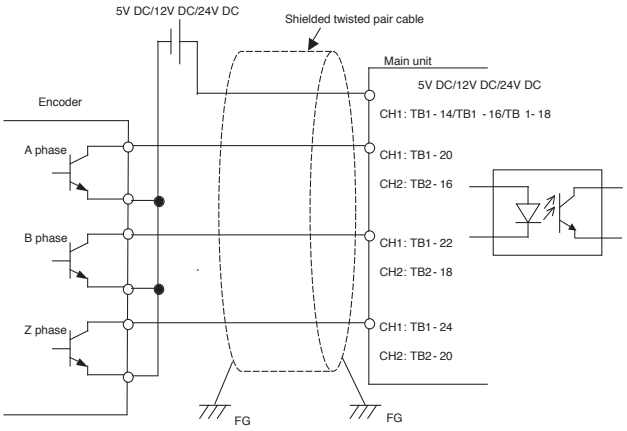


■ Integrated type interface module (development underway)

It can be mounted on the conventional SPH base board so that the SX bus connection device which is controlled by this module can be used as a module on the E-SX bus.

Item	Specifications
Type	**NP1L-RU1**
No. of connections	Maximum 8 units/configuration
SX bus control	SX bus system control of self-administration station
SX bus tact period	1, 1.5, 2, 3, 4, 5 (default), 6, 7, 8, 9, 10ms
Extended SX bus	Maximum 512 words (I/O extension disallowed)
SX bus controllable module	Direct connection I/O module, POD, inverter and servo (CPU module, communication module and remote I /O module disallowed)
Date exchange	I/O data and messages between the higher-level E-SX bus and the lower-level SX bus
Fail-soft-RAS	RAS degeneracy administration of the SX bus system of the self-administration station Notification to the high-level E-SX bus
USB loader connection	Connection of the program support tool
Module-connectable base board	Standard and high-performance base: NP1B □ - □□ Base with the station number settings function: NP1B □ - □□ S (Base with the live wire removal function: NP1B □ - □□ D disallowed)
Intemal current consumption	360mA or less
Mass	Approx. 420g

• Open collector input section wiring



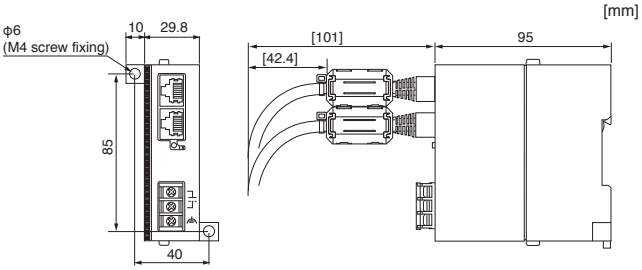
■ Auxiliary power supply unit

It is a separate mounting auxiliary unit to supply 24V DC to the E-SX bus cable and to connect 5 or more units which are compatible with the E-SX bus to the E-SX bus connector of the CPU module.

Item	Specifications
Type	**NU2V-PA1**
No. of connections	Maximum 10 units on the E-SX bus (maximum 8m between main units) This one unit for 5 E-SX bus devices as a guide
Rated input voltage	24V DC (external power supply is used) *1
Voltage tolerance	22.8 to 27V DC
Overcurrent detection	When an overcurrent is detected, the 24V DC supply is stopped. To restart the power supply, press the reset switch.
Intemal current consumption	No load: 70mA or less, 10 units connected: 1A or less
Dimension (W×H×D) [mm]	50×95×95
Mass	Approx. 150 g

*1: Use a switching power supply (UL-specified product) of 24V DC and 1.1A for an external power supply.

• Outline drawing of auxiliary power unit



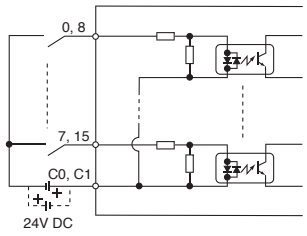
Digital Input Module: NP1X □

■ Performance specifications

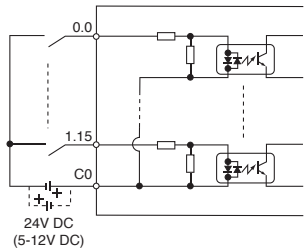
Type	Input	No. of input points	Rated voltage	Rated current	Operating voltage		Input delay time		Isolation method	Status indication	No. of points /common	External wire connection	Internal current consumption (24V DC)	Mass
					OFF to ON	ON to OFF	OFF to ON	ON to OFF						
NP1X1606-W	DC input, sink/ source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

■ Internal circuit diagram

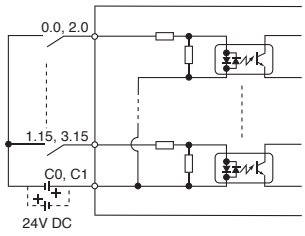
NP1X1606-W, NP1X1607-W



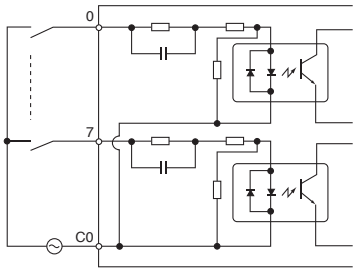
NP1X3206-W, NP1X3202-W



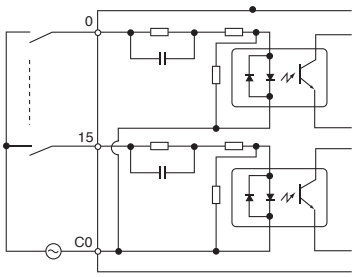
NP1X6406-W



NP1X0810, NP1X0811



NP1X1610, NP1X1611-RI



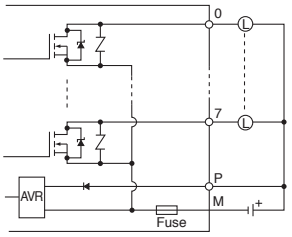
Digital Output Module: NP1Y □

■ Performance specifications

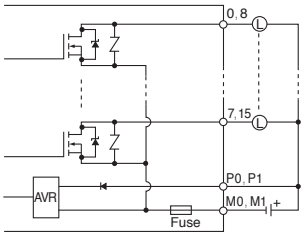
Type	Output	No. of output points	Rated voltage	Max. load current		Response time		Isolation method	Status indication	No. of points / common	Surge protection	External wire connection	Internal current consumption (24V DC)	Mass
				Per point	Common	OFF to ON	ON to OFF							
NP1Y08T0902	Transistor output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

■ Internal circuit diagram

NP1Y08T0902



NP1Y16T09P6, NP1Y16T10P2



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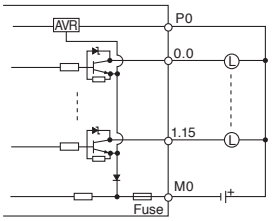

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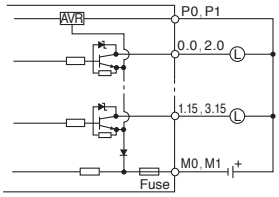

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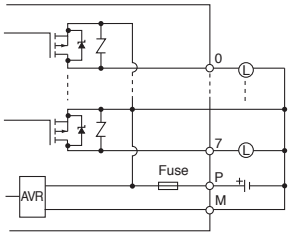

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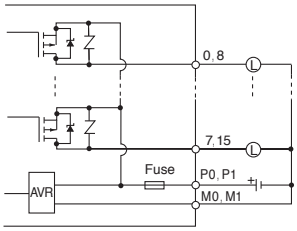

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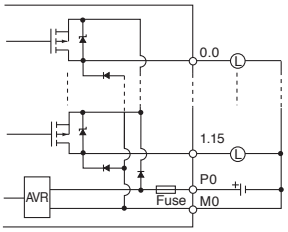
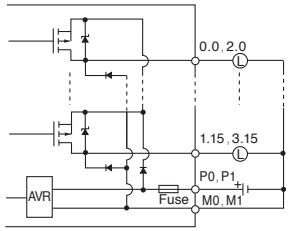


NP1Y64U09P1



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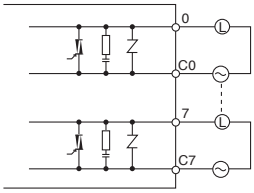

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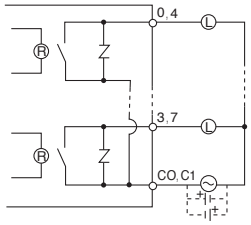

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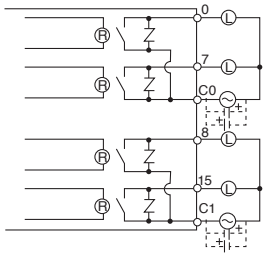
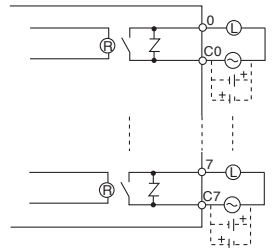


NP1Y08R-00



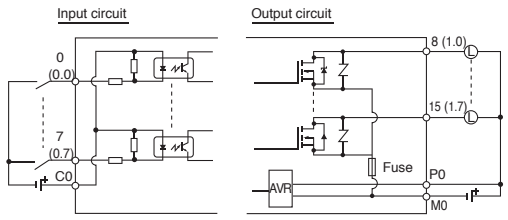
Digital Input/Output Module: NP1W □

■ Performance specifications

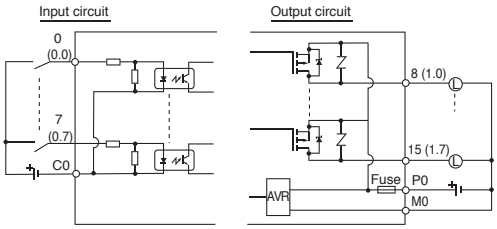
Type	Input					Output						Common				
	Input	No. of input points	Rated voltage	Rated current	No. of points / common	Output	No. of output points	Rated voltage	Max. load current Per point	Max. load current Common	No.of points/ common	Isolation method	Status indication	External wire connection	Internal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

■ Internal circuit diagram

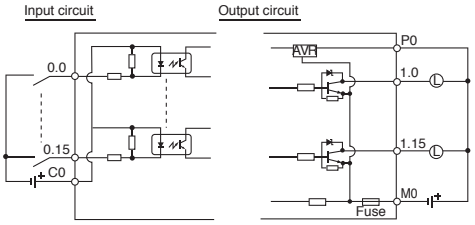
NP1W1606T



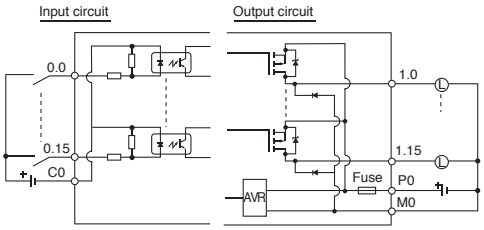
NP1W1606U



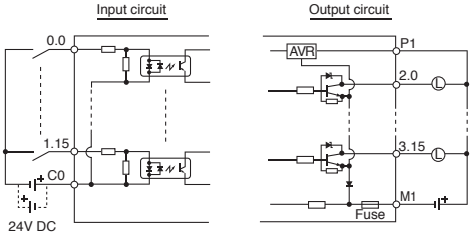
NP1W3206T



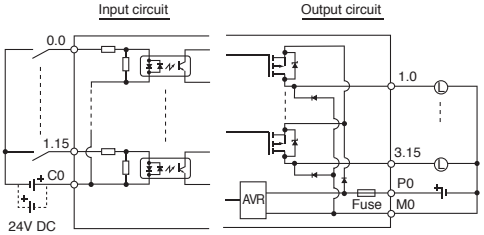
NP1W3206U



NP1W6406T



NP1W6406U



High-speed Digital Input Module: NP1X3206-A

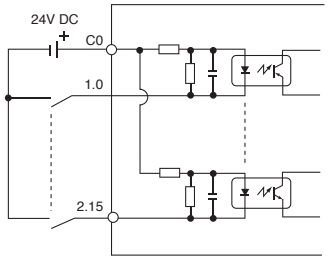
- Digital input module with pulse catch input
- Pulse catch input of minimum 20μs or normal input
- Pulse counter input function of maximum 20kHz, 4 ch. (2-phase)

■ Specifications

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

■ Internal circuit diagram

NP1X3206-A



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

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

■ Specifications

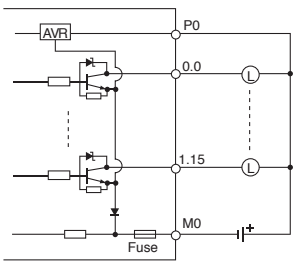
Type	Ouput	No. of output points	Rated voltage	Max. load current		Respose time		Isolation method	Status indication	No. of points /common	Surge protection	External wire connection	Internal current consumption (24V DC)	Mass
				Per point	Commom	OFF to ON	ON to OFF							
NP1Y32T09P1-A	Transistor output,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

■ Built-in pulse train output specifications

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

■ Internal circuit diagram

NP1Y32T09P1-A



Analog Input Module: NP1AX □

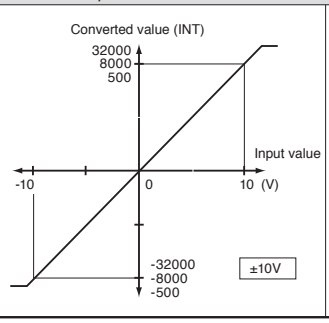
■ Performance specifications

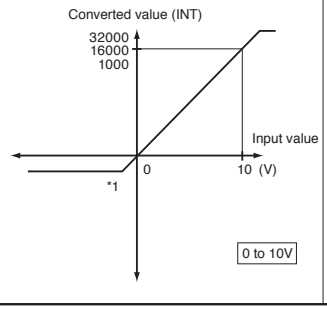
Type	Input	No. of channels	Signal range	Digital output value	Digital resolution	Total accuracy	Converting speed	Occupied word (Input + Output)	Insulation between channels	External wire connection	Internal current consumption (24V DC)	Mass
NP1AX04-MR	Multi-range input	4 ch	DC-5 to +5V DC0 to 20mA DC4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

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

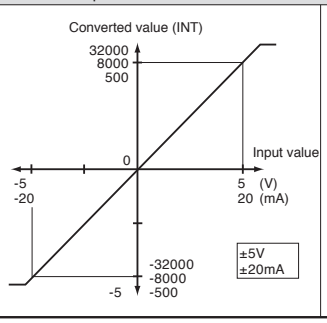
■ Characteristic diagram

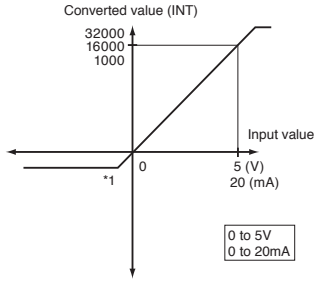
Characteristic pattern 1



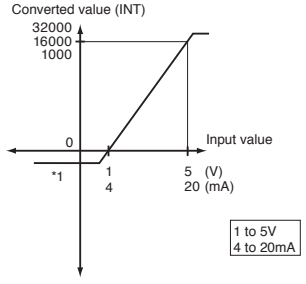


Characteristic pattern 2





Characteristic pattern 3



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

■ Input value and converted value

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

Analog Output Module: NP1AY

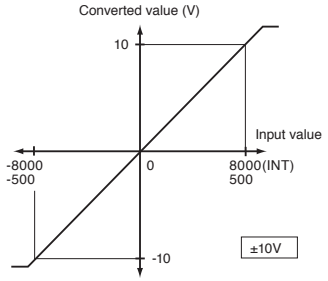
■ Performance specifications

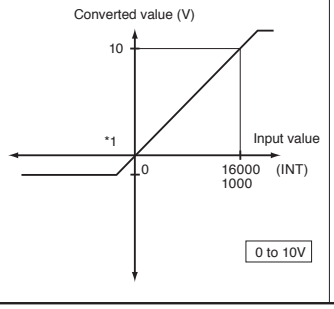
Type	Output	No. of channels	Signal range	Digital output value	Digital resolution	Total accuracy	Converting speed	Occupied word (Input + Output)	Insulation between channels	External wire connection	Internal current consumption (24V DC)	Mass
NP1AY02-MR	Multi-range output	2 ch	DC-5 to +5V DC0 to 20mA DC4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

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

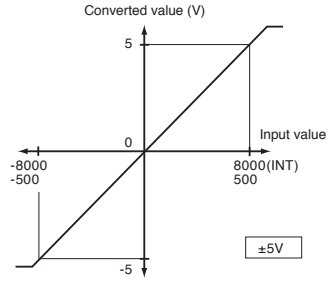
■ Characteristic diagram

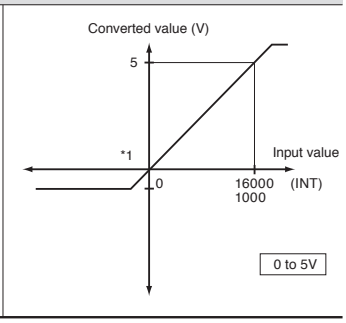
Characteristic pattern 1



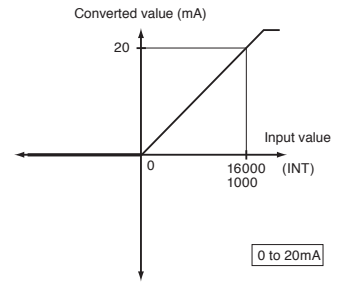


Characteristic pattern 2

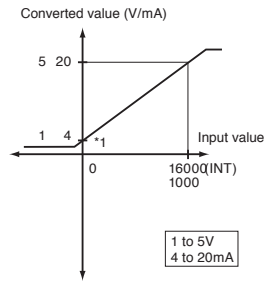




Characteristic pattern 2



Characteristic pattern 3



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

■ Output signal range and converted value

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

Analog Input /Output Module: NP1AWH6-MR

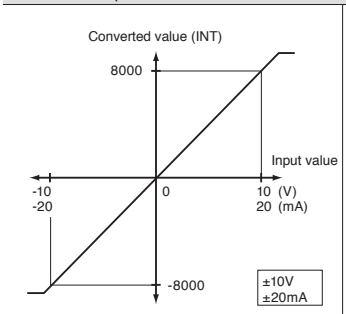
■ Performance specifications

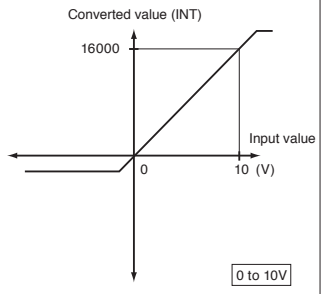
Type	I/O type	No. of channels	Signal range	Digital input output value	Digital resolution	Total accuracy	Converting speed	Occupied word (input + output)	Insulation between channels	External wire connection	Internal current consumption (24V DC)	Mass
NP1AWH6-MR	Multi-range input/output	4 ch	Voltage input: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

■ Characteristic diagram

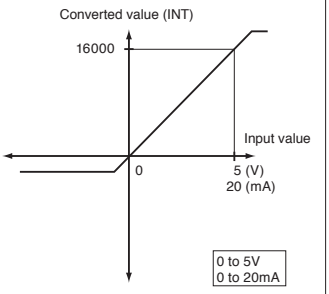
• Analog input

Characteristic pattern 1

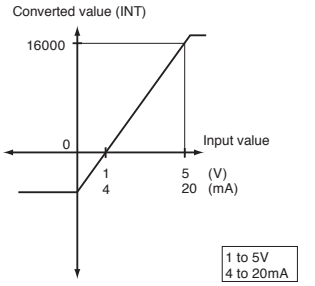




Characteristic pattern 2

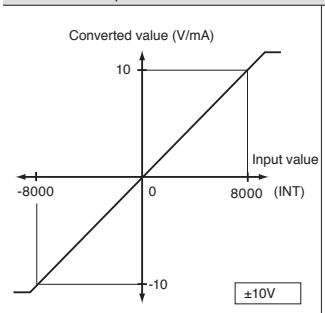


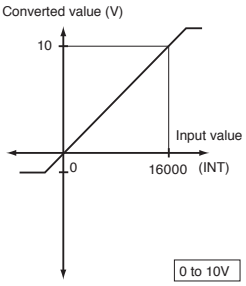
Characteristic pattern 3



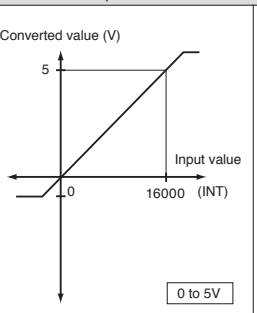
• Analog output

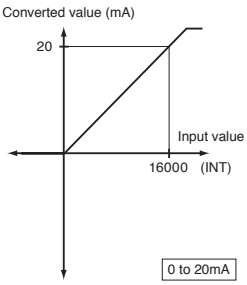
Characteristic pattern 1



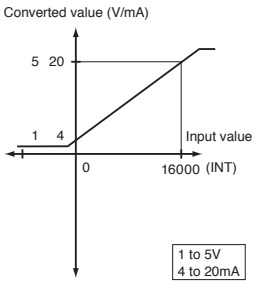


Characteristic pattern 2





Characteristic pattern 3



■ Input/output value and converted value

• Analog input

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

• Analog output

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

Resistance Bulb Input Module: NP1AX □ □ -PT

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

■ Specifications

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

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

■ Type of resistance thermometer element and Resolutions

• NP1AXH4-PT

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

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

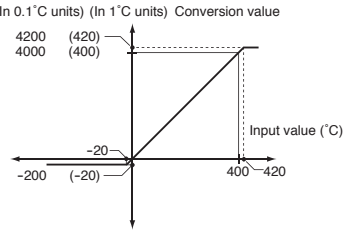
• NP1AXH6G-PT

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

■ Characteristic diagram

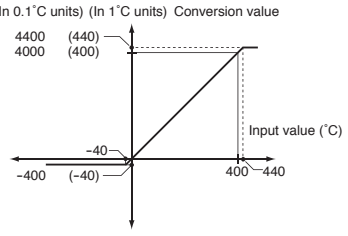
• NP1AXH4-PT

In case of PT0.0 to 400.0°C



• NP1AXH6G-PT

In case of PT0.0 to 400.0°C



Thermo-couple Input Module: NP1AXH □ □ -TC

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

■ Specifications

Item	Specification	
Types	**NP1AXH4-TC**	**NP1AXH8G-TC**
Measurement accuracy * 3	±0.3% (ambient temperature 18 to 28˚C) * 1 ±0.7% (ambient temperature 0 to 55˚C)	±0.05% (ambient temperature 25˚C) * 2
Cold contact compensation accuracy	±1˚C (ambient temperature 18 to 28˚C)	±1˚C (ambient temperature 18 to 28˚C)
Sampling interval	500ms/4 ch	60ms/8 ch
Input filtering time	Hardware (time constant): 50ms,	Hardware (time constant): 30ms
No. of input channels	Software filter: 1s (variable from 1 to 100s by program)	Software filter: 1 to 100s, Moving average over: 4 times, 8 times, 16 times, 32 times. (Configurable per 1s unit. Default value: Moving average over 32 times)
No. of occupied I/O points	4 ch (insulation between channels)	8 ch (insulation between channels)
Internal current consumption	Input 8 words, output 8 words	Input 8 words, output 4 words
External connection	150mA or less	150mA or less
Mass	Removable terminal block M3, 20 poles	Removable terminal block M3, 20 poles
	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	
	0.0 to 700.0	32.0 to 1292.0	0.1
J	0 to 500	32 to 932	1
	0 to 800	32 to 1472	
	0.0 to 400.0	32.0 to 752.0	0.1
	0.0 to 500.0	32.0 to 932.0	
	0.0 to 800.0	32.0 to 1472.0	
T	0 to 400	32 to 752	1
	0.0 to 400.0	32.0 to 752.0	0.1
N	0 to 1300	32 to 2372	1
U	0 to 400	32 to 752	1
	0 to 600	32 to 1112	
	0.0 to 600.0	32.0 to 1112.0	0.1
L	0 to 400	32 to 752	1
	0 to 900	32 to 1652	
	0.0 to 400.0	32.0 to 752.0	0.1
	0.0 to 900.0	32.0 to 1652.0	
PL II	0 to 1200	32 to 2372	1
W5Re, W26Re	0 to 2300	32 to 4172	1

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

• NP1AXH8G-TC

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

Distributor Module: NP1AXH4DG-MR

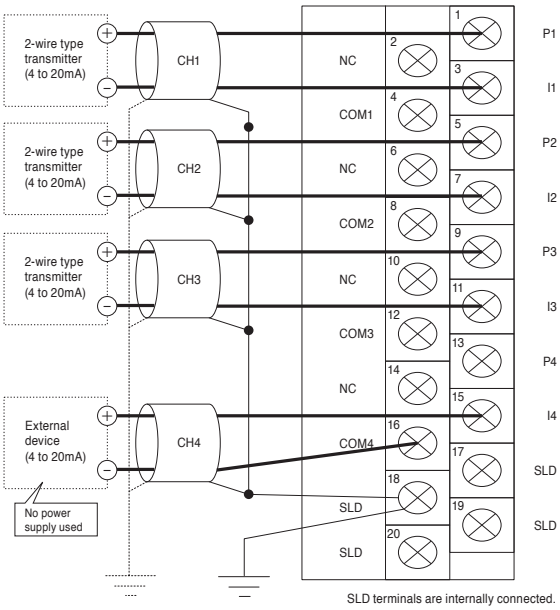
- Converts signals (4 to 20mA) from two-wire transmitters, such as differential pressure flowmeters, water gauges, and temperature communicators, into digital data.
- A transducer is unnecessary as the module is insulated with high pressure-resistance (AC1000V) between channels.
- An external power supply 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.
- It can be also used as 4 channels of an insulation AI (amperage: 0 to 20mA, 4 to 20mA).
- A product compatible with the flow rate pulse input is also prepared (format: NP1F-PI4).

■ Specifications

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

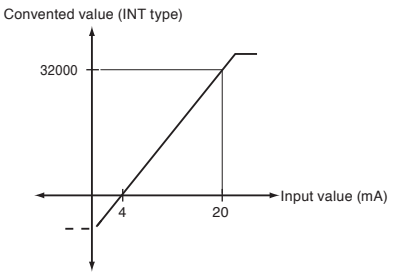
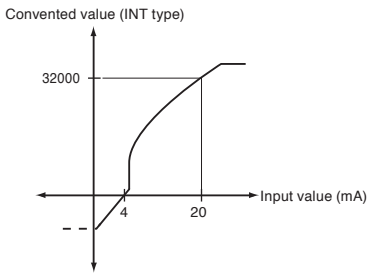
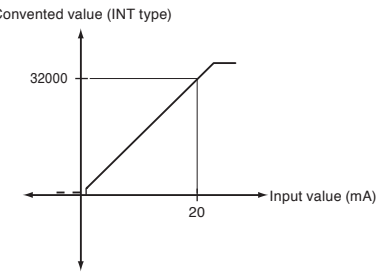
* 1 Reference precision = 0.22% (no need to warm-up when Ta=25°C)
* 2 It is able to reduction by usable of the transmissions number. For more detail, refer to the User's Manual "FEH432."
An ambient temperature is 40°C or less. (40 to 50°C: 10 minutes or less).
* 3 For the step response,
Response time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

■ External wiring



SLD terminals are internally connected.

■ Characteristic diagram

4 to 20mA Reange (Evolution OFF)	4 to 20mA Range (Evolution ON)	0 to 20mA Renge
		

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

Duplex analog output module: NP1AYH8VHR-MR

■ Features

- Duplication of analog output
  - Analog output can be duplicated with the duplex switch control signal.
  - Switching from the operation to the waiting can be performed by the application program or the front switch.
  - The status of operation and waiting can be confirmed with the OUT LED on the front face of the module.
  - The terminal block drop detection function is built in.

- Duplication of analog output by the instruction from the 2-system or 3-system of controller.
  Operation instruction is available from controllers (maximum 3 systems) of different configurations to this module via the communication module.

Operation mode	Overview
Single mode	Output data are provided by 1 unit of CPU and are D/A-converted.
DUPLEX mode (CPU duplication)	One of output data provided by 2 units of CPU is selected and D/A-converted.
DUAL mode (CPU duplication)	A mid value is selected from output data provided by 2 units of CPU and previous output value, and D/A-converted.
Triple mode (CPU triplication)	A mid value is selected from output data provided by 3 units of CPU, and D/A-converted.

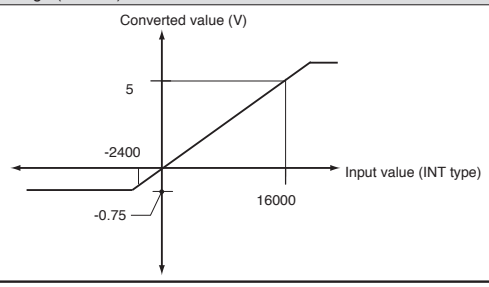
- High speed and high accuracy
  High-speed conversion period of 3.2ms/8ch and high standard accuracy of ±0.25% enable a detailed control.

■ Specifications

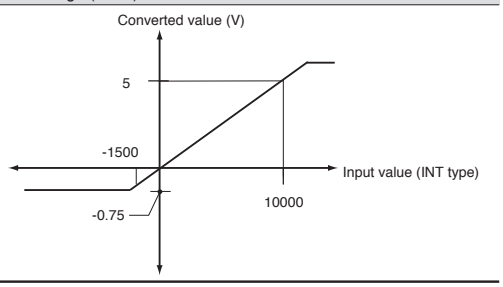
Type	NP1AYH8VHR-MR			
NO. of output channels	8 points			
Analog output range	0 to 5V	1 to 5V	0 to 10V	-10 to +10V
Load impedance	500Ω or more		1kΩ or more	
Max. resolution	1.25mV			
Digital conversion	0 to 16000 (Date type : INT)		0 to 16000	-8000 to 8000
Total accuracy	±0.25 % of F.S.R			
Temperature coefficient	±0.007%/°C			
Maximum noise deviation	±0.6% of F.S.R			
Conversion cycle	3.2ms/8 points			
Response time	Conversion cycle + tact cycle (ms)			
Load short protection	Provided			
No. of occupied words	Input 16W + output 34W			
Isolation method	Between analog input terminal and FG: Photo coupler insulation and transformer insulation			
Dielectric strength	AC500V for 1 minute between total analog output terminals and FG (10mA short-circuit current)			
Insulation resistance	10MΩ or more with the DC500V of DC megger between total analog output terminals and FG			
Internal current consumption	200mA or less (at rated load)			
Non use output treatment	Opening			
Use cable	Analog output cable Use an AWG #22 to 18 shielded twisted pair line.			
	Duplex switch signal cable (maximum wire distance: 5m) Use an AWG #22 to 18 shielded straight cable.			
Mass	Approx. 260g			
External connection	Detachable terminal block (M3 x 20 poles)			
Dimension	W35 x H105 x D111mm (26mm protrusion)			

■ Characteristic diagram

0 to 5V range (for LSB)



0 to 5V range (for %)



I/O Connection of Connector-type Modules

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

■ Connector type module list

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

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

■ Recommended connectors

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

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

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

• Kind, type (product code)

• Main unit

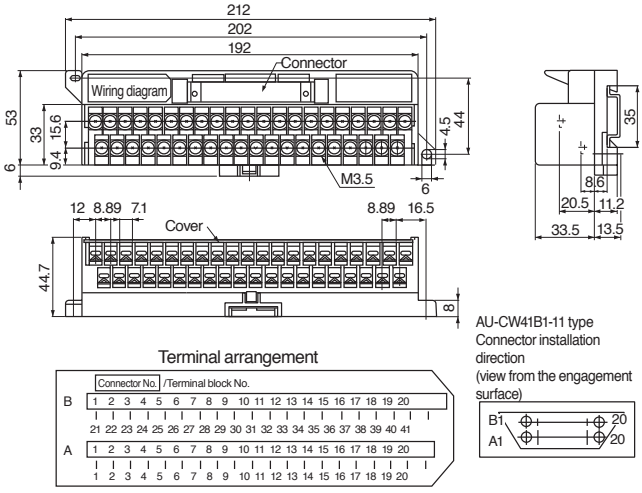
Type (product code)	Terminal block Odd number	Connector Odd number	Rated (Odd number)	Performance
AU-CW41B1-11	41	40	Insulation voltage: 60V (AC, DC) Rated thermal current: 1A (at 40°C)	Insulation resistance: 100MΩ or more Voltage resistance: For 1 min. at 500V Allowable ambient temperature: -5 to +40°C Allowable ambient humidity: 45 to 85%RH Fire-resistant UL94-V1

• Connection cable

Applied terminal block type	Number of poles	Cable type	Connection cable type
AU-CW41B1-11	40	Multi-core cable	AUX011-40 ☐
		Flat cable	AUX021-40 ☐

Note: The value in the box indicates the length of multi-core cables and flat cables.
1: 1m (standard), 2: 2m, 3: 3m

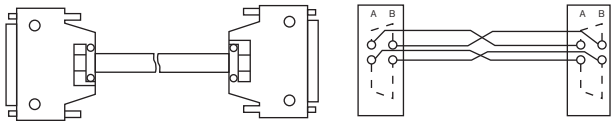
• Outline drawing (AU-CW41B1-11 type)



• Cable wiring diagram

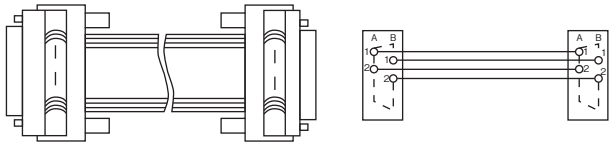
[Multi-core cable with connector]

AUX011-40 ☐ type (Fujitsu product)



[Flat cable with connector]

AUX011-40 ☐ type (Fujitsu product)

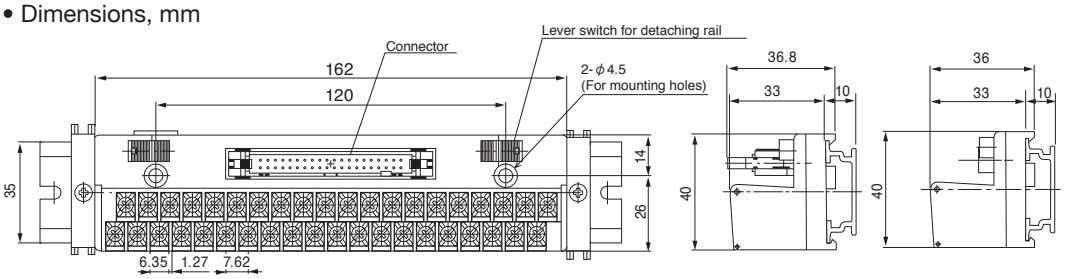


■ Recommended relay terminal blocks (Made by Fuji Electric Technica Co., Ltd.)

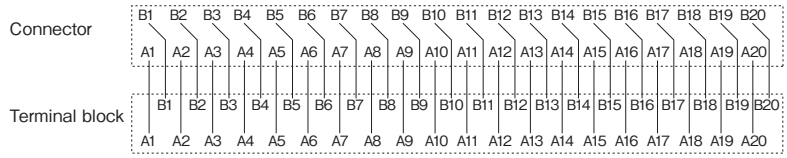
• Specifications

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

• Dimensions, mm



• Dimensions, mm

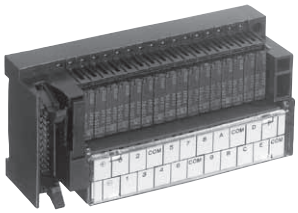


• Applicable connector

Types	Types (Fujitsu Component Ltd.)	
	Jack	Cover
Soldered type *1	FCN-361J040-AU	FCN-360C040-B (B type)
Crimp type	FCN-363J040 (Housing) FCN-363J-AU (Contact)	FCN-360C040-D (D type: Wide mouthed type) 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 Fuji Electric solder type connector (NP8V-CN) is prepared (cover attached: FCN-360C040-B).
Note: For more retail, refer to each of the manuals.

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



AF96-82

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

■ Performance specifications

Item		Performance
Operating duration		10ms or less
Recovery duration		10ms or less
Vibration resistance	Malfunction	10 to 55Hz, Duplex amplitude 1.0mm
	Durability	10 to 55Hz, Duplex amplitude 1.0mm 3 times each in X, Y, and Z directions to total 18 times
Impact resistance	Malfunction	100 m/s^2
	Durability	200 m/s^2 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		Approx. 200g

■ Type/Model/Ordering code

Model (Ordering code)	I/O type	No. of points	Rated voltage	Common line handling on Connector side
RS16E-DE04	Input	16 points	5V DC [DY]	NPN compatible (+ common)
RS16-DE04	Output	16 points	24V DC [DE]	NPN compatible (+ common)
RS16-DE04P		(1a x 16)		PNP compatible (- common)

■ Terminal Relay Application Table

Terminal relay type	**RS16E-DE04**	**RS16-DE04**	**RS16-DE04P**
SPH	**NP1X3206-W**	**NP1Y32T09P1**	**NP1Y32U09P1**
I/O module type	**NP1X6406-W**	**NP1Y64T09P1**	**NP1Y64U09P1**

■ Rating

Opening section, connector side (for 1 point RB105)

Item \ Load	RS16 (output) resistor				RS16E (input) resistor	
	Load (cosφ = 1, L/R = 0ms)		Inductive load (cosφ = 0.4, L/R = 7ms)		Resistance load (cosφ = 1, L/R = 0ms)	Inductive load (cosφ = 0.4, L/R = 7ms)
Rated load and rated voltage current	220V AC, 2A	24V DC, 2A	220V AC, 2A	24V DC, 2A	24V DC, 1A	24V DC, 1A
Rated thermal current	2 A *1				1 A *2	
Contact resistance	30mΩ or less				30mΩ or less	
Minimum application load application voltage current (P level reference value)	0.1V, 0.1mA				0.1V, 0.1mA	
Electrical lifetime	200 thousand times					
Mechanical lifetime	20 million times	300 thousand times	100 thousand times	60 thousand times	—	

*1 While the used relay (RB105) is a product to use the rated thermal current 5A, the rated thermal current of the main unit is 2A because of the terminal relay unit structure.
*2 While the used relay (RB105) is a product to use the rated thermal current 5A, the rated thermal current of the main unit is 1A because of the terminal relay unit structure.

Operation coil I/O specifications (for 1 point RB105)

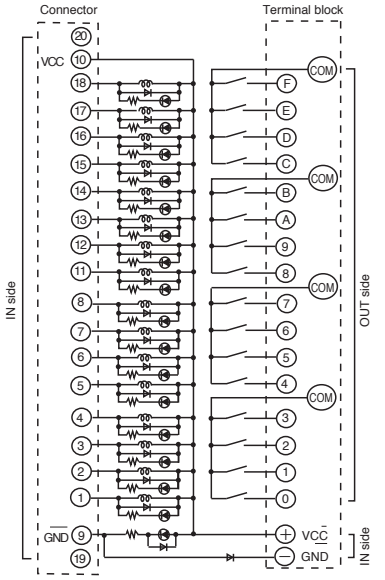
Ambient temperature: 20°C

Rated voltage	Rated current [mA]	Coil resistance [Ω] ±10%	Pick-up voltage	Return voltage	Maximum allowable voltage	Power consumption [W]	
						Per 1 point	Per 16 points
DC5V	40	125	70% of rated voltage or less	10% of rated voltage or more	110% of rated voltage	0.2	3.2
DC24V	8.3	2,880	70% of rated voltage or less	10% of rated voltage or less	110% of rated voltage or less	0.2	3.2

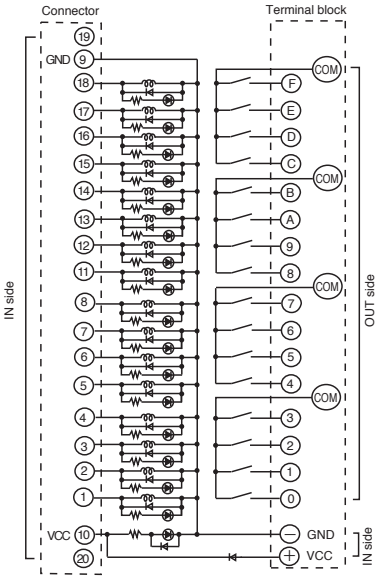
Note: The current flowing in the LED is about 1mA. Add each of amperage values for the power capacity calculation.

■ Internal connection diagram

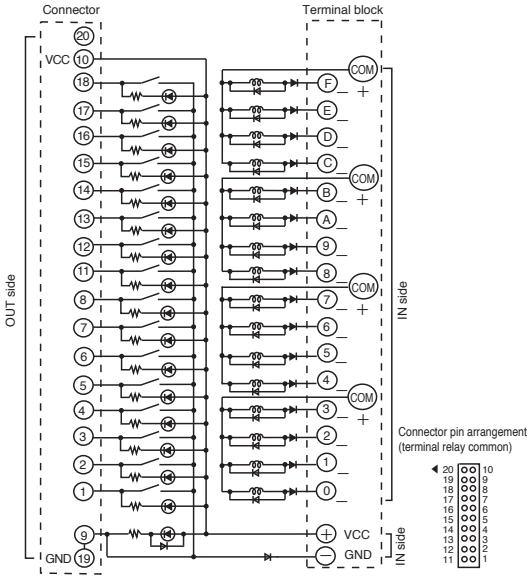
•RS16-DE04
(output, NPN compatible product)



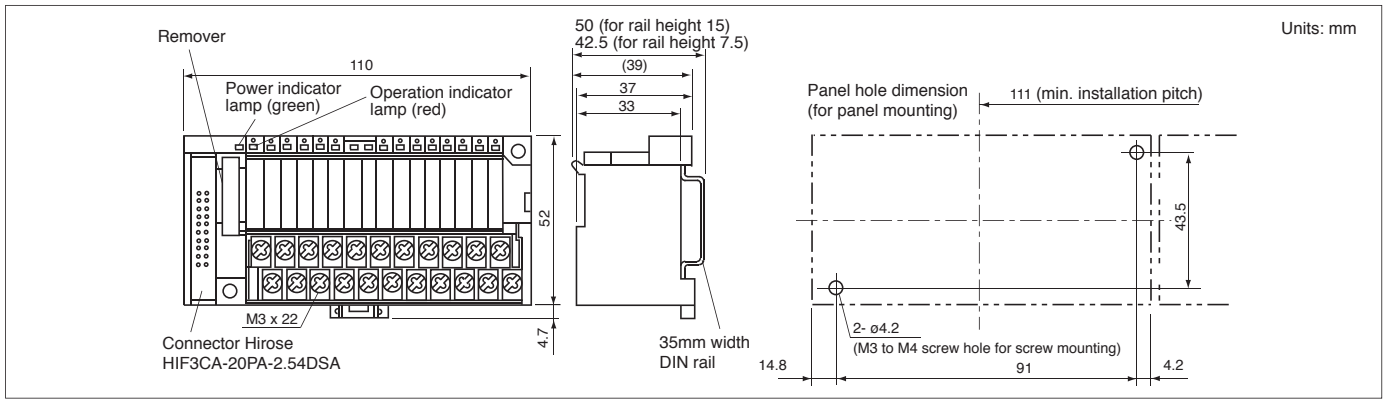
•RS16-DE04P
(output, PNP compatible product)



•RS16E-DE04
(input, NPN compatible product)



■ Dimensions

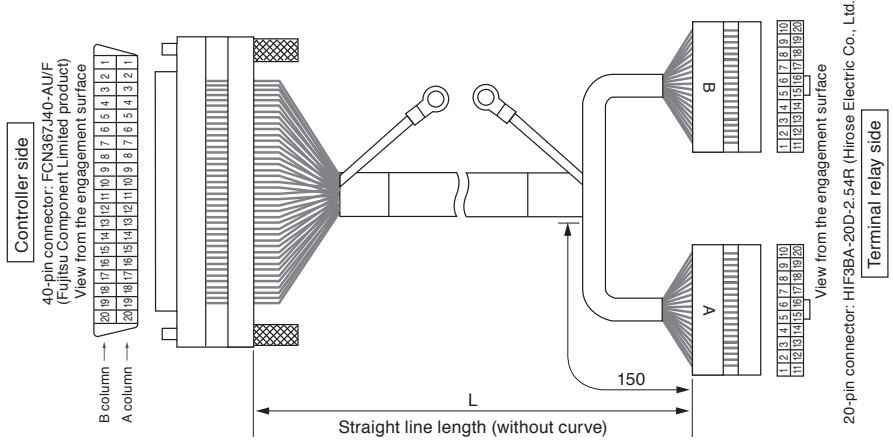


■ Terminal relay cable

• Type, model, and ordering code

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

• Cable outline wiring diagram



<Wiring>

20pin(A)	40pin		20pin(B)	40pin
1	A20	I/O signal	1	B20
2	A19		2	B19
3	A18		3	B18
4	A17		4	B17
5	A16		5	B16
6	A15		6	B15
7	A14		7	B14
8	A13		8	B13
9	A 1	Power supply (-)	9	A 2
10	B 1	Power supply (+)	10	B 2
11	A12	I/O signal	11	B12
12	A11		12	B11
13	A10		13	B10
14	A 9		14	B 9
15	A 8		15	B 8
16	A 7		16	B 7
17	A 6		17	B 6
18	A 5		18	B 5
19	A 3	Power supply (-)	19	A 4
20	B 3	Power supply (+)	20	B 4

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

■ Features

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

NP1L-WE2
KD02-041A

■ Functional specifications

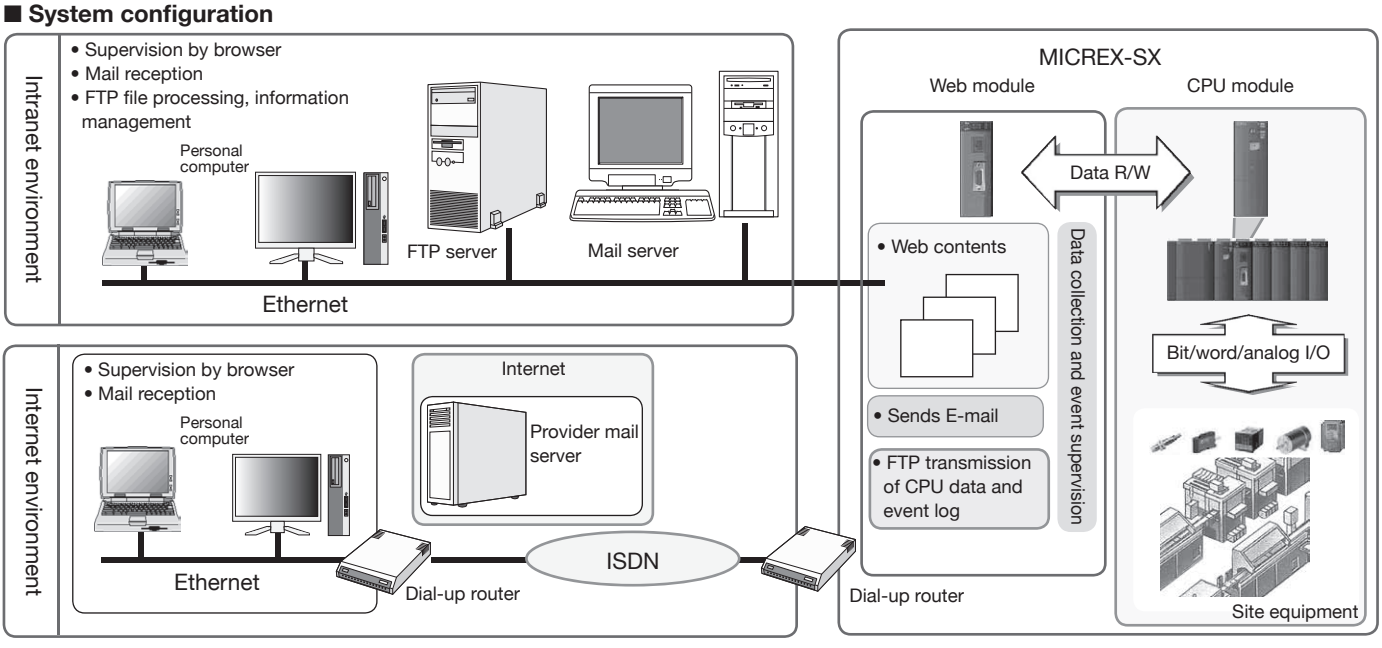
Item	Specification
Web server functions	Controller data can be monitored and set using a browser (Internet Explorer) on a remote personal computer. Mounts the tabular form data display and trend graph display functions as standard. Initial setup items for the Web modules are all set in the browser screen.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

■ Performance specifications

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

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

■ System configuration



Ethernet Interface Module: NP1L-ET1

■ Features

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

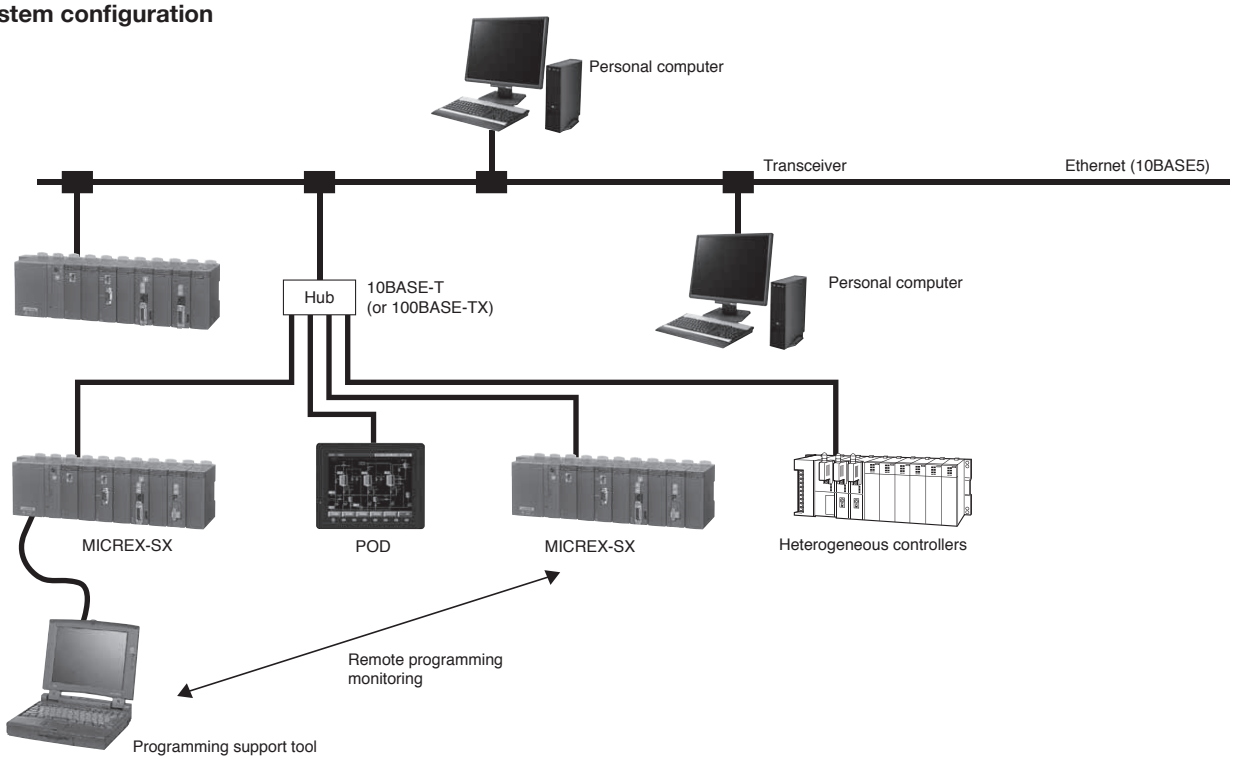
NP1L-ET1
KD02-040A

■ Performance specifications

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

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

■ System configuration



Online Adapter: FOA-ALFA2 [Japanese Version]

■ Features

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

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

■ Specifications

- General specifications

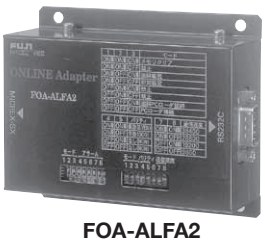
Item		Specification
Physical environment	Operating ambient temperature	0 to ±55˚C (without condensation)
	Storage temperature	-20 to ±70˚C (without condensation)
	Relative humidity	20 to -90%RH (without condensation)
	Contamination	Contamination level 2
	Corrosion resistance	No corrosive gas is present,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

Note: For operating environment, take into consideration the specifications of the communication devices used.

* 1 Use the AC adapter only at the time of initial setup data transmission. Do not use it for connection with SPH.

■ System configuration

Specialized connection cable (option)
NP4H-CB2



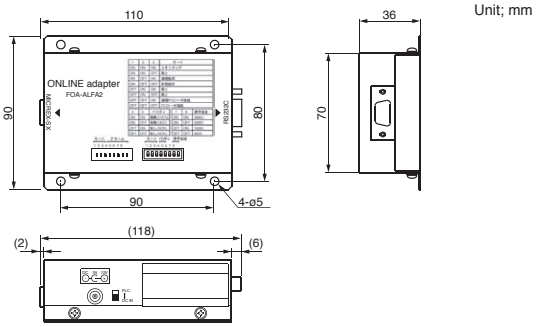
FOA-ALFA2
KD02-024B

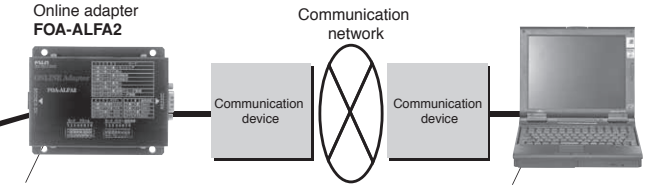
- Functional specifications

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

■ Outside dimensional drawing

Unit; mm





■ 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.

■ Master station monitoring software (Model: FOA-CENTER2-CD) <Japanese version>

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

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

NP1L-FL3
KDD05-017

■ Features

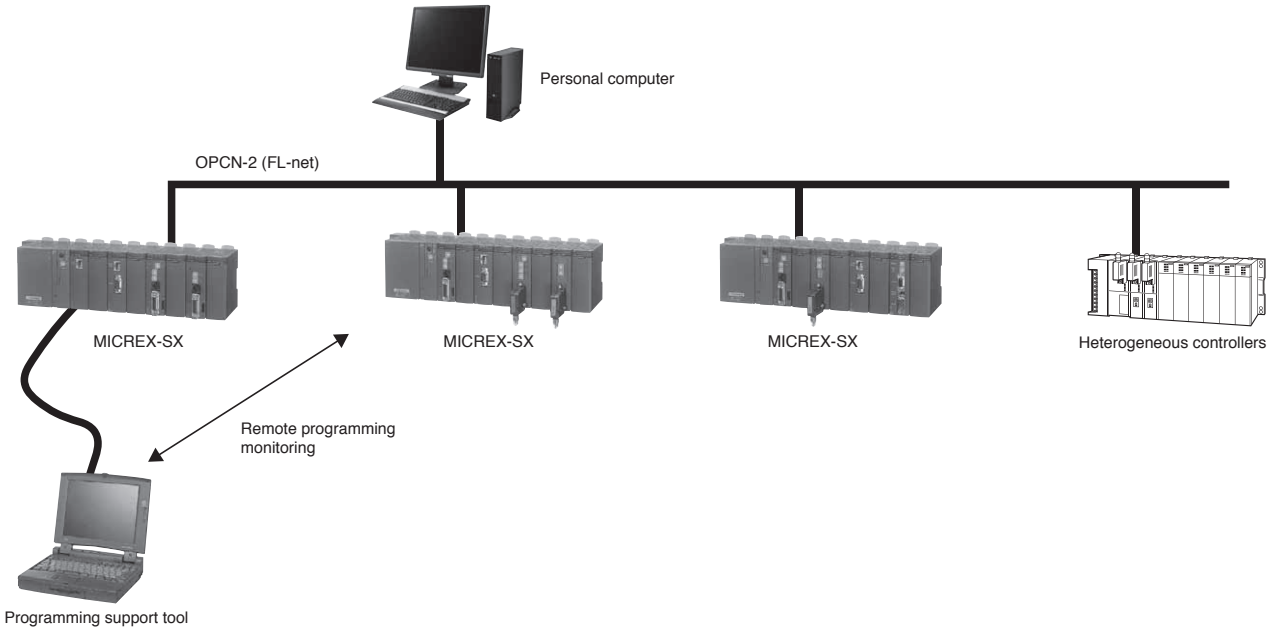
- Up to 2 communication modules including P/PE-link can be installed on the base board equipped with CPU. (For SPH200, up to two modules)
- Data exchange between processors
  Cyclic data communication, message communication
- OPCN-2 (FL-net) loader commands supported
- SX system loader functions via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

■ Performance specifications

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

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

■ System configuration



LONWORKS Network Interface Module: NP1L-LW1

■ Features

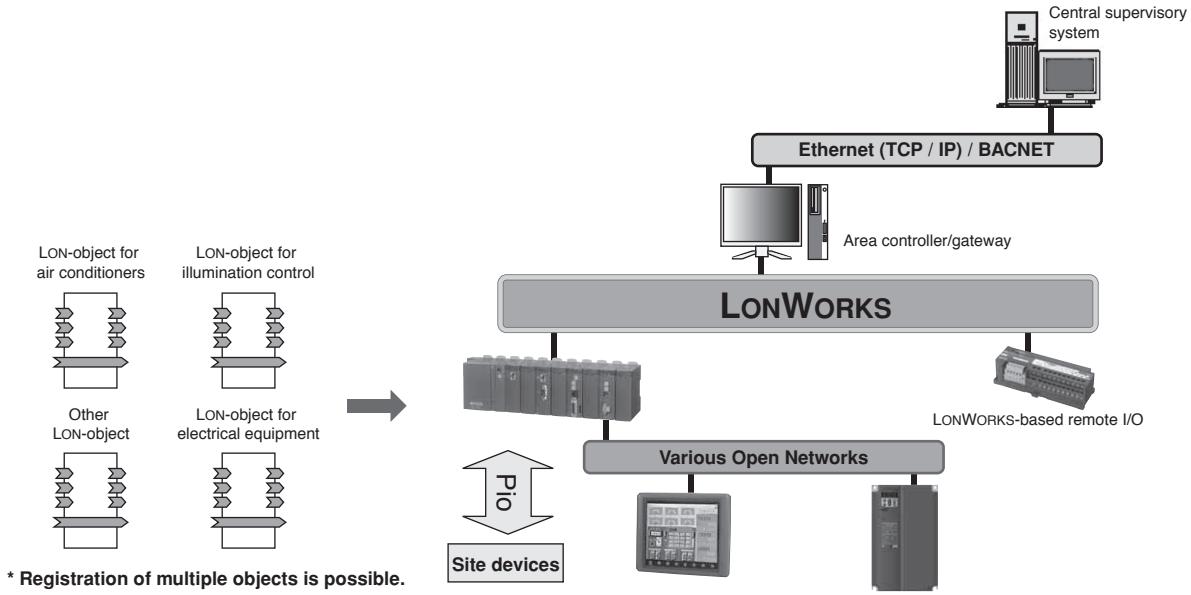
- Uses the communication extension FB compatible with the LONWORKS network, making it easier to transfer and receive MICREX-SX application data to/from other LONWORKS nodes.
- Max. number of NVs: 300, Number of CPs: Up to 200 intelligent nodes can be configured.
- Up to two units can be mounted in one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

NP1L-LW1
AF00-197A

■ Specifications

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

■ System configuration



*** Registration of multiple objects is possible.**

LONWORKS Network Interface Module Support Tool: [Japanese Version]

- This support tool can be downloaded from our homepage at no charge.
- 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)

NP1L-PL1
AF98-133

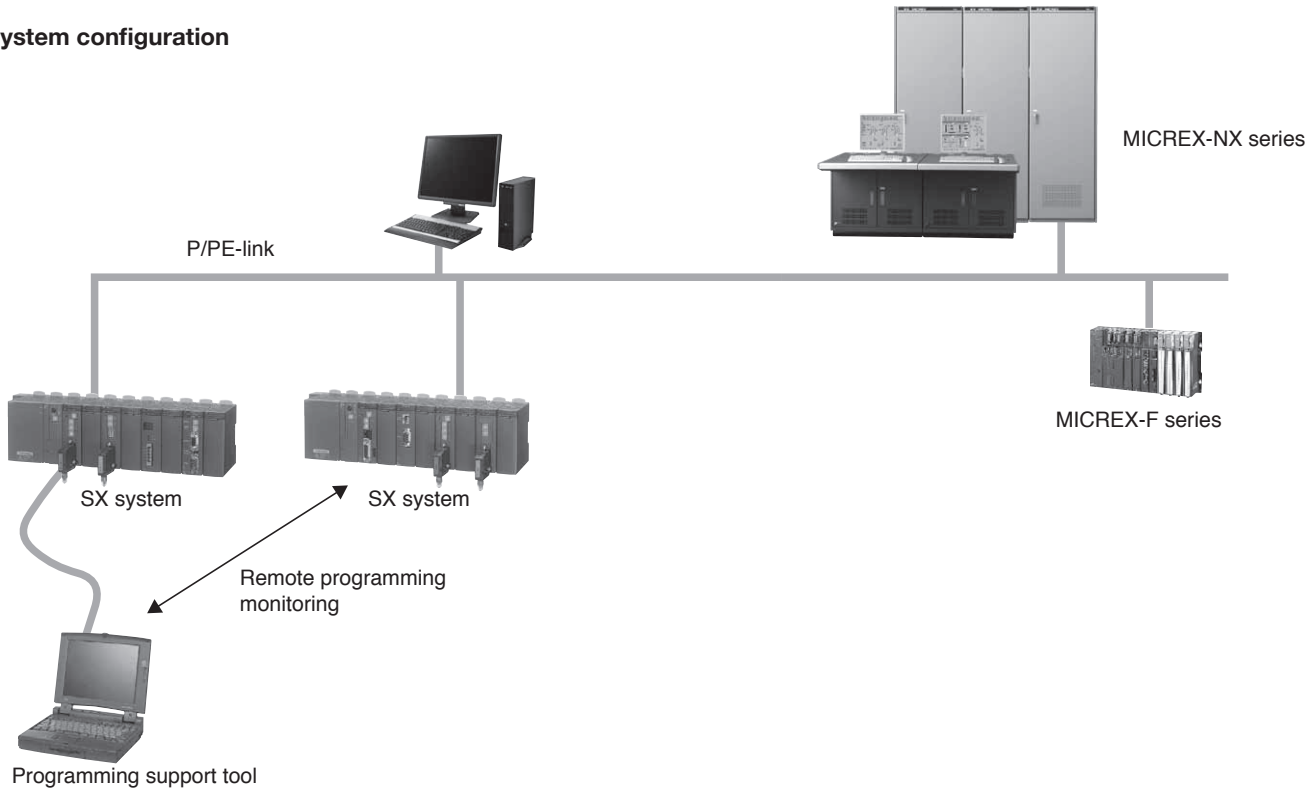
■ Features

- 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 Total length: Max.250m	Coaxial cable Total length: Max.500m
Transmission method	Half-duplex, serial transmission	
Data exchange method	N: N (token passing) method, memory refresh method	
Transmission speed	5Mbps	
Data transfer	Broadcast communication, message transmission	
Cable	Coaxial cable /5C-2V (conforming to JIS C 3501)	
Internal current consumption	24V DC, 160mA or less	
Mass	Approx. 235g (module), approx. 40g (P/PE-link connector)	

■ System configuration



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

■ Features

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

NP1L-LL2 KD04-015 **NP1L-LE1** KD04-016

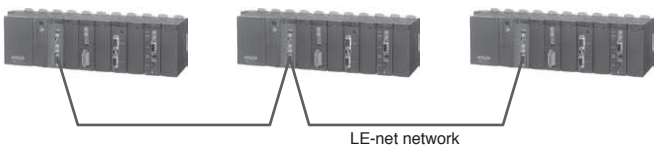
Note: Multi-drop networks, loop-2 networks cannot be connected with each other because each network uses a different transmission protocol. To connect them together, the transmission method must be unified.

■ Performance specifications

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

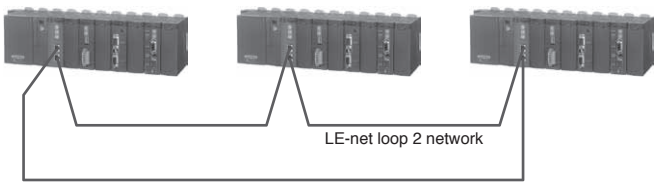
■ System configuration

• LE-net module



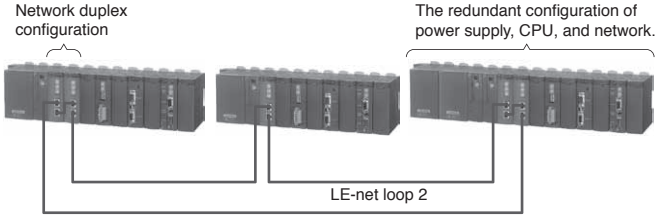
• LE-net loop 2 module

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.



General Purpose Communication Module: NP1L-RS□

NP1L-RS1
AF01-93

■ 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

• Commnication port type by module types

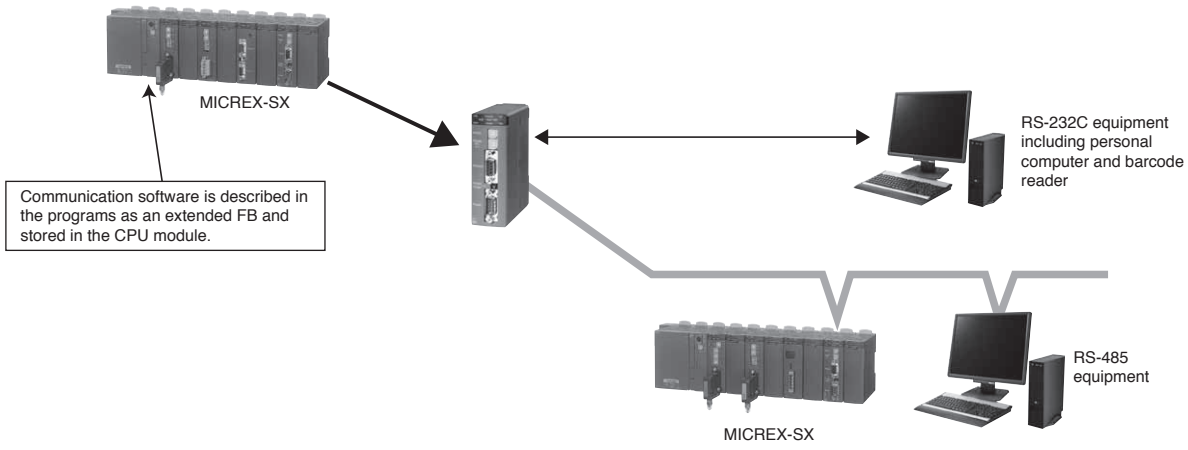
Type	NP1L-RS1	NP1L-RS2	NP1L-RS3	NP1L-RS4	NP1L-RS5
Communication port	RS-232C x 1 channel RS-485 x 1 channel	RS-232C x 1 channel	RS-232C x 2 channels	RS-485 x 1 channel	RS-485 x 2 channels

• Commnication port specifications

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

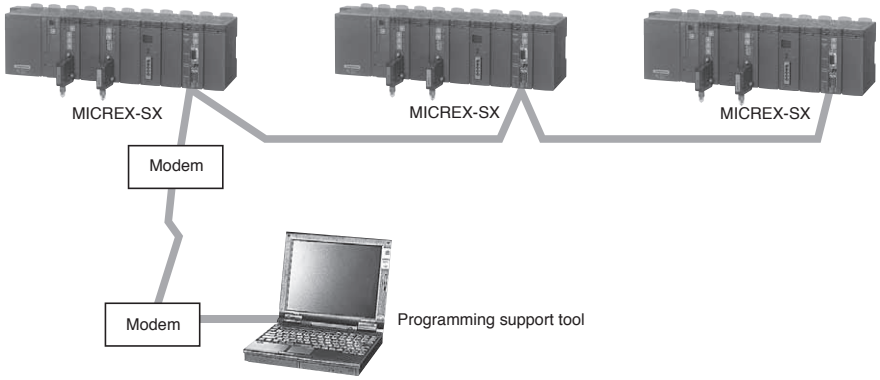
*1 : The use of the non-procedure FB allows full-duplex communication on applications.
*2 : For transmission rates 300, 600, 76800, and 115200 bps, use FBs corresponding to the transmission rate.

■ System configuration



■ Support tool network function

Use of general-purpose communication modules enables supporting multiple systems with one unit of personal computer loader or remotely supporting the system via modem.



Device-level Communication Module

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

NP1L-JP1
AF97-522

■ Features

NP1L-JP1

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

NP1L-JS1

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

NP1L-RJ1

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

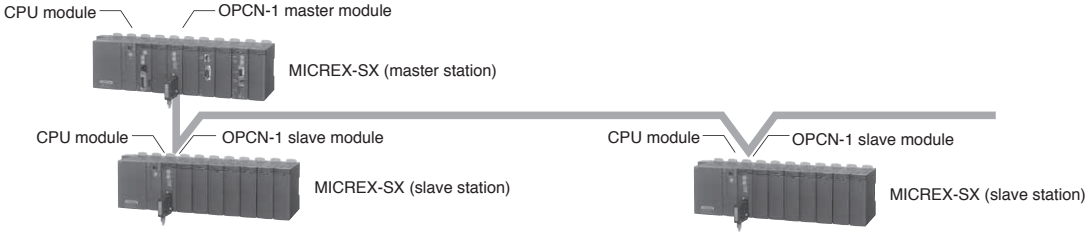
■ Communication specifications

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

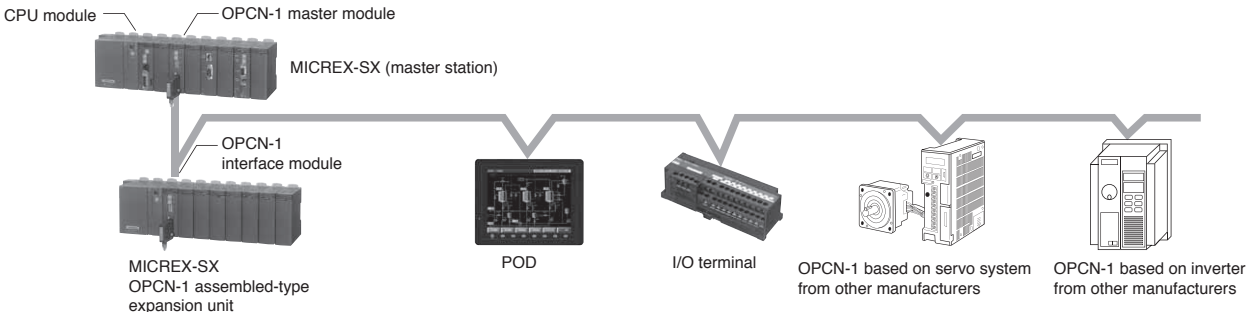
* 1 The transmission distance applies to T-KPEV-SB 1.25mm² from Furukawa Electric Co. Note that the distance may vary with the cable characteristics.

■ System configuration

●OPCN-1 slave system



●OPCN-1 remote I/O system



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

NP1L-DN1
AF99-340

■ 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).

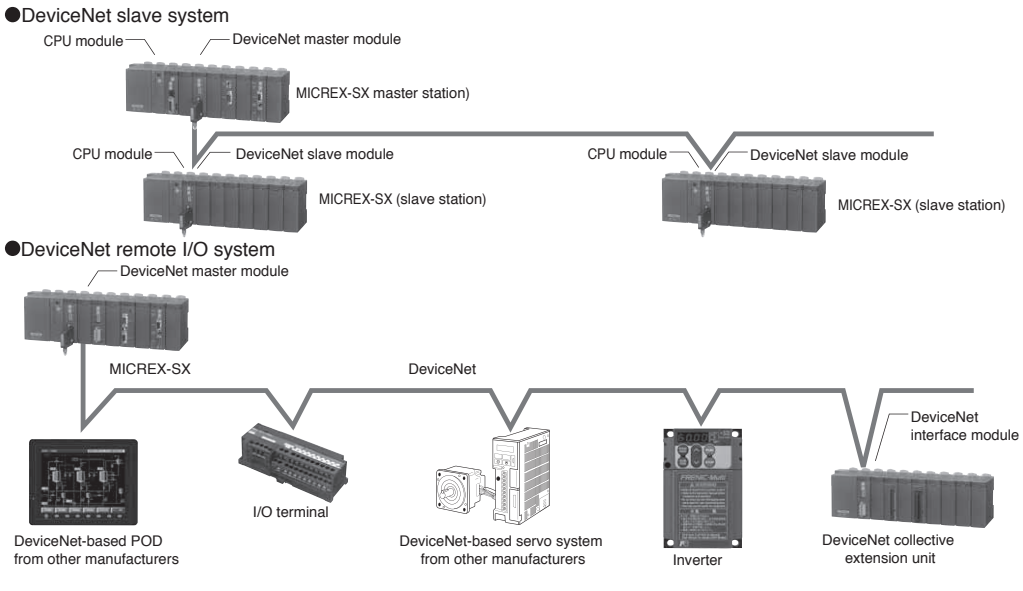
NP1L-DS1
- I/O data link through the DeviceNet is possible between CPUs.
- Number of I/O points is maximum 2048 points (128 words)

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 · Poll command/response · Bit-Strobe command/response · Change of state/Cyclic ACK not provided · Change of state/Cyclic ACK provided Explicit message (implements the client/server function to set and diagnose the remote I/O stations Low priority communication traffic)	Poll command/response Explicit message	
Vendor ID	319 (Fuji Electric Systems Co,. Ltd.)		
Device type	Communication Adapter (Code: 0x0C)		
No. of I/O points	Normal mode: Max. 2048 points (128 words) Extension mode or I/O Extension mode: Max. 8192 points (512 words)	Max. 2048 points (128 words) /1 slave	
No. of message points	Max. length 492 bytes per transmission (Explicit message)		
Network current consumption	24V DC, 45mA or less (supplied from DeviceNet power supply)		
Internal current consumption	24V DC, 90mA or less		
Mass	Approx. 170g		

■ System configuration



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

NP1L-TL1
AF98-132

■ 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.

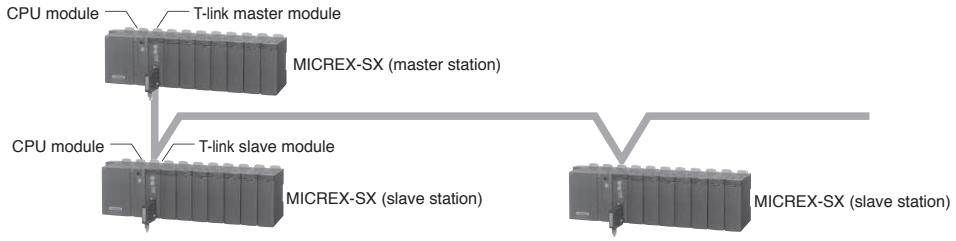
■ Communication specifications

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

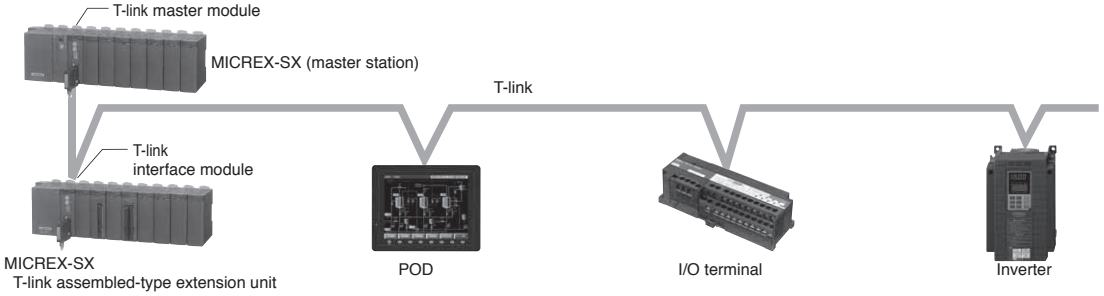
* 1 Transmission distance is the length when using the T-KPEV-SB 1.25mm^2 cable manufactured by Furukawa Electric Co. However, note that the distance may occasionally vary due to the cable characteristics.
* 2 Up to 64 units can be connected as slaves when using the T link electric repeater.

■ System configuration

●T-link slave system



●T-link remote I/O system



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

NP1L-PD1
KD02-038A

NP1L-PS1/RP1
KD03-023

■ Features

NP1L-PD1

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

NP1L-PR1

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

NP1L-PS1

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

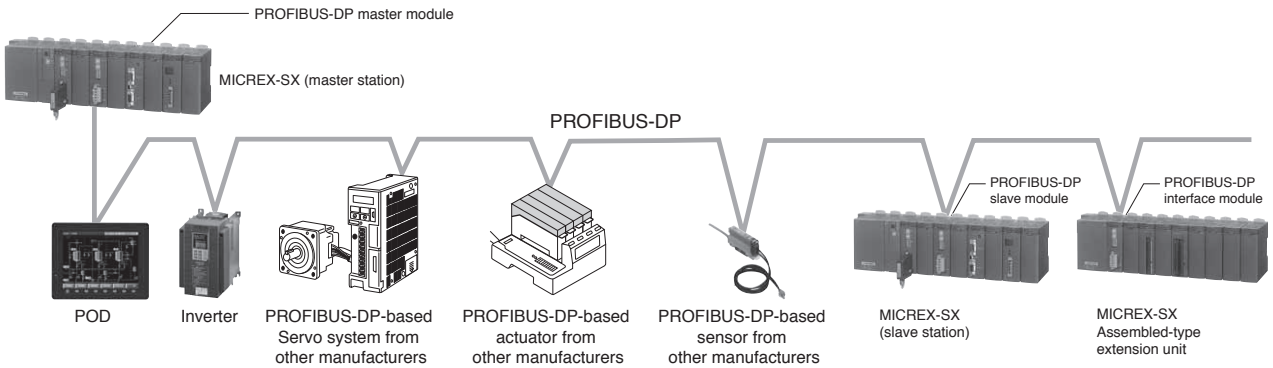
■ Performance specifications

Item	Specification		
Type	**NP1L-PD1**	**NP1L-PS1**	**NP1L-RP1**
No. of SX bus connectable modules	Max. 8/configuration		—
Applicable standards	IEC 66158, EN 50170, DIN 19245	PROFIBUS-DP slave function	
Communication function	PROFIBUS-DP master (DPM1) function	—	
No. of slave station connections	Up to 32 units (up to 126 units with repeaters)	0 to 99	
Station No. (station address) setup range	0 to 125		
Transmission line form	Bus configuration (multi-drop)		
Communication standard	Applicable to EN 50170 and DIN 19245.		
Data exchange system	1:N (polling/selecting)		
Transmission rate	Nine options (set by configuration of the programming loader) 9.6/19.2/93.75/187.5/500/1500/3000/6000/12000 kbps		
Transmission distance	1200m with a transmission rate of 9.6kbps, 100m with a transmission rate of 12Mbps (Refer to the table below.)		
Cable	PROFIBUS-DP cable (Shielded twist pair cable)		
No. of I/O points	Normal mode: Max. 2048 points (128 words) *1 Extension mode or I/O Extension mode: Max. 8160 points (510 words)	In total I/O: Max. 128 words (Each I/O: Max. 122 words)	
Internal current consumption	24V DC, 200mA or less	24V DC, 150mA or less	
Mass	Approx. 250g	Approx. 180g	

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

*1 SPH200 supports standard mode only.

■ System configuration



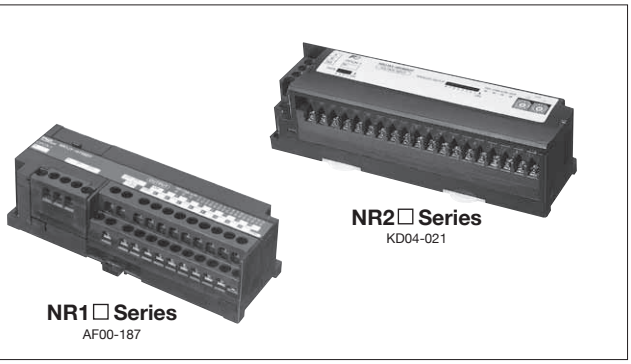
■ Configurator Software: KONF-PDP

Used to download the system configuration information to the PROFIBUS-DP master module. Required to update the initial setup or system configuration.

• Please purchase from
HMS INDUSTRIAL NETWORKS

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

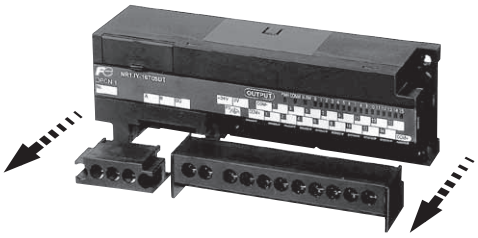
Compact type I/O terminal applicable to diverse field networks with a common frame size.



■ 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

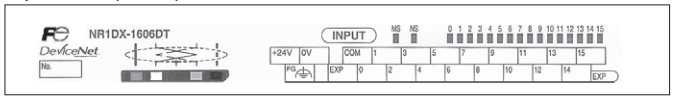


NR2 series

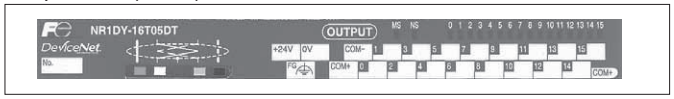
- Preventing mis-wiring
  Uses different colors for the surface sheets of the main unit: input (white), output (black), and I/O mixture (zebra). Applicable networks are also displayed, enabling determination of the unit type at a glance.

- NR1 series

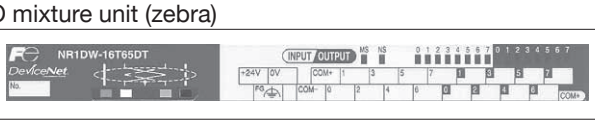
Input unit (white)



Output unit (black)



I/O mixture unit (zebra)



- NR2 series

Input unit (white)

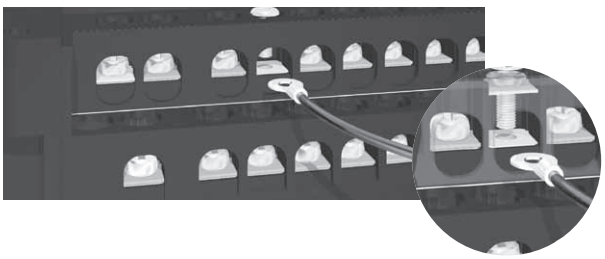
Output unit (black)

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

■ Features of the NR1 Series

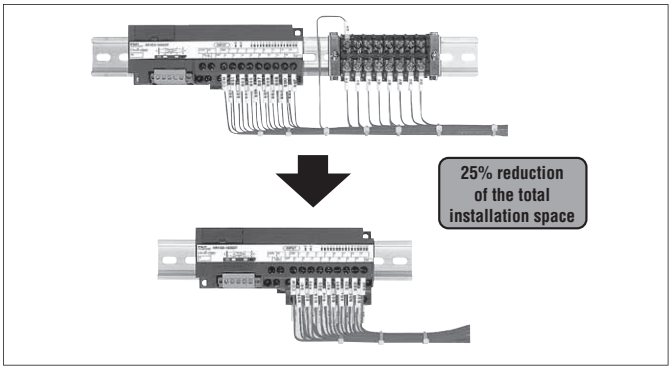
- Efficient safe terminal block structure
  This terminal block has terminal screws which are self-lifting by themselves after loosening, thus preventing screws from being lost at the time of wiring to the round amplifier terminal, increasing the wiring work efficiency.
  The use of power supply and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

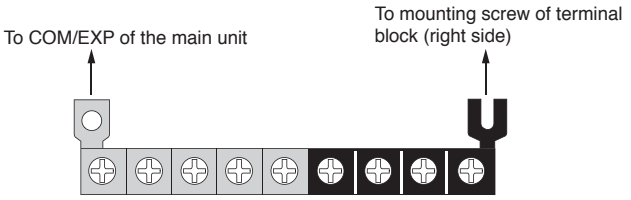
• 25% reduction of total installation space
"Common extension terminal block" which extends the number of common terminals with one-touch operation is optionally available.
The use of "common extension terminal block" eliminates the necessity of the separate relay terminal block for common extension, 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 comand, 250kHz, 4-axis (2 points / 1-axis)
LonWorks	16-point input	**NR1LX-1606DT**	24V DC, 16-point bi-directional input (4 points can be used as pulse inputs), removable terminal block
	8-point Ry output	**NR1LY-08R07DT**	240V AC/110V DC, 8-point Ry output, removable terminal block
	9-point input/2-point output	**NR1LW-11R80DT**	24V DC, 9-point source input (4 points can be used as pulse inputs), 2-point Ry output, removable terminal block
Option		**NR1XV-CB1**	Common extension terminal block (9 pins)

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

NR2 □ series

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

■ Specifications

• General specifications

Item		Specification
Physical environment	Operating ambient temperature	0 to ±55˚C (Lon Works-based product: -10 to +55˚C)
	Storage temperature	-25 to +70˚C
	Relative humidity	20 to 95%RH (without condensation)
	Contamination degree	Contamination degree 2
	Corrosion resistance	No corrosive gas is present, no organic solvent adhesion
	Operating altitude	Altitude of 2000m or less (air pressure of 70kPa or higher during transportation)
Mechanical operating condition	Resistance to vibration	One amplitude: 0.15mm, constant acceleration: 19.6m/s^2, 1.5 hours for each direction, 4.5 hours total
	Resistance to shock	Peak acceleration: 147m/s^2, 3 times for each direction
Electrical operating condition	Electrostatic discharge	Contact discharge: ±6kV, air discharge: ±8kV
	Radiative radio frequency electromagnetic field	80 to 1,000MHz: 10V/m, 1.4 to 2.0GHz: 3V/m, 2.0 to 2.7GHz: 1V/m
	Fast transient burst wave	Power supply line and input/output signal line (AC non-shield line): ± 2kV Communication line and input/output signal line (except AC non-shield line): ± 1kV
	Conductive radio frequency interference	150KHz to 80MHz, 10Vrms
	Square wave noise	±1.5kV, 1ns rising edge, 1 μs pulse width, 50Hz
Installation and wiring conditions	Structure	Open type device (control panel built-in type) Terminal screw: M3, Screw tightening torque I/O terminal screw: 0.5 to 0.6N-m Main unit mounting screw: 1 to 1.5N-m
	Cooling system	Natural cooling

• Power supply specifications

Item	Specification			
Type	**NR1□□**		**NR2D□**(digital I/O)	**NR2JA□**(analog I/O)
Power supply method	External power supply		DeviceNet communication cable	External power supply
Rated input voltage	24V DC		24V DC	24V DC (Three phase full-wave rectification can not be used.)
Input voltage range	21.6 to 26.4V DC, (LonWorks-based product: 20.4 to 27.6V DC)		11 to 25V DC	20.4 to 26.4V DC
Dropout tolerance	1ms (at 21.6V), LonWorks-based product (at 20.4V)		1ms (at 20.4V)	1ms (at 20.4V)
Inrush current	5A, 1ms or less (LonWorks-based product: 3A, 5ms or less, 25A, 5ms or less for the **NR1LY-08R07DT**)		7A, 0.4ms or less	5A, 1ms or less
Dielectric strength	1500V AC, 1 minute (Between power supply input terminal and frame ground)		500V AC, 1 minute (Between power supply input terminal and I/O terminal)	500V AC, 1 minute (Between analog I/O terminal and frame ground)
Insulation resistance	10MΩ or more (500V DC megger) (Between input terminal and frame ground)		10MΩ or more (500V DC megger) (Between power supply input terminal and I/O terminal)	10MΩ or more (500V DC megger) (Between analog I/O terminal and frame ground)
Power consumption	OPCN-1 SX bus T-link DeviceNet	**NR1□X-1606DT**: 1.4W or less **NR1□Y-08R07DT**: 3W or less **NR1□X-16T05DT**: 1.4W or less **NR1□X-16T65DT**: 1.4W or less **NR1SF-HP4DT**: 3.5W or less	**NR2DX-3206DT**: 2.5W or less **NR2DY-32T05DT**: 2.5W or less **NR2DW-32T65DT**: 2.5W or less **NR2DY-16R07DT**: 4.5W or less	**NR2JAX-08VMRDT**: 4.8W or less **NR2JAX-08IMRDT**: 4.8W or less **NR2JAX-04VMRDT**: 5.6W or less **NR2JAX-04IMRDT**: 6.3W or less
	LonWorks	**NR1LX-1606DT**: 1.6W or less **NR1LY-08R07DT**: 3W or less **NR1LW-11R80DT**: 1.6W 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
Type	**NR1□X-1606DT/NR1□W-16T65DT**
Rated input voltage	24V DC
Max. input voltage	26.4V DC
Ripple percentage	5% or less
Rated input current	7mA
Input type	No polarity
Input impedance	3.3kΩ
Operating voltage	ON voltage range: 15 to 26.4V OFF voltage range: 0 to 5V
Input delay time ON/OFF filtering time	OPCN-1, DeviceNet: 3ms/3ms SX bus: Can be changed collectively through parameter setup. * T-link: 5ms/5ms
No. of points per common	16 points/common (Mixture model: 8 points/common)
Isolation	Photocoupler
Dielectric strength	1500V AC, 1 minute (Between input terminals and frame ground)
Insulation resistance	10MΩ or more (500V DC megger) (Between input terminals and frame ground)
Mass	Approx. 240g

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

• Transistor output specifications

Item	Specification
Type	**NR1□Y-16T05DT/NR1□W-16T65DT**
Rated output voltage	24V DC
Allowable output voltage range	19.2-30V DC
Output format	Sink
Rated load current	0.5A/point (30V DC), 4A/common
Max. load current	0.6A/point (30V DC), 4.8A/common
Output voltage drop	1.5V or less (0.5A)
Output delay time	OFF to ON: 1ms or less ON to OFF: 1ms or less
Leakage current when OFF	0.1mA max.
Surge current	2A, 10ms
Surge suppresser circuit	Clamp diode
Common configuration	16 points/common (8 points/common only for mixture products)
Insulation method	Photocoupler insulation
Dielectric strength	1500V AC, one minute, between input terminals and FG
Insulation resistance	10MΩ or more with a 500V DC megger Between input terminals and FG
Mass	Approx. 240g

• Relay output specifications

Item	Specification
Type	**NR1□Y-08R07DT**
Rated output voltage	240V AC, 110V DC
Max. allowable output voltage	264V AC or less, 110V DC or less
Max. load current	30/240V DC: 2A/point, 110V DC: 0.2A/point
Output delay time	OFF to ON: 10ms or less ON to OFF: 10ms or less
Leakage current when OFF	None
Surge suppresser circuit	None
Min. load voltage, current	5V DC, 1mA
Max. open/close frequency	1800 times/hour
Common configuration	1 point/common
Insulation method	Relay insulation + photocoupler insulation
Dielectric strength	1500V AC, one minute, between output terminals and FG
Insulation resistance	10MΩ or more with a 500V DC megger Between output terminals and FG
Mass	Approx. 250g

(2) Four-axis pulse train output of SX bus compatible products

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

• Specifications

Item		Specification
Type		**NR1SF-HP4DT**
No. of control axes		4 axes
Speed command	Command signal	Pulse train command
	Max. command frequency	250kHz (Conditions: Shielding twist pair cable: 2m or less)
	Output type	Open collector, sink output
	Max. load current	50mA (24V DC)
	Insulation method	Photocoupler
	Signal type	forward pulse (CW) + reverse pulse (CCW)
Feedback pulse input		None
External pulse input		None
DI signal	No. of points	8 points (2 points / axis) Original point LS (x 4 ch) timing signal / Z phase (x 4 ch)
	Input type	Source input (Non voltage contactor input)
	Input model	DC (IEC 61131-2 type 2)
	Rated current	Approx. 4mA (24V DC)
	Input impedance	Approx. 5.6kΩ
	Insulation method	Photocoupler
	Common configuration	2 points (Extension can be used to the Common extension bar)
Occuipied words		Up to 40 words in total (input: 16words / output: 24words)
Mass		Approx. 240g

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

• Input specification

Item	Specification	
Type	**NR1LX-1606DT**	**NR1LW-11R80DT**
No. of input points	DI: 12 points, PI (Pulse input): 4 points *1	DI: 5 points, PI (Pulse input): 4 points *1
Input common composition	16 points/common	9 points/common
Input type	None polarity	Source input
Rated voltage	24V DC	
Max. voltage	26.4V DC	
Rated current	7mA	
Input inpedance	3.3kΩ	
Max. pulse input frequency	20Hz	
Pulse input measurement range	0-2147483648 (31 bits, incremental method)	
Standard operation range	OFF to ON 15 to 26.4V, ON to OFF 0 to 5V	
Input delay time	OFF to ON 10ms or less, ON to OFF 10ms or less	
Input type	DC (EN 61131 Type 2)	
Isolation method	Photo coupler	
Delating condition	None	
Mass	Approx. 240g	

* 1 PI can be used also as DI.

• Output specification

Item	Specification	
Type	**NR1LY-08R07DT**	**NR1LW-11R80DT**
No. of output points	DO: 8 points	DO: 2 points
Output common composition	1 point/common	
Rated voltage	240V AC 110V DC	
Max. load current	Relay output 30V DC/240V AC: 2A, 110V DC: 0.2A	
		Voltage output 24V DC: 50mA/point
Min. load current	5V DC: 1mA	
Output delay time	OFF to ON 10ms or less	
	ON to OFF 10ms or less	
Leakage current at the time of OFF	0.1mA or less (200V AC 60Hz)	
Surge protection	None	Varistor
Output protection	None	
Max. operating frequency	1800 times/hour	
Isolation method	Photo coupler+Relay	Relay
Output type	Relay output	Relay output or 24V DC voltage output
Delating condition	None	
Mass	Approx. 260g	

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

• Input specifications

Item	Specification
Type	**NR2DX-3206DT/NR2DW-32T65DT**
Rated input voltage	24V DC
Max. input voltage	26.4V DC
Ripple percentage	5% or less
Rated input current	5mA
Input type	No polarity
Input impedance	4.7kΩ
Operating voltage	ON voltage range: 15 to 26.4V OFF voltage range: 0 to 5V
Input delay time ON/OFF filtering time	3ms/3ms
No. of points per common	16 points/common (Mixture model: 8 points/common) x 2 circuits
Isolation method	Photocoupler
Dielectric strength	1500V AC, 1 minute (Between input terminals and communication terminals)
Insulation resistance	10MΩ or more (500V DC megger) (Between input terminals and communication terminals)
Delating condition	0 to 40˚C: None, 40 to 55˚C: 75%
Mass	Approx. 300g

• Transistor output specifications

Item	Specification
Type	**NR2DY-32T05DT/NR2DW-32T65DT**
Rated output voltage	24V DC
Allowable output voltage range	19.2-30V DC
Output format	Sink
Rated load current	0.5A/point (30V DC), 2A/common
Max. load current	0.6A/point (30V DC), 2A/common
Output voltage drop	0.1V or less (at 0.5A)
Output delay time	OFF to ON: 1ms or less ON to OFF: 1ms or less
Leakage current when OFF	0.1mA max.
Surge current	4A, 10ms
Surge suppresser circuit	Zener diode
Common configuration	32 points/common (16 points/common only for mixture products)
Isolation method	Photocoupler insulation
Dielectric strength	1500V AC, 1 minute Between output terminals and communication terminals
Insulation resistance	10MΩ or more with a 500V DC megger Between output terminals and communication terminals
Mass	Approx. 300g

• Relay output specifications

Item	Specification
Type	**NR2DY-16R07DT**
Rated output voltage	240V AC, 120V DC
Max. allowable output voltage	264V AC or less, 120V DC or less
Max. load current	30/250V DC: 2A/point, 110V DC: 0.2A/point
Output delay time	OFF to ON: 10ms or less ON to OFF: 5ms or less
Leakage current when OFF	None
Surge suppresser circuit	None
Min. load voltage, current	5V DC, 1mA
Max. open/close frequency	1800 times/hour
Common configuration	1 point/common
Isolation method	Relay insulation
Dielectric strength	1500V AC, 1 minute Between output terminals and communicatioin terminals
Insulation resistance	10MΩ or more with a 500V DC megger Between output terminals and communicatioin terminals
Mass	Approx. 340g

(5) Analog I/O specification

• Analog voltage input type

Item	Specification			
Type	**NR2JAX-08VMRDT**			
No. of input points	8 points			
Analog input range	0 to 5V	1 to 5V	0 to 10V	-10 to +10V
Input impedance	1MΩ			
Max. input voltage	±15V			
Input filter	Approx. 100μs or less (Hardware: Primary delay time constant)			
Resolution	1.25mV	1.25mV	1.25mV	1.25mV
Digital value (INT type)	0 to 4000		0 to 8000	-8000 to 8000
Measurement accuracy	±0.1% of F.S.R (Ta=23˚C ±5˚C) ±0.3% of F.S.R (Ta=0 to 55˚C)			
Sampling period	4ms or less / 8 points			
Response time	4ms or less / 8 points + transmission periods (ms)			
Occupied words	Input: 8 words			
Isolation method	Between analog input terminals and FG: Isolation Between analog input terminals and communication terminals: Isolation Between analog input terminals and channels: Not isolation			
Dielectric strength	500V AC, 1 minute, (Between analog input terminals and FG (Shorted current: 5mA))			
Insulation resistance	10MΩ or more (500V DC megger) (Between analog input terminals and FG)			
External connections	External power supply, analog input connection: Detachable screw terminals (M3) 38 poles Communication connection: Detachable screw terminals (M3) 3 poles			
Mass	Approx. 340g			

• Analog current input type

Item	Specification		
Type	**NR2JAX-08IMRDT**		
No. of input points	8 points		
Analog input range	±20mA	0 to 20mA	4 to 20mA
Input impedance	250Ω		
Max. input voltage	±30mA		
Input filter	Approx. 100μs or less (Hardware: Primary delay time constant)		
Resolution	2.5μA		
Digital value (INT type)	±8000	0 to 8000	
Measurement accuracy	±0.1% of F.S.R (Ta=23˚C ±5˚C) ±0.4% of F.S.R (Ta=0 to 55˚C)		
Sampling period	4ms or less / 8 points		
Response time	4ms or less / 8 points + transmission periods (ms)		
Occupied words	Input: 8 words		
Isolation method	Between analog input terminals and FG: Isolation Between analog input terminals and communication terminals: Isolation Between analog input terminals and channels: Not isolation		
Dielectric strength	500V AC, 1 minute, (Between analog input terminals and FG (Shorted current: 5mA))		
Insulation resistance	10MΩ or more (500V DC megger) (Between analog input terminals and FG)		
External connections	External power supply, analog input connection: Detachable screw terminals (M3) 38 poles Communication connection: Detachable screw terminals (M3) 3 poles		
Mass	Approx. 340g		

• Analog voltage output type

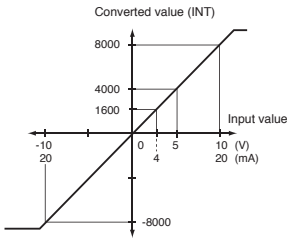
Item	Specification			
Type	**NR2JAY-04VMRDT**			
No. of input points	4 points			
Analog output range	0 to 5V	1 to 5V	0 to 10V	-10 to +10V
Load impedance	1kΩ or more	1kΩ or more	2kΩ or more	2kΩ or more
Resolution	1.25mV	1.25mV	1.25mV	1.25mV
Digital value (INT type)	0 to 4000		0 to 8000	-8000 to 8000
Measurement accuracy	±0.1% of F.S.R (Ta=23˚C ±5˚C) ±0.3% of F.S.R (Ta=0 to 55˚C)			
Sampling period	2ms or less / 4 points			
Response time	2ms or less / 4 points + transmission periods (ms)			
Load short protection	Provided			
High frequency noise (100kHz or more)	150mVp-p or less			
Output ripple	50mVp-p or less			
Occupied words	Output: 4 words			
Isolation method	Between analog input terminals and FG: Isolation Between analog input terminals and communication terminals: Isolation Between analog input terminals and channels: Not isolation			
Dielectric strength	500V AC, 1 minute, (Between analog input terminals and FG (Shorted current: 5mA))			
Insulation resistance	10MΩ or more (500V DC megger) (Between analog input terminals and FG)			
External connections	External power supply, analog input connection: Detachable screw terminals (M3) 38 poles Communication connection: Detachable screw terminals (M3) 3 poles			
Mass	Approx. 340g			

• Analog current output type

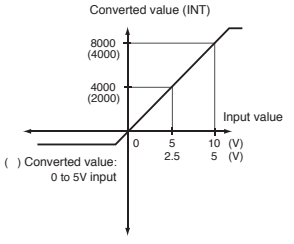
Item	Specification	
Type	**NR2JAY-04IMRDT**	
No. of input points	4 points	
Analog output range	0 to 20mA	4 to 20mA
Load impedance	500Ω or less	
Resolution	2.5μA	
Digital value (INT type)	0 to 8000	
Measurement accuracy	±0.2% of F.S.R (Ta=23˚C ±5˚C) ±0.4% of F.S.R (Ta=0 to 55˚C)	
Sampling period	2ms / 4 points	
Response time	2ms or less / 4 points + transmission periods (ms)	
High frequency noise (100kHz or more)	300μAp-p or less	
Output ripple	100μAp-p or less	
Occupied words	Output: 4 words	
Isolation method	Between analog input terminals and FG: Isolation Between analog input terminals and communication terminals: Isolation Between analog input terminals and channels: Not isolation	
Dielectric strength	500V AC, 1 minute, (Between analog input terminals and FG (Shorted current: 5mA))	
Insulation resistance	10MΩ or more (500V DC megger) (Between analog input terminals and FG)	
External connections	External power supply, analog input connection: Detachable screw terminals (M3) 38 poles Communication connection: Detachable screw terminals (M3) 3 poles	
Mass	Approx. 350g	

• Characteristec of the analog voltage/current input type

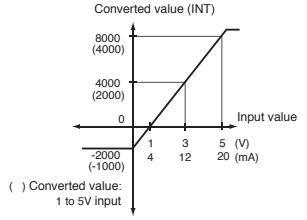
±10V, ±20mA



0 to 5V, 0 to 10V

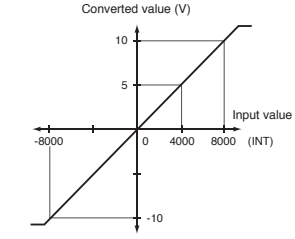


1 to 5V, 4 to 20mA

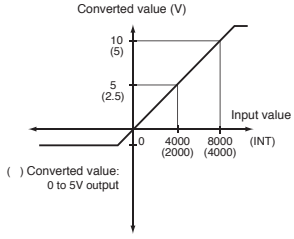


• Characteristec of the analog voltage/current output type

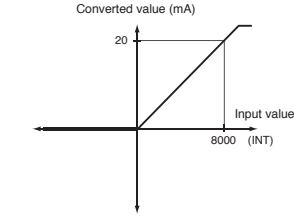
±10V



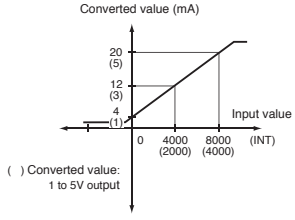
0 to 5V, 0 to 10V



0 to 20mA



1 to 5V, 4 to 20mA



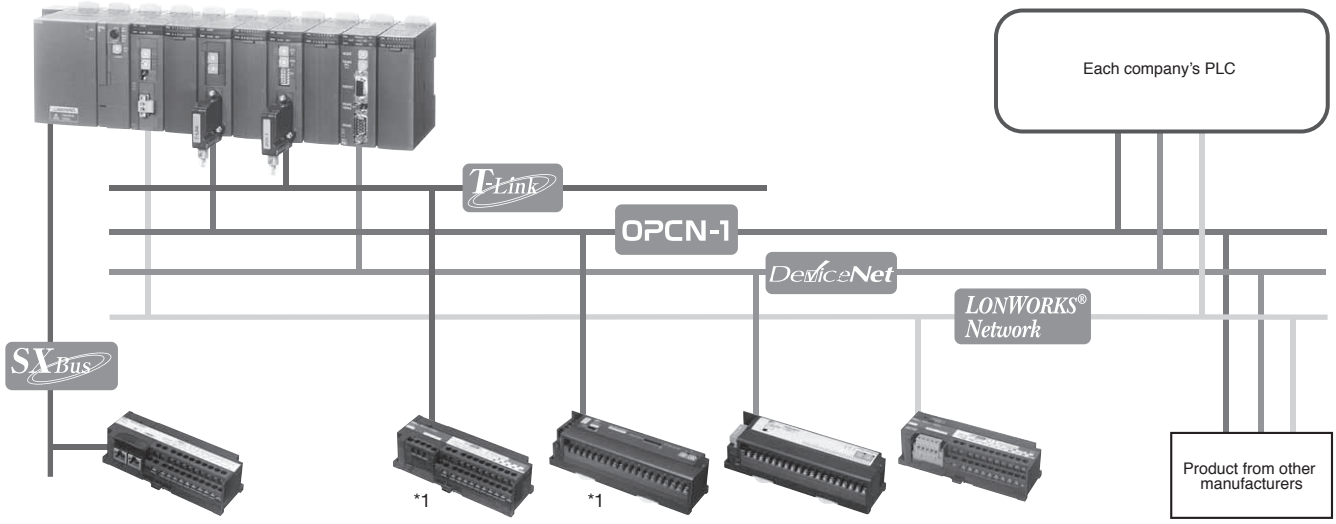
• Communication specifications

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

*1 When the master module of MICREX-SX series is used
*2 The maximum number of the I/O terminal connections are each 10 units at inside and outside per one base board.
Consumes the SX bus transmission power supply by 25mA per one I/O terminal.

■ System configuration

<MICREX-SX: SPH>



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

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

NP1L-AS2
AF00-196

■ Features

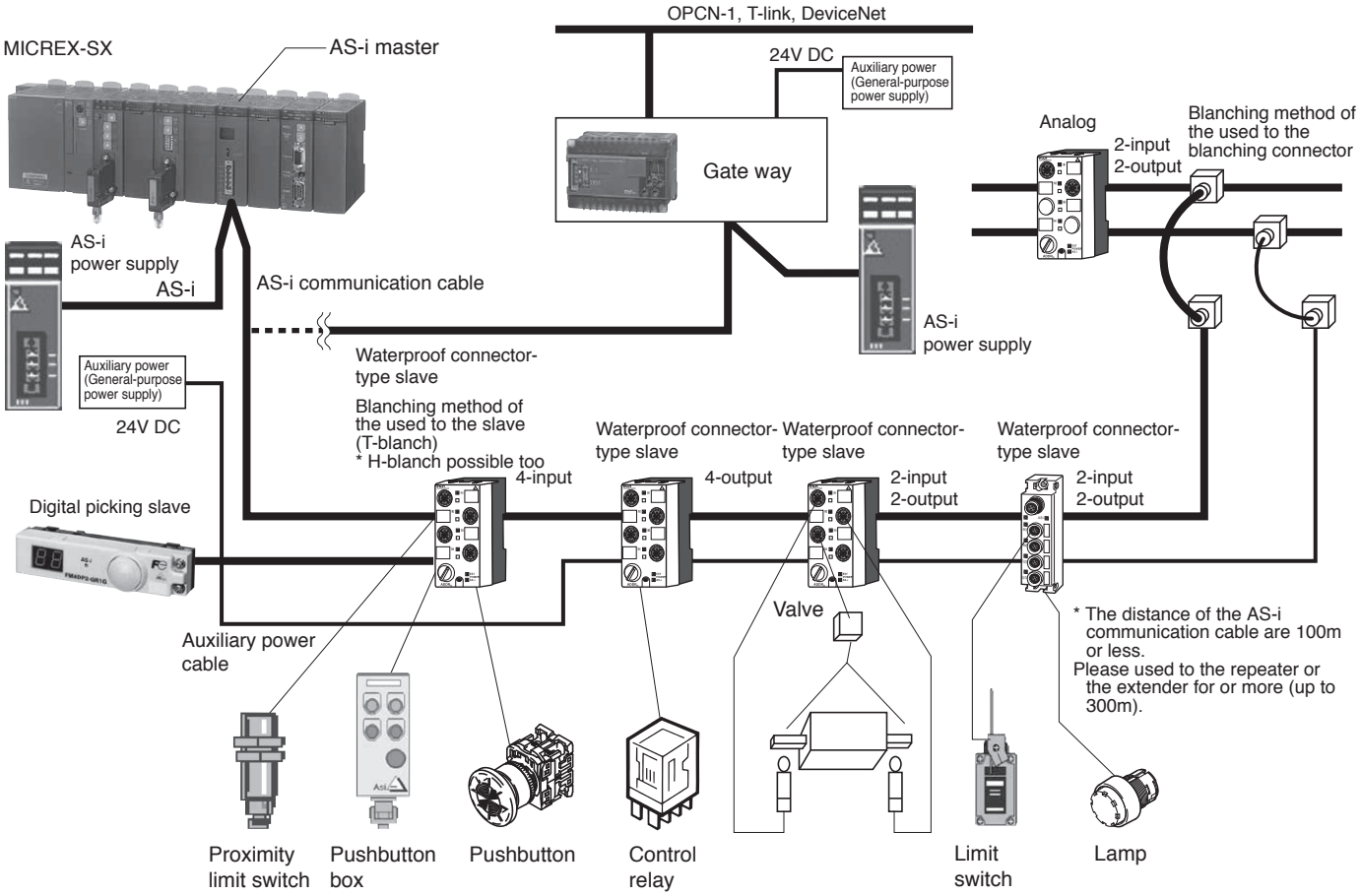
- The **NP1L-AS2** is based on the AS-i communication protocol Version 2.1.
- Up to 12 units can be connected in a single system configuration. configuration.
- Can be connected to diverse types of actuators and sensors conforming to the AS-i Standards.
- Line length: Total 100m
- Up to 62 slave stations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

■ Communication specifications

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

■ System configuration

- System configuration example with the AS-i master
- System configuration example via the gate way



S-LINK Master Module: NP1L-SL1

■ Features

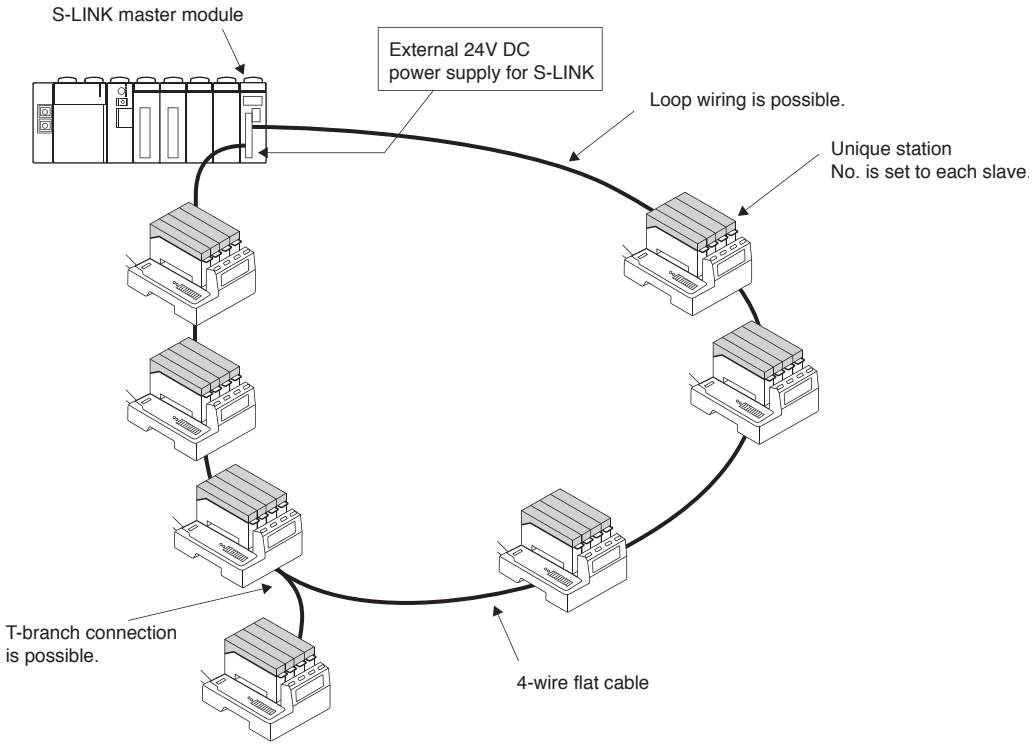
- Connected to the S-LINK (bit) level serial transmission provided by SUNX.
- 128-point I/O control can be performed for each master station. There is no limitation on the number of master connections.

NP1L-SL1
AF01-102

■ Communication specifications

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

■ System configuration



Remote Terminal Master/Slave Module: NP1L-RM1

■ Features

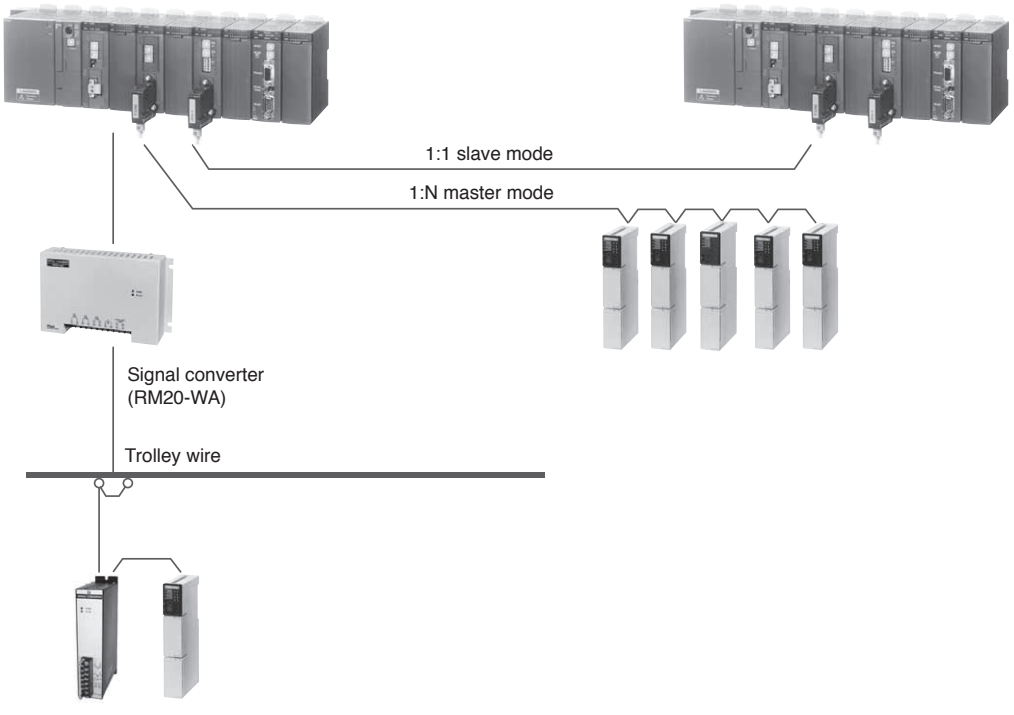
- Connectable to Fuji Electric's RM20 and RM21 remote terminal series.
- Data can be transmitted up to 5km between master/slave modules and remote terminals.
- The use of a signal converter makes it possible to use existing, unoccupied cables and trolley lines.

NP1L-RM1
GKDD06-002

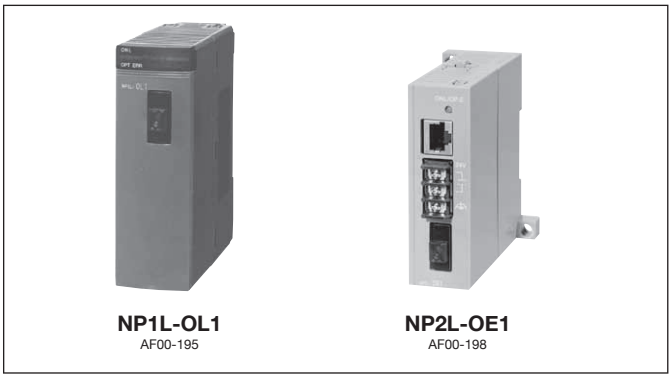
■ Communication specifications

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

■ System configuration



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).

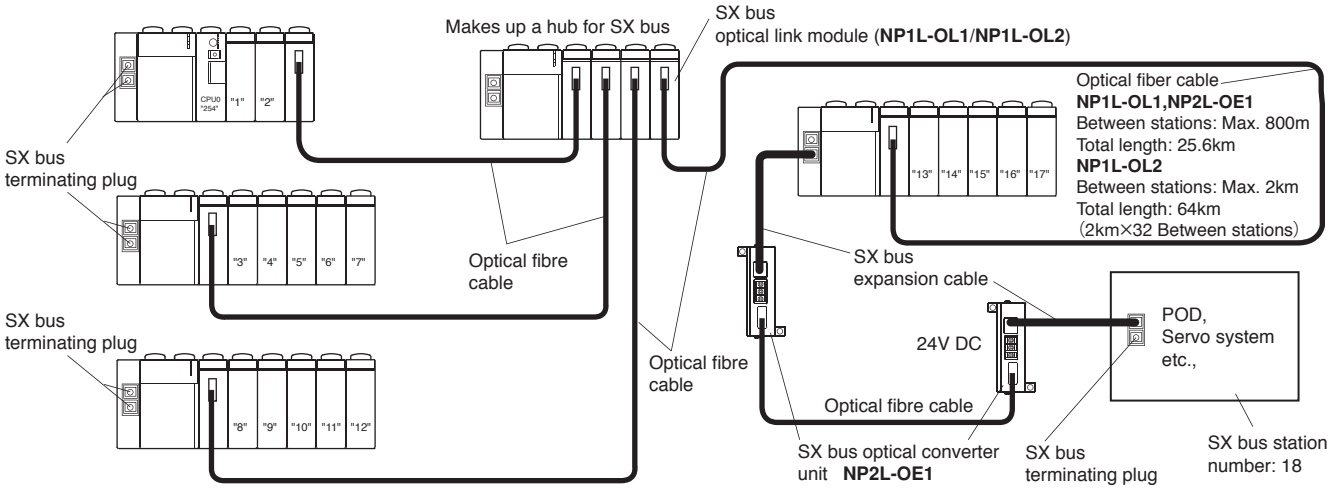
■ Transmission specifications

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 (External power supply) * 2	Rated input voltage	24V DC, 70mA or less	–	
	Rush current	165mA or less: When a switching power supply is used* 3 50Ao-p-70μs: When 24V DC is directly turned ON	–	
Mass		Approx. 155g	Approx. 135g	

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

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

■ System configuration



SX Bus Electric Repeater Unit: NP2L-RP1

■ Features

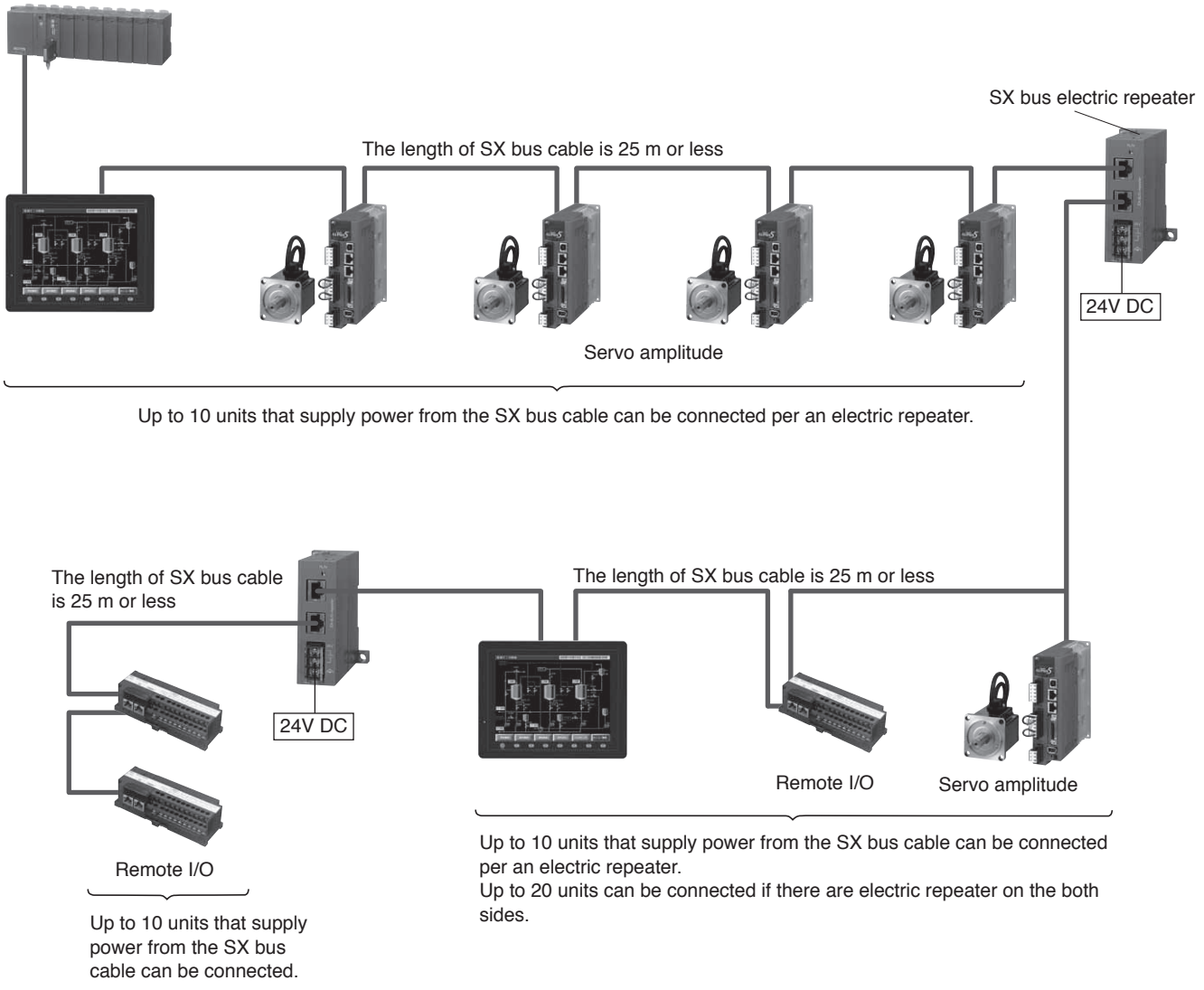
- SX bus connection using another 25m electric cable is enabled by correcting the signal waveforms of the SX bus electric cable.
- Up to three units can be used in one SX system, increasing the total extension length of the SX bus electric cable to a maximum of 100m.

NP2L-RP1
KD03-017

■ Specifications

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

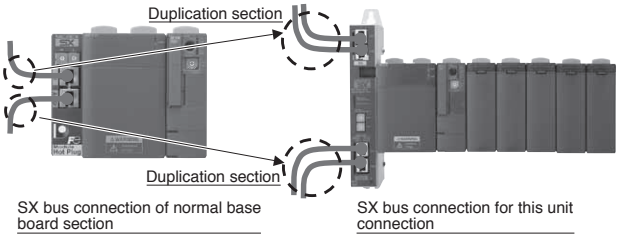
■ Example of the system configuration



SX bus duplication unit: NP2L-BH1

■ Features

- It is a unit to duplicate the SX bus cable from the base board.
  It is installed on the left side of the base board (adjacent to the SX bus connector of the base board) to physically separate the SX bus into 2 systems.
- The duplicated SX bus which allows the continued bus communication even when a line disconnection can be applicable to ships, power plants and vehicle systems that require high reliability.



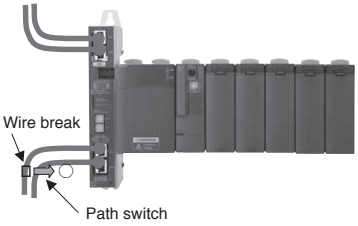

NP2L-BH1
KDD11-001

■ Specifications

Item	Specification
Communication method	SX bus communication (conforming to the SX bus transmission specifications)
Number of systems	2 systems of IN and OUT
Transmission rate	25Mbps (conforming to the SX bus transmission specifications)
Interface connection shape	SX bus extension connector (modular jack)
No. of connections	Maximum 10 units
Connection distance	Maximum 25m distance between units, Total 100m length
Power supply	Unnecessary external power supply (24V SX bus cable used)
Station address setting function	Available (using the station address setting rotary switch on the unit)
Installation method	Independent type (no slots on the base board occupied)
Occupied number of I/O points	Input: 16 points (They are used for the status area and have no actual input function.)
Internal current consumption	24V DC 120mA or less
Pick-up power source	Operated by 24V DC from the SX bus cable.
Mass	Approx. 500g

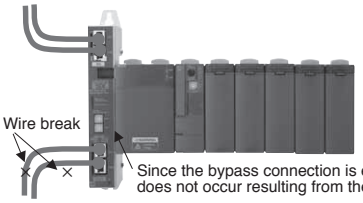
■ Duplication operation

- Switch operation
  When a broken wire is detected, the path is switched to another SX bus cable.

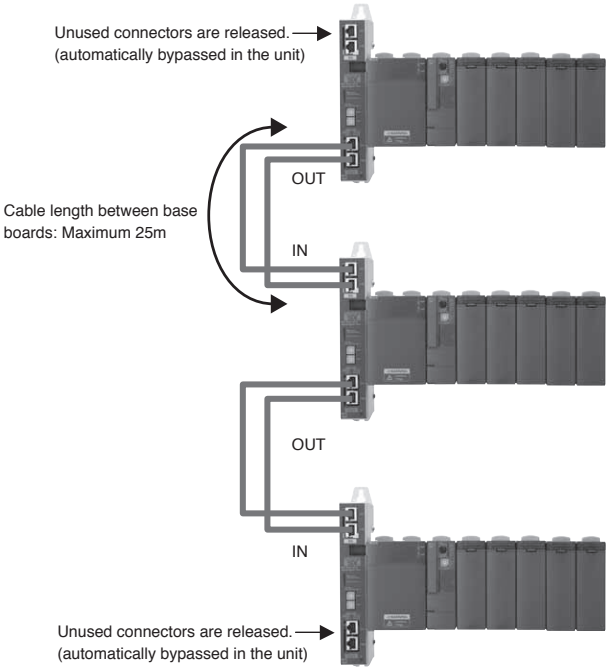


■ Bypass function

- When the SX bus signals on both paths are stopped, the SX bus signals are looped back and the bypass connection is established in the duplication unit. (The SX bus disconnection is prevented.)



■ Example 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. 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 Optical converter for OCT T-link system	[Constraint] OCT: Up to three units	[Constraint] OCT: Up to 16 units	[Constraint] OCT: Up to 16 units	[Constraint] OCT: Up to 16 units	[Constraint] OCT: Up to 8 pairs (16 units)
Example of optical P/PE-link system configuration Optical converter for OCP P/PE-link system	[Constraint] OCP: Up to 16 units (P-link) Up to 64 units (PE-link)	[Constraint] OCP: Up to 16 units (P-link) Up to 64 units (PE-link)		[Constraint] OCP: Up to 16 units (P-link) Up to 64 units (PE-link)	[Constraint] OCP: Up to 8 pairs (16 units) (P-link) Up to 32 pairs (64 units) (PE-link)
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

FNC160A-C20
KKD10-008

■ 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 1 km when a pair of T-KPEV-SB 1.25 mm2 cables manufactured by Furukawa Electric Co. is used 700 m when a pair of TKPEV-SB 0.75 mm2 cables manufactured by Furukawa Electric Co. is used
Model compatible with optical fiber	Type	Multimode quartz glass fiber (2-core)
	Refractive index profile	GI type
	Core diameter/Clad diameter	50/125 µm
	Numerical aperture	0.2
	Transmission loss	3 dB/km
Compatible with optical modules	Optical connector	SC type connector
	Emission wavelength	860 nm (typ)
	Permissible loss (transmit, receive)	10 dB or below (when 3 dB/km fiber is used: 3 km)

P/PE-link Optical Converter : FNC360A-C20

FNC360A-C20
KKD10-007

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

Memory Card Interface Module: NP1F-MM1

NP1F-MM1
AF99-14

■ Features

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

■ Performance specifications

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

■ Functional specifications

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

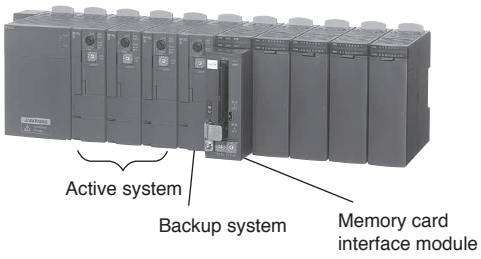
■ Memory card selection reference

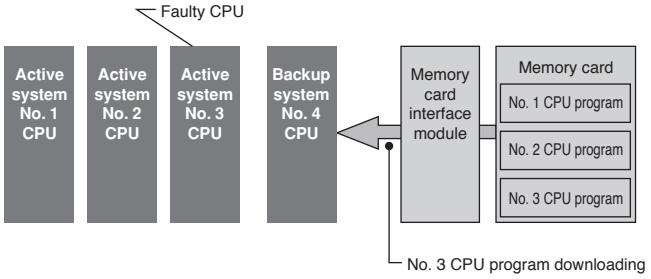
Item	Specification (Example)	Application restrictions and conditions	Remarks
Power supply voltage	5 ±0.25V DC	Available if the product is specified for 5V	
Current consumption	90mA or less at 5V DC	**NP1F-MM1**: Available if the total is 300mA or less.	
Operating temperature range	0 to 60˚C	When a memory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

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

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

■ System configuration





Dummy Module: NP1F-DMY

■ Features

- When your system will be expanded in the future, the dummy module can be used as a substitute for the extension module.
- If an active module has failed during operation of the system, the system can be restarted when you replace the failed module with the dummy module (which, however, cannot perform the functions of the failed module).

NP1F-DMY
AF00-44

■ Specifications

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

Multiuse Communication Module: NP1F-MU1

■ Features

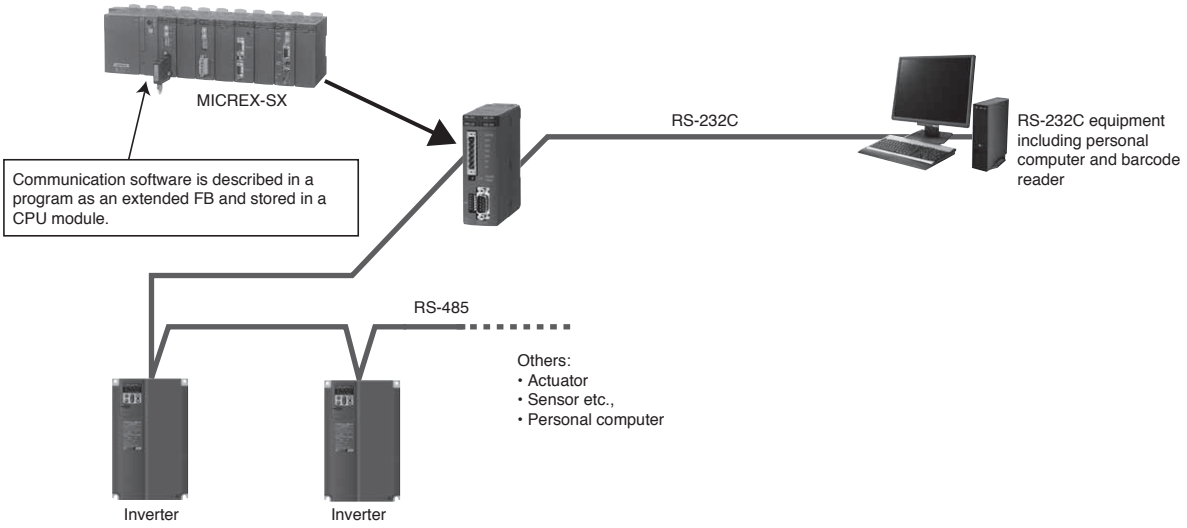
- High-speed communication (RS-485: max. 460.8 kbps) with actuators and sensors can be implemented.
- Optimal communication with devices of various manufacturers can be implemented by freely creating a communication protocol. Protocols can be created by modifying the sample FB.
- Microcomputer circuit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

NP1F-MU1
KDD05-018

■ Performance specifications

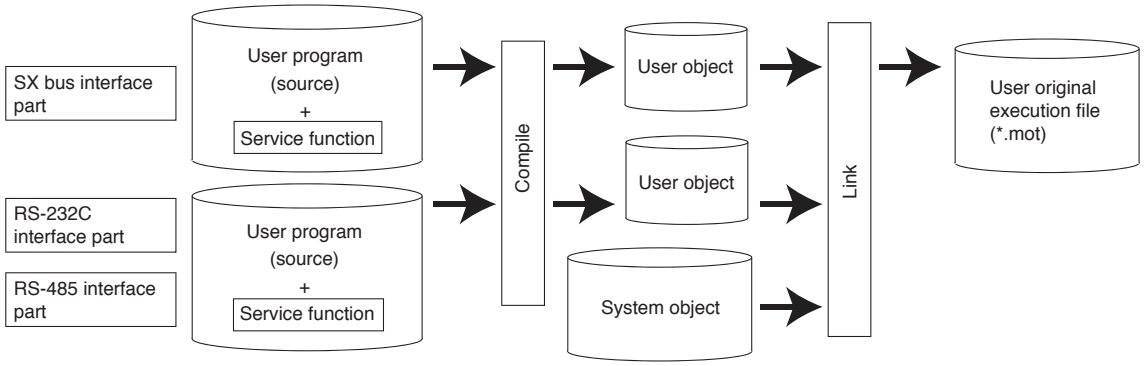
Item	Specification	
Type	**NP1F-MU1**	
Port	RS-232C	RS-485
No. of ports	1 channel	1 channel
Transmission method	Half-duplex communication method	
Synchronisation method	Start-stop synchronous transmission	
Transmission speed	300/600/1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200bps	300/600/1,200/2,400/4,800/9,600/19,200/38,400/57,600/115,200/230,400/460,80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

■ System configuration



■ Outline of Original Firmware Development

Original high-speed communication modules can be built by combining user programs developed in C language programming, service functions for multiuse communication modules that can be downloaded from homepages, and system objects.



Flowmeter F/AD Conversion Module: NP1F-PI4

■ Features

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

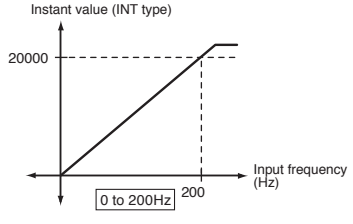
■ Specifications

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

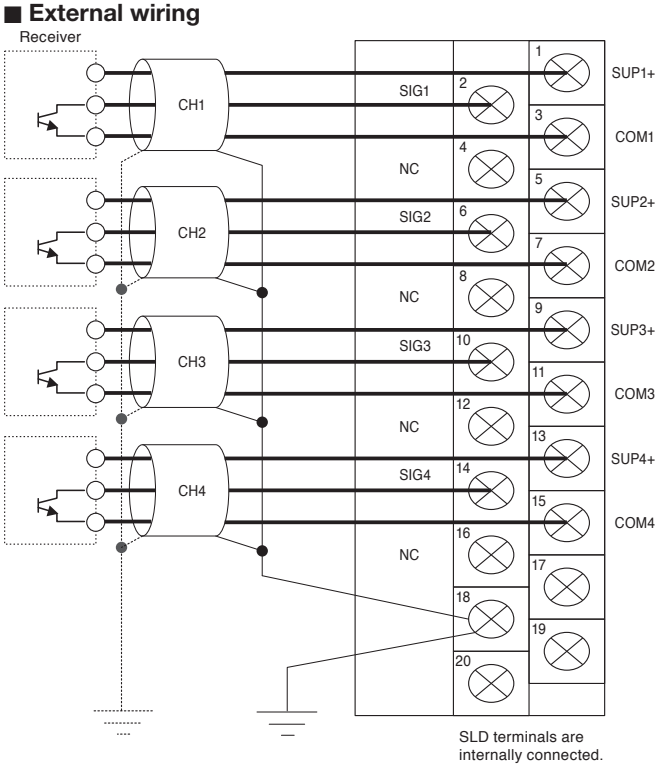
* 1 An ambient air temperature during short circuit should be 40°C or less.
* 2 This can be reduced according to the used number of channels and the used number of sensor power supplies. For more information, refer to User's Manual FEH431.

■ Characteristic diagram

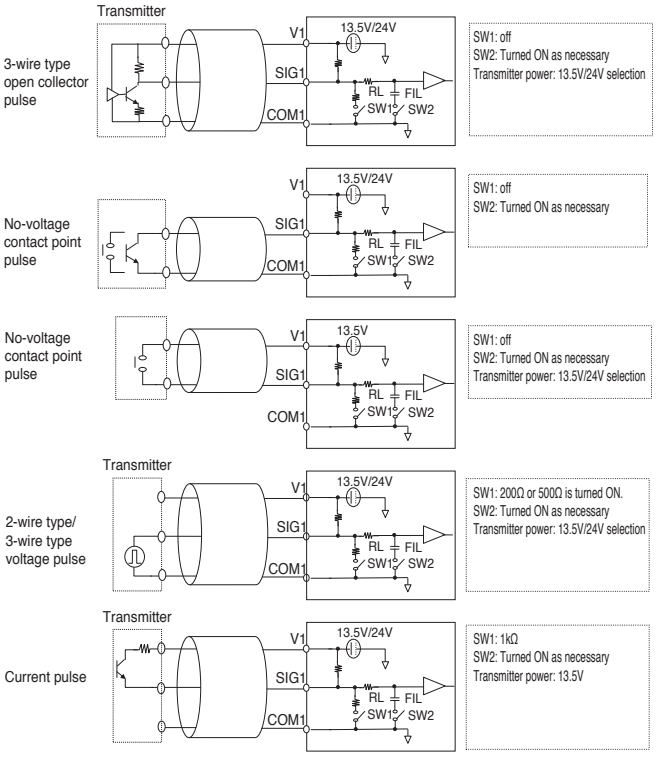
In the case of the input frequency range: 0 to 200Hz, and the instant value unit (INT type): 0 to 23000.



■ External wiring



■ Filter setting switch transmitter



High-speed Counter Module: NP1F-HC □

■ Features

NP1F-HC2 □

- Fast input pulses can be counted up to 2-channels.
- Compatible with 3 types of input signals.
  1) 90° phase-difference pulse
  2) Forward/reverse pulse
  3) Pulse + sign
- 4 types of operation modes
  1) Ring operation
  2) Gating operation
  3) Compare detecting operation
  4) Phase-Z detecting operation
- Since the input voltage for **NP1F-HC2MR** supports DC 5/12/24 V, it becomes possible to standardize the external power supply at DC 24 V and to improve pulse input connectivity.
- The pulse input filter of **NP1F-HC2MR1** is set so that connection with the inverter FRENIC5000 VG7 of Fuji Electric is optimized.

NP1F-HC8

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

NP1F-HC2
AF97-520

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

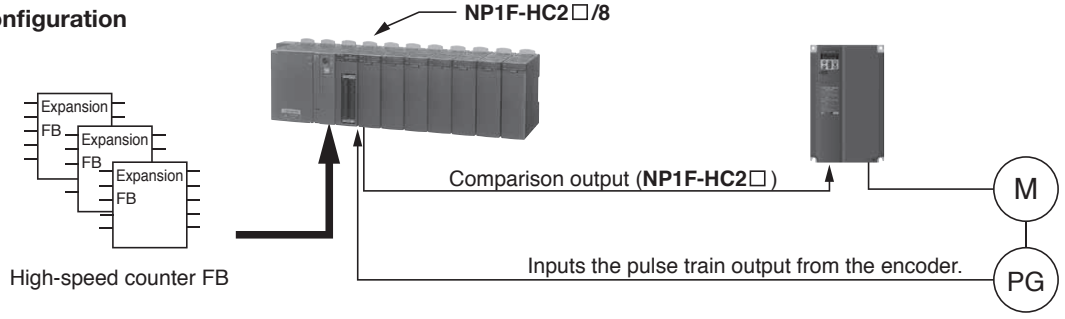
■ Performance specifications

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

■ Functions

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

■ System configuration



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

■ Features

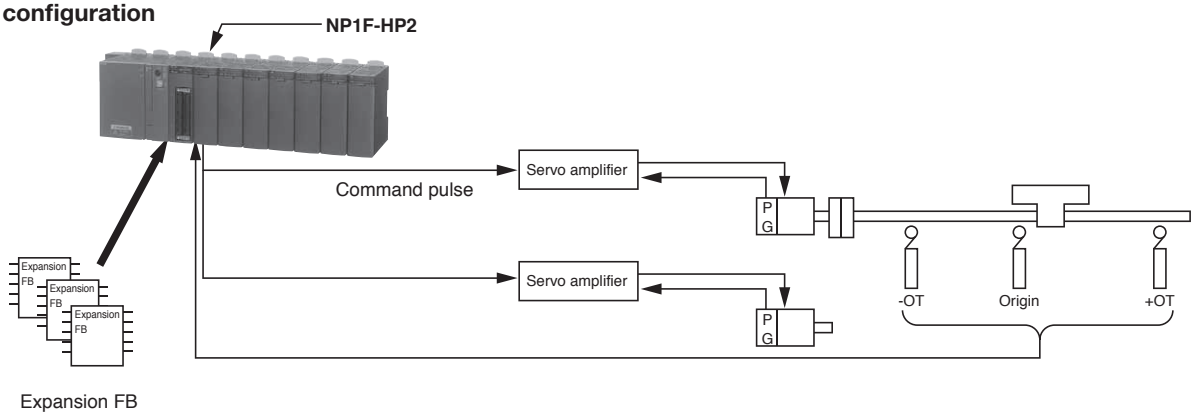
- Combined with the servo amplifier motor of the pulse train command input type or the stepping motor driver allows high-precision positioning.
- Use of an expansion FB facilitates embedding necessary functions including axis-independent single-function positioning to multi-axis simultaneous start positioning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

NP1F-HP2
AF97-517

■ Performance specifications

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

■ System configuration



Expansion FB

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

■ Features

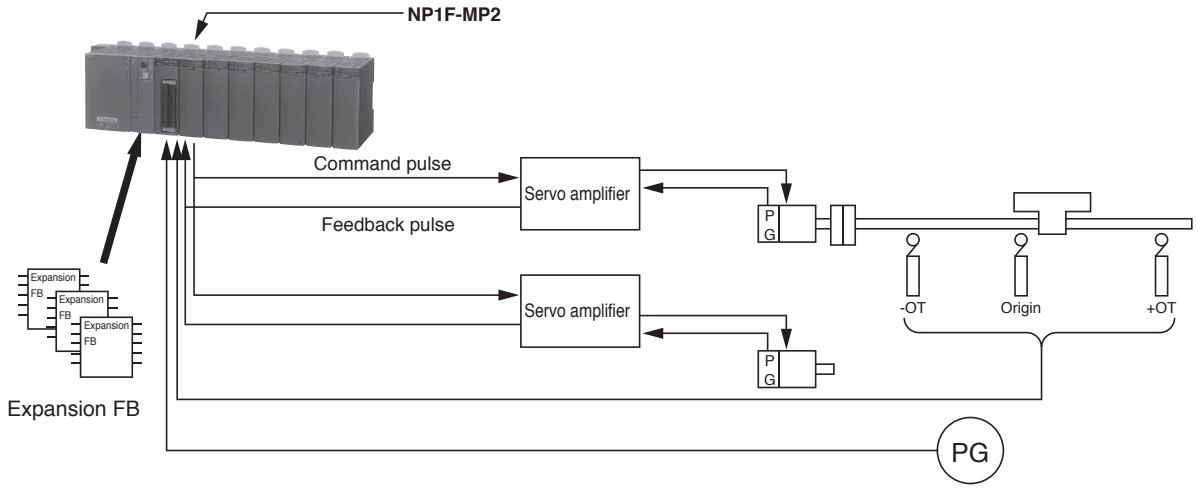
- Combined with the servo amplifier motor of the pulse train command input type or the stepping motor driver allows high-precision positioning.
- Use of an expansion FB facilitates embedding necessary functions including axis-independent single-function positioning to multi-axis simultaneous start positioning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

NP1F-MP2
AF97-518

■ Performance specifications

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

■ System configuration



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

NP1F-MA2
AF97-519

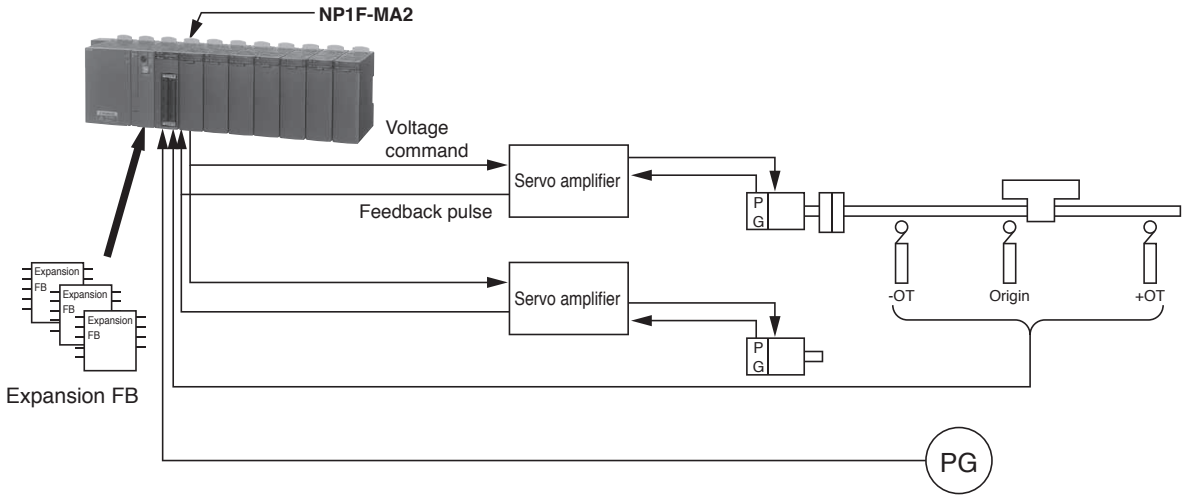
■ Features

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

■ Performance specifications

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

■ System configuration



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

■ Features

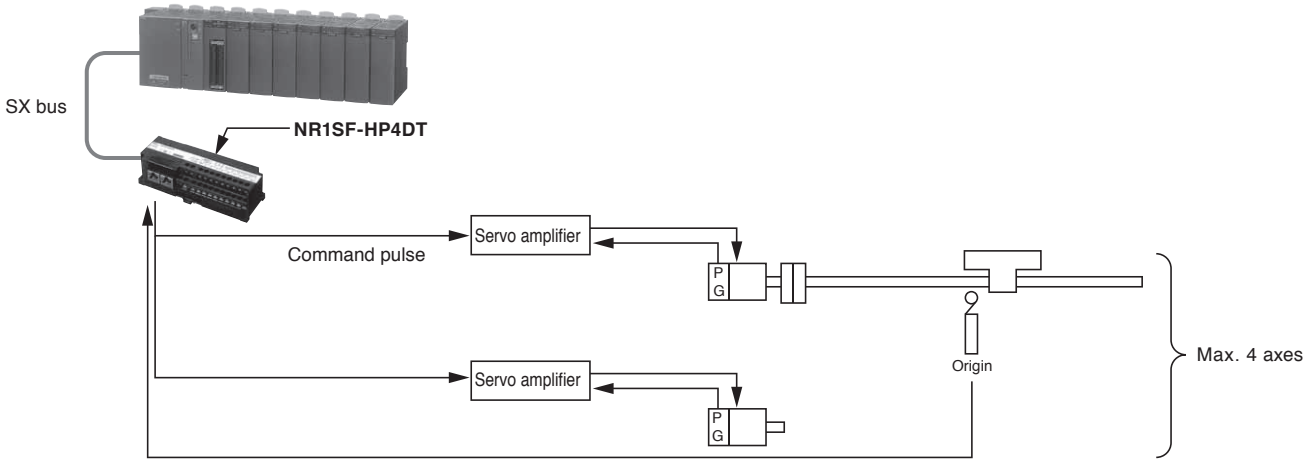
- Combination of this module and driver for servo amplifier and motor of pulse sequence command input type or driver for stepping motor allows you to carry out highly precise positioning.
- Minimum program for data setting and command operation that does not need an expansion FB allows you to control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

NR1SF-HP4DT

■ Performance specifications

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

■ System configuration



■ 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).	○	○	○	○	○	○	○
		Counts the feedback pulse and detects the current feedback value (multiplied by 4).		○	○	○	○	○	
6	Phase-Z position detect (Origin return operation)	Detects the command position at the phase-Z rising edge (or falling edge).	○	○	○				○
		Detects the deviation amount at the phase-Z rising edge (or falling edge).		○	○	○	○	○	
		Detects the current feedback position at the phase-Z rising edge (or falling edge).		○	○	○	○	○	
7	Interrupt position detect (Interrupt positioning operation)	Detects the command position at the rising edge (or falling edge) of the external interrupt signal.	○	○	○				○
		Detects the deviation value at the rising edge (or falling edge) of the external interrupt signal.		○	○	○	○	○	
		Detects the current feedback position at the rising edge (or falling edge) of the external interrupt signal.		○	○	○	○	○	
8	Automatic-start frequency setting	Allows the user to set the automatic-start frequency.	○	○		○			○
9	Trapezoidal acceleration/ deceleration computation	Computes trapezoidal acceleration/deceleration.	○	○		○			○
10	Deceleration point automatic computation	Automatically computes the deceleration point.	○	○		○			○
11	Continuous frequency change	Continuously updates the command frequency of the pulse generator.	○	○		○			○
12	Command pulse count additional setting	Sets the additional command pulse count during pulse generator output.	○	○		○			○
13	Pulse output stop processing	Two types of acceleration can be selected for trapezoidal deceleration when the pulse output is interrupted.	○	○		○			○
14	Emergency stop processing	Carries out quick stop when an emergency stop error is detected.	○	○					○
		Immediately stops the pulse output.			○				
		Immediately clears the speed command voltage to 0V.				○	○	○	
15	Over travel (Plus or minus error detection)	Carries out deceleration and stop when a +/-OT error is detected.	○	○		○			○
		Immediately stops the pulse output.			○				
		Performs exponential deceleration and stop.					○	○	
16	Transmission error monitoring	Monitors a module control program error on the CPU module side, and carries out quick stop when a transmission error is detected.	○	○		○			○
		Immediately stops the pulse output.			○				
		Performs exponential deceleration and stop.					○	○	
17	External pulse count	Counts the external input pulse for manual pulse unit operation or synchronous operation.		○	○	○	○	○	
18	Positioning data first read	Up to four items of positioning data per axis can be registered in the FIFO buffer. The registered positioning data is executed sequentially. It is also possible to make additional settings in the FIFO buffer during operation.		○		○			
19	Positioning data write	Sets additional positioning data during continuous frequency change processing.		○		○			
20	External input signal detect	Detects the input status of all DI signals.	○	○	○	○	○	○	○
21	External output signal setting	All DO signals can be switched with the CPU module.	○	○	○	○	○	○	○

Functional Extension FB Software

■ **Easily realizes functional extension by software**

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

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

■ **Diagnostic FB**

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

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

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

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

■ **PID FB**

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

Extension FB realizing the temperature regulation system operation function

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

Note: This Function Extension FB Software can be downloaded from our homepage at no charge.

Programming Support Tool

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

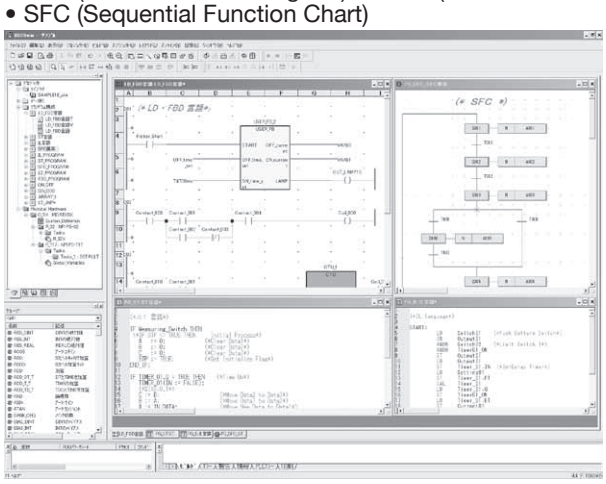
■ **Features**

• Complete conformity to IEC 61131-3 International Standard

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

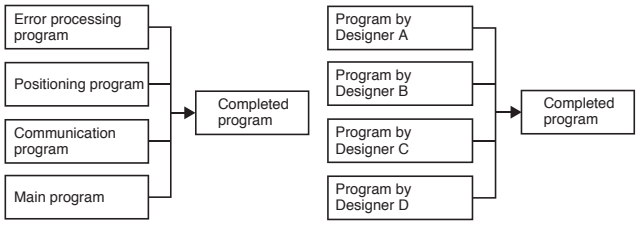
• Supported representations

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



• Structured programming

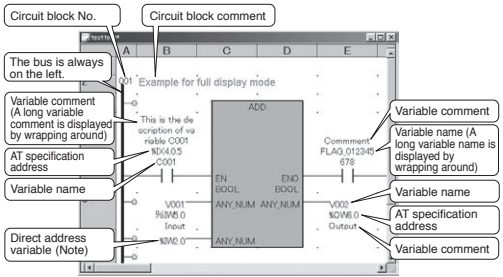
Programming in units of POU or worksheets allows the use of the structured design method by which a program is created by dividing it by functionality or process. This method enables multiple designers to divide the program design among them so that substantial reduction in the program creation time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



• Ladder programming using key operations (grid fixed method)

Ladder programming can be performed using familiar key operations:

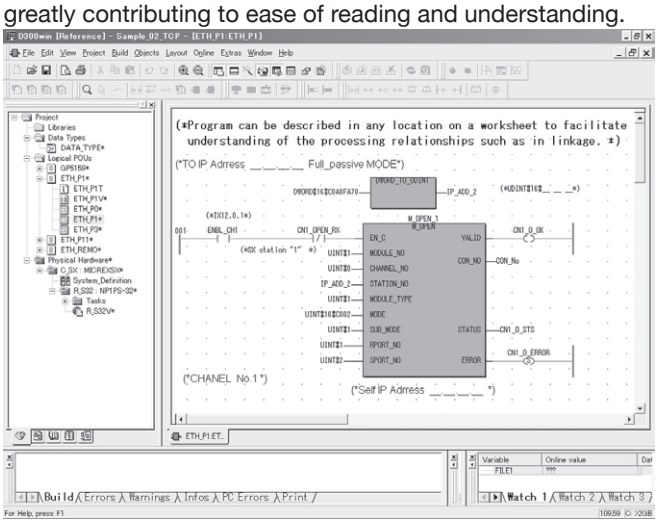
· Standard display mode (variable only)
· Extended display mode (variable + AT specification address)
· All display mode (variable name + AT specification address + variable comment)



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

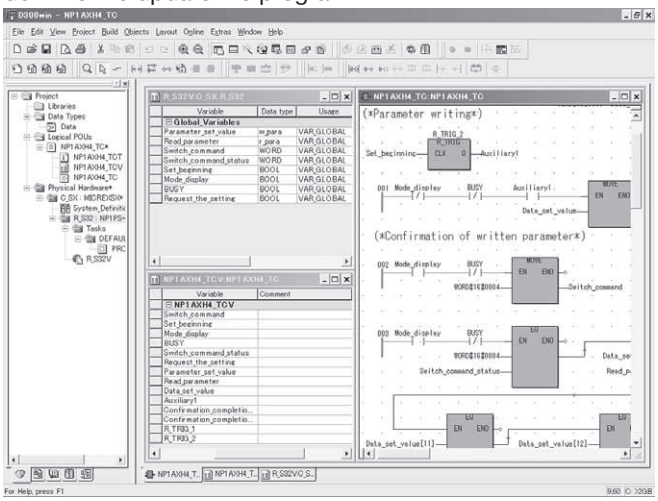
• Free description of programs and comments (Free editing style)

Programs can be described in any location on a worksheet to facilitate understanding of the processing relationships such as in linkage between the interlock condition and the sequence processing section/computing section, allowing efficient programming.
In addition, when a comment is described on a worksheet, the programmer can put a local comment for each circuit block as well as a comment in units of contacts, coils, or circuits, greatly contributing to ease of reading and understanding.



• Programming with variables (labels)

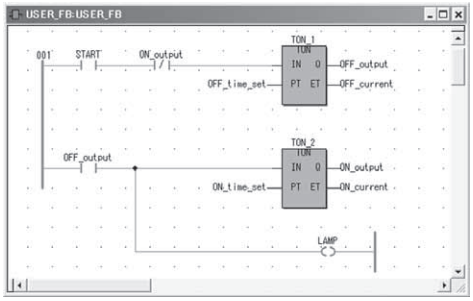
Differing from conventional programming, the Expert (D300win) Programming Support Tool uses label programming (addresses are automatically assigned) in which the address section is described like conventional comments, enabling program coding without being conscious of memory addressing. After the programming,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



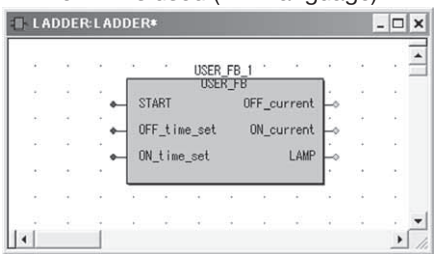
• Integrates user-original circuits into an FB

Frequently used routine programs or circuits can be integrated into an FB so that the programmer can easily reuse them. For FB generation, the user can select a language compatible with IEC 61131-3 supported by Expert (D300win) instead of a special language. If the programs or circuits are stored in library form, the target function can be effectively used without being conscious of debugging.
This is also effective for circuit standardization or structuring if a single control block is integrated into an FB.

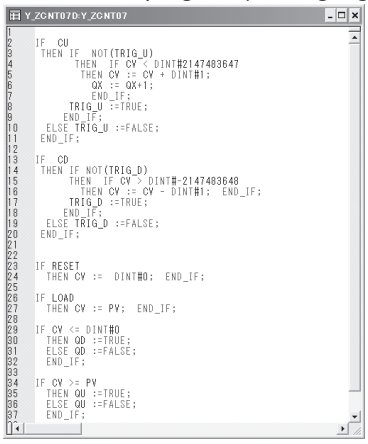
• FB internal program (LD/FBD language)



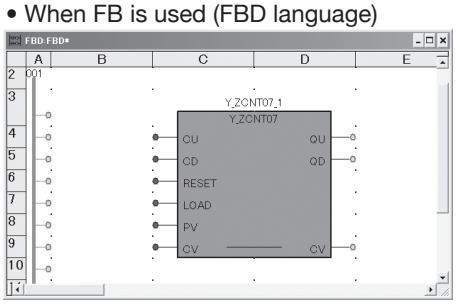
• When FB is used (FBD language)



• FB internal program (ST language)

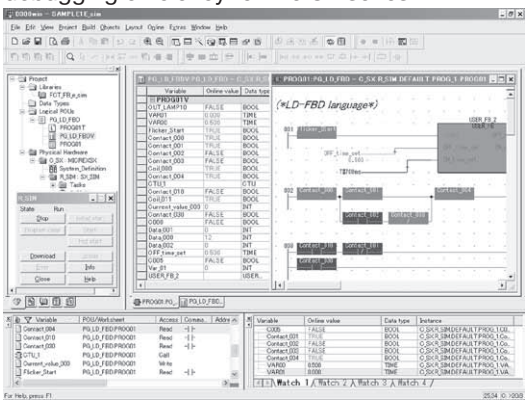


• When FB is used (FBD language)



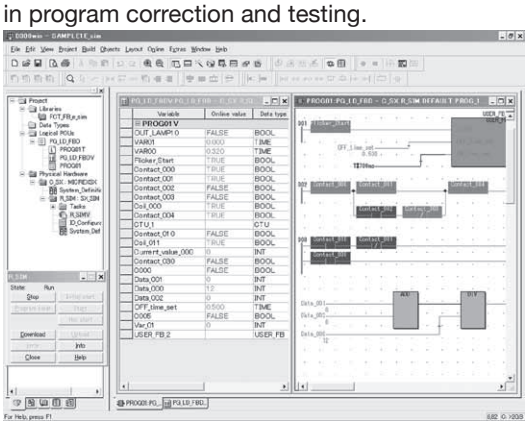
• Simulation function

This tool enables program logic test using the software PLC function for simulation built in Expert (D300win), without using the actual unit.
It performs operating simulation of a program written with a programming language conforming to IEC 61131-3. It enables forced ON/OFF and monitoring of any signal, exhibits its power in remarkable improvement of the programming and debugging efficiency for the SX series.



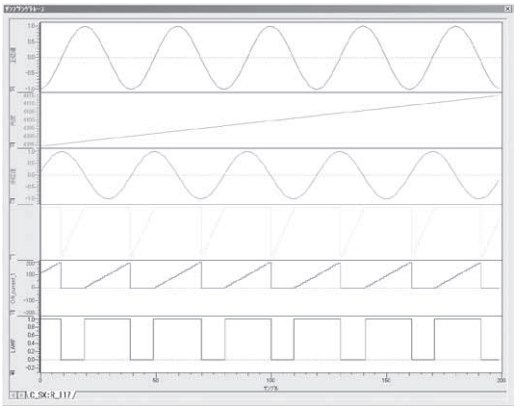
• Error & jump check function

The tool performs program syntax check at the time of program compilation to detect syntax errors. It is possible to jump to an error position by double-clicking an error detection section. This function, together with the cross-reference function and data watch window function, exhibits its power in program correction and testing.



• Sampling trace

Sampling trace function saves variable (memory) data change during PLC is in RUN. It is possible to show sampling data on sampling trace window as graph. Sampling data is automatically saved with project file. This saved sampling data can be exported as csv file (ASCII data).



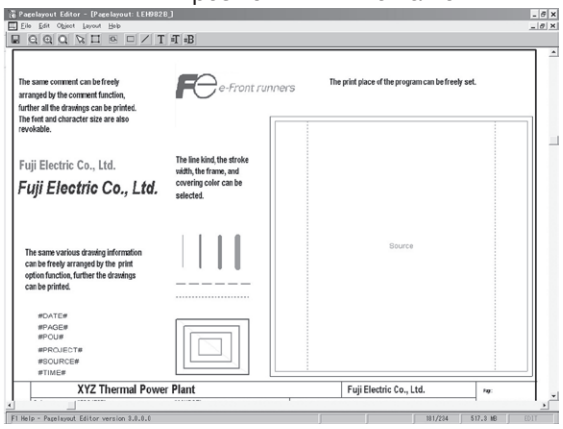
• Documentation function

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

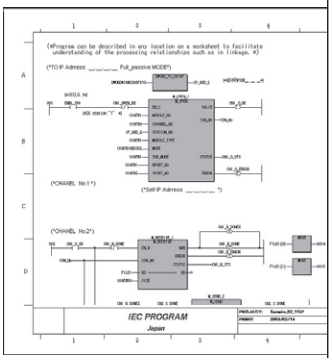
The layout function allows the user to print a program list in a free, user-original format. The created layout can be stored as a layout library, which can be used when necessary.

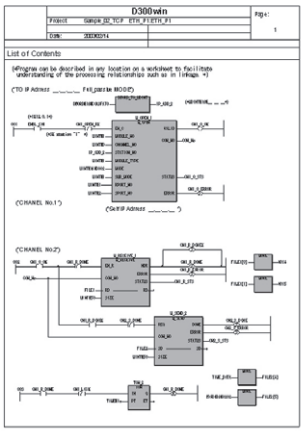
Frame creation: Program list can be printed with frames. The frames can be freely designed facilitating reproduction of a conventionally used drawing sheet.
Company logo: Company logo can be attached to a document. It is created as BMP data and pasted to the frames.
Drawing number: Drawing number can 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

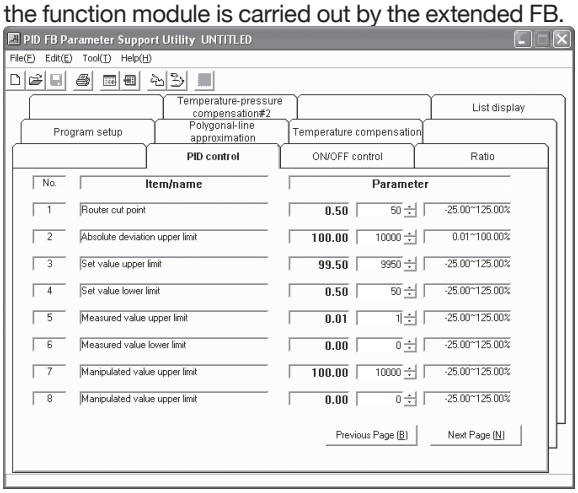
The function module support (built-in each extended FB software package) has been realized as a common support tool. Thus, a dedicated loader is not required.

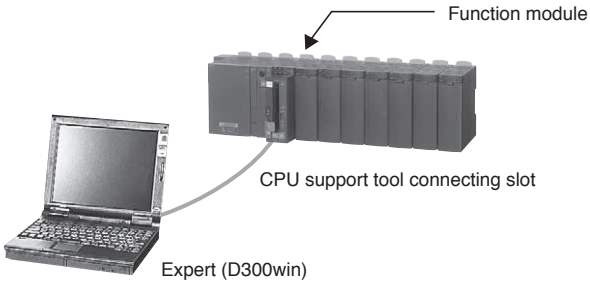
• Sharing program definitions including variable names

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.



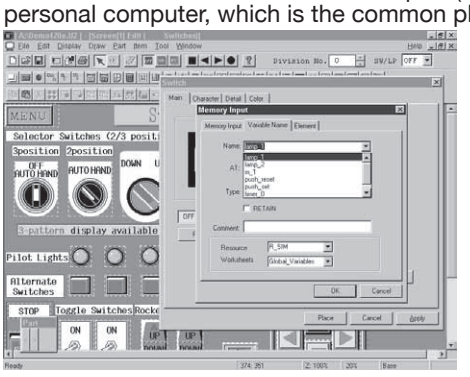


• POD cooperated support

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.



• 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.

• Data access to the user ROM

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

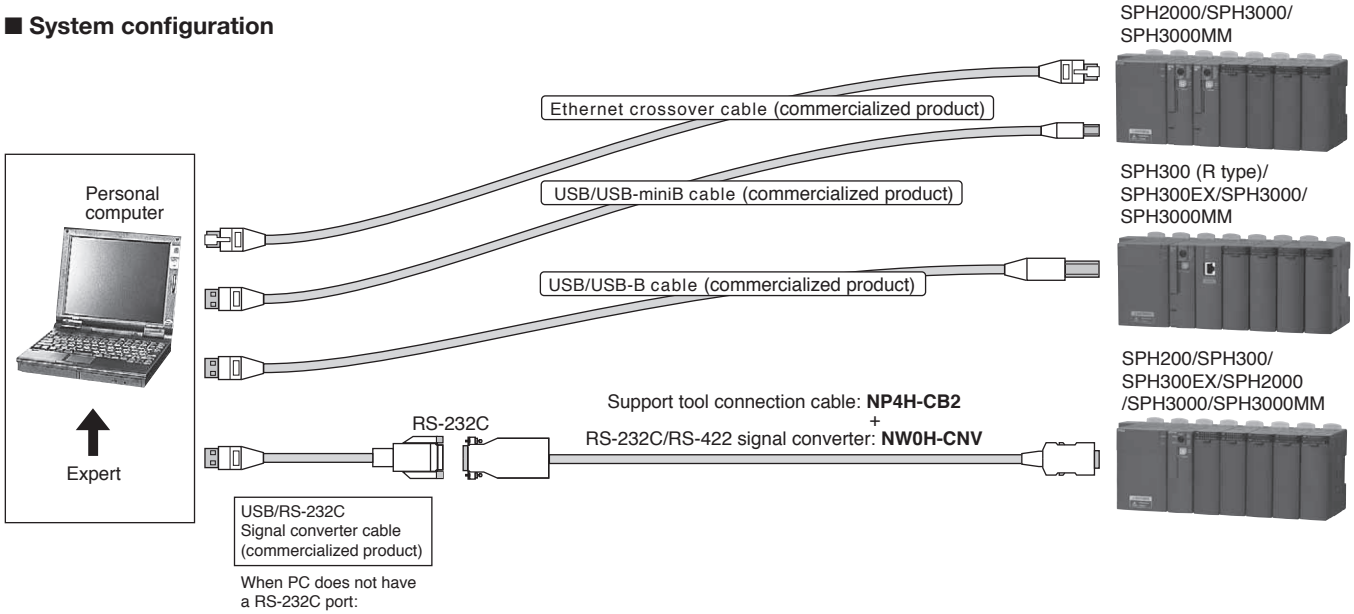
• Password function

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

■ Operating environment

Item		Specification
Hardware		IBM-PC/AT compatible
CPU		Intel Pentium 400MHz or higher (800MHz or higher recommended)
Hard disk		Free space of 140M bytes or more (Expert (D300win) system software: 100MB or more; Standard extension FB software package: 40MB or more)
CD-ROM unit		1 unit (x 4 speed or faster), media: ISO 9660 format
Memory capacity		64M bytes or more (256M bytes or more recommended)
Keyboard		101 keyboard
Mouse		USB mouse, bus mouse, or PS2 mouse
Indicator		800 x 600-dots resolution or higher (1024 x 768-dots resolution or higher recommended)
Communication interface	RS-232C	9600bps-57600kbps (default setup according to resource model selection)
	Ethernet	Possible
	ISDN	Possible (analog port is used)
	USB	Possible with V1.1 (Target CPU: **NP1PS-□□R**, SPH300EX and SPH2000 or SPH3000)
	P/PE-link	Possible
	SX bus	Possible
	FL-net	Possible
OS		Windows2000/XP/Vista/7
Portability		Depends on commercial mobile personal computer.
Environmental durability		Depends on environmental conditions of commercial personal computer.

■ System configuration



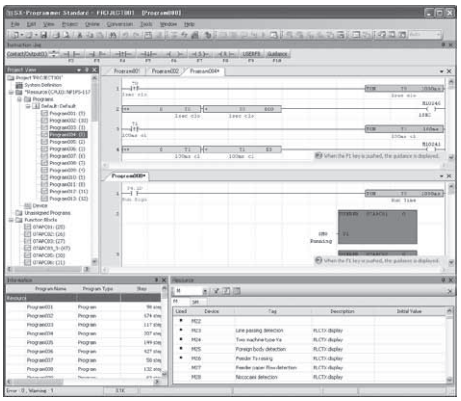
Programming Support Tool

Programming Support Tool SX-Programmer Standard: NP4H-SWN

■ **Features**

• Familiar user interface

The user interface and ladder programming support SPB programming equivalent to a FLEX-PC Windows-compatible PC loader.
Support for full-keyboard operation is also handy for on-site debugging and maintenance. With a whopping 202 different instruction words, the possibilities for your programs are limited only by your imagination.



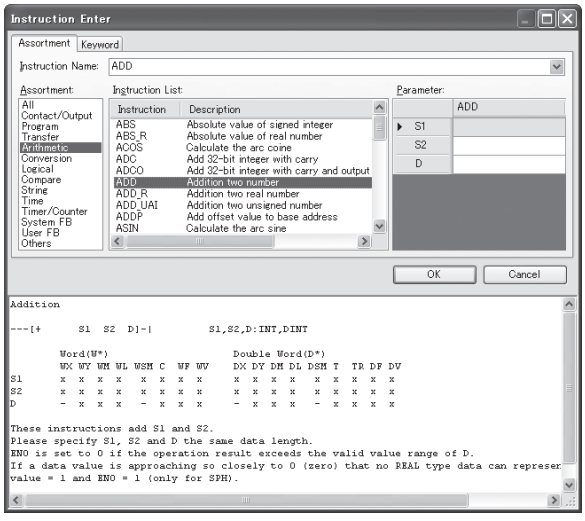
• Compatible with the international standard IEC 61131-3

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

• Intuitive screen operation

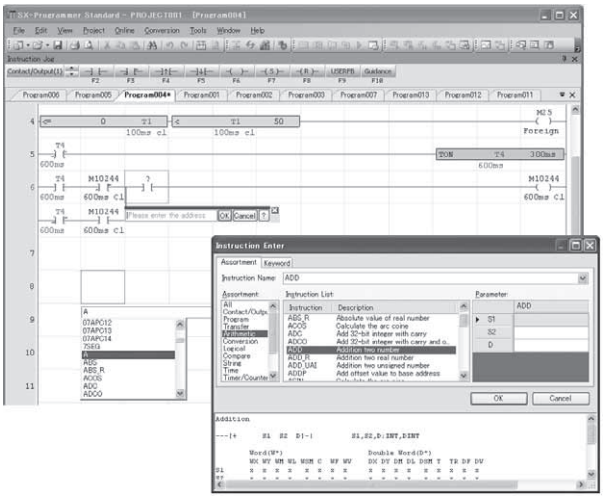
The easy-to-see and understandable layout enables you to intuitively operate the screen.

・Command word input is simplified by the command jog bar and the command word candidate narrow-down function based on a keyword search.
・Multiple sheet display and a flexible layout help improve operation efficiency.
・Input can be completed on a single screen because operands can be input in succession.
・Operation help corresponding to the screen displayed makes the manual no longer necessary.



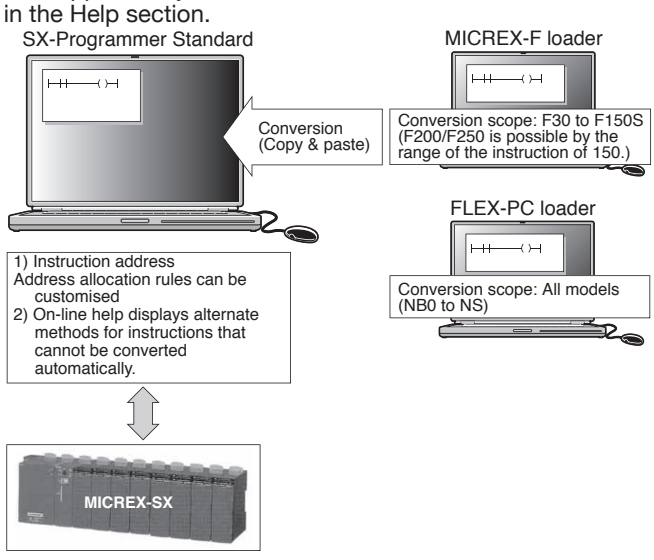
・Supports a variety of input methods

Standard supports three input methods, and you can select the optimum input method for the situation.
・Data can be input simply by operating the mouse wheel and clicking the mouse button. You can register any command words you desire.
・Even if you do not know a command word, you can easily narrow down command words through a keyword search.
・Candidates can be automatically displayed by mnemonic input mainly using the keyboard and the Intellisense function.



• Leverage your program assets

You can make good use of program assets for the MICREX-F and FLEX-PC series of our PLC. For circuits and commands not supported by Standard, alternative methods are described in the Help section.



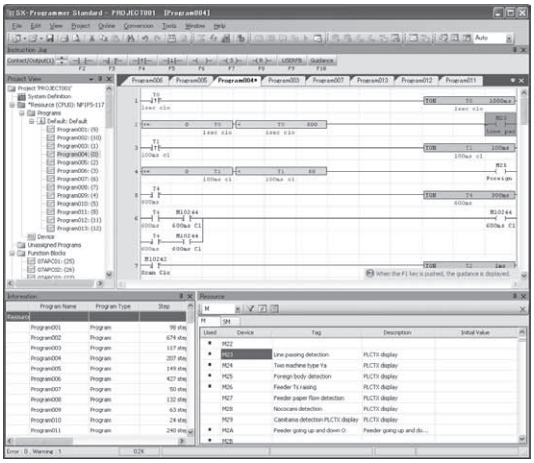
• Resume feature

When the software is started, the previous edit/monitor position is automatically displayed.
When you go on-line, monitoring starts at the position you were monitoring last time. When you are off-line, the system transitions to edit mode displaying the point you were editing last time.

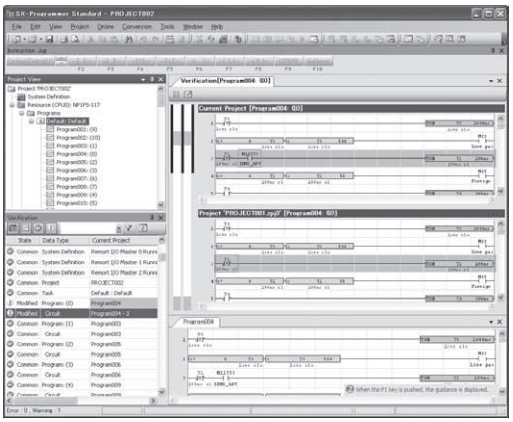
•Password function

Setting a path word for access authentication to the online function allows the control with 3 levels of level 1, level 2 and level 3 for the PLC operation.

•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.



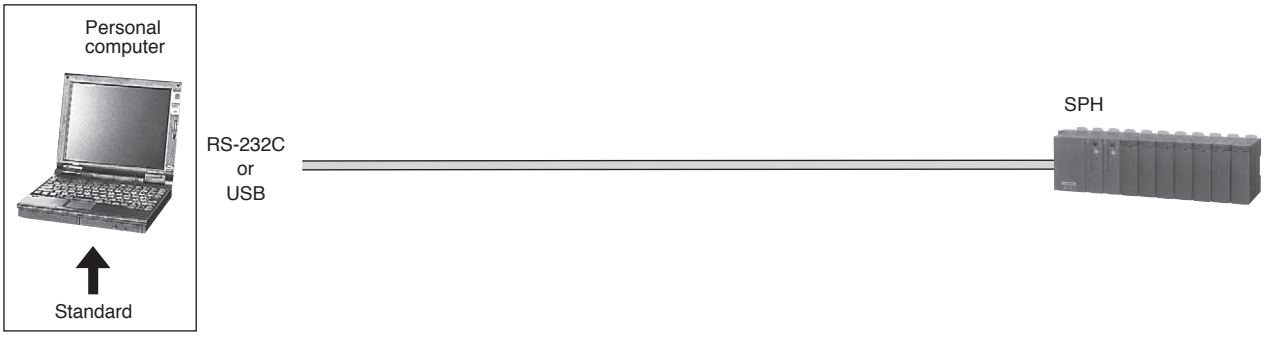
• USB interface
Connection method with the full-speed USB (Universal Serial Bus) 1.1 is added to the loader connection method.

• Compatible with the Japanese and English OS
Compatible with the Japanese OS and the English OS using a same format.

■ Operating environment

Item		Specification
Hardware		IBM-PC/AT compatible
CPU		Intel Pentium 233MHz or higher (350MHz or higher recommended)
Hard disk		Free space of 200M bytes or more
CD-ROM unit		1 unit (x 4 speed or faster), media: ISO 9660 format
Memory capacity		64M bytes or more (256M bytes or more recommended)
Keyboard		101 keyboard
Mouse		USB mouse, bus mouse, PS2 mouse
Indicator		800 x 600-dots resolution or higher (1024 x 768-dots resolution or higher recommended)
Communication interface	RS-232C	9600bps-57600kbps (default setup according to resource model selection)
	Ethernet	Possible
	ISDN	Possible (analog port is used)
	USB	Possible with V1.1 (Target CPU: **NP1PS-**□□**R**, SPH2000 and SHP3000)
	P/PE-link	Possible
	SX bus	Possible
	FL-net	Possible
OS		Windows2000/XP/Vista/7
Portability		Depends on commercial mobile personal computer.
Environmental durability		Depends on environmental conditions of commercial personal computer.

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



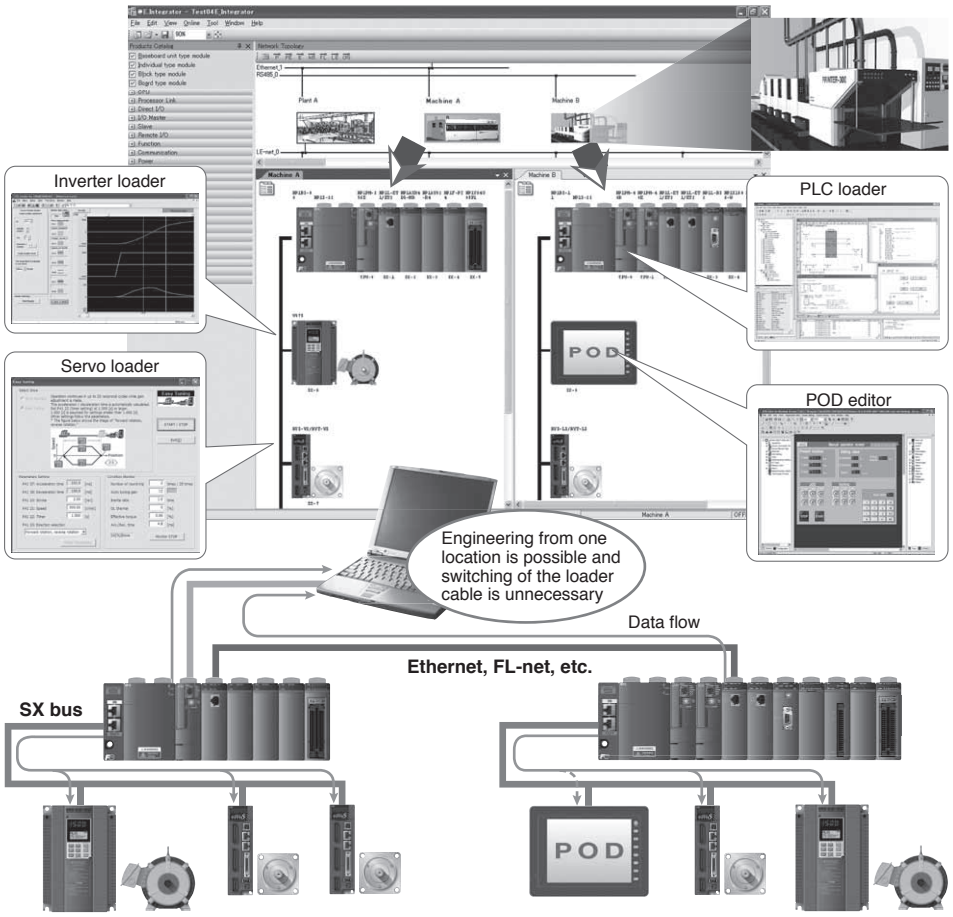
Fuji Integrated Support Tool: NP4N-ITGR

■ Overview

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

■ Features

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



■ Supported devices

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

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

■ Operating environment

@E.Integrator operating environment

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

Operating environment combining @E.Integrator with each support tool

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

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

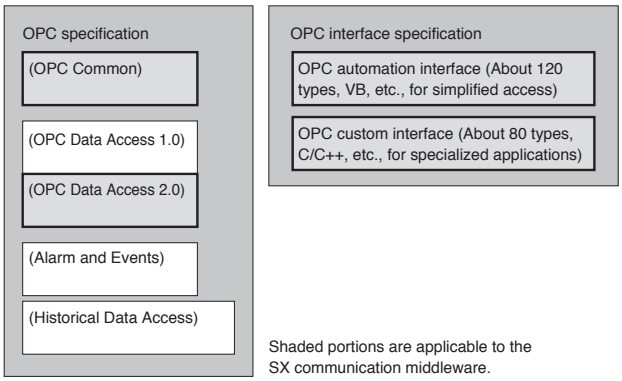
OPC-Coordinated Library SX Communication Middleware

■ Features

• OPC-coordinated library

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

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



Shaded portions are applicable to the SX communication middleware.

■ Operating environment

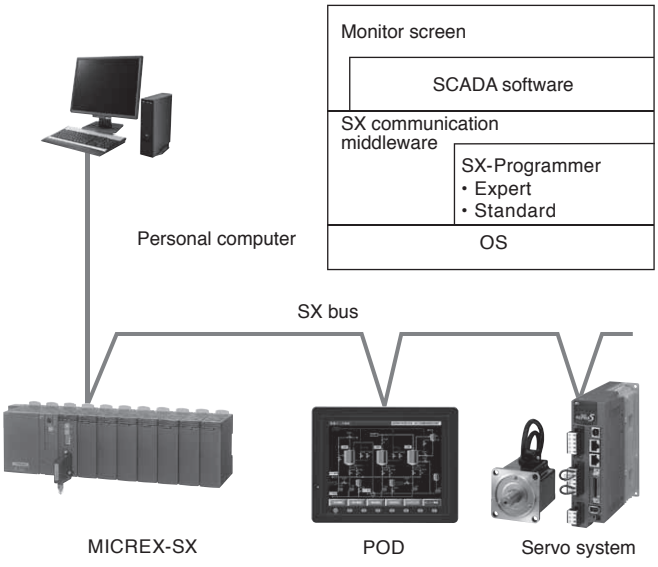
Item		Specification
Hardware		IBM-PC/AT compatible
CPU		Intel Pentium 233MHz or higher
Hard disk		Free space of 10M bytes or more (with additional disk space for Programming support tool)
CD-ROM unit		1 unit (x 4 speed or faster), media: ISO 9660 format
Memory capacity		128M bytes or more
Keyboard		101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

■ Sample application system

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

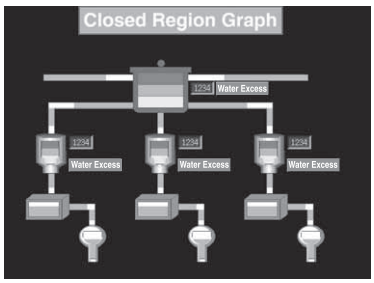
• The monitor screen makes status display and data collection of each I/O device.

• The operation screen sets production command data for each line.



■ Sample application monitor screen

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

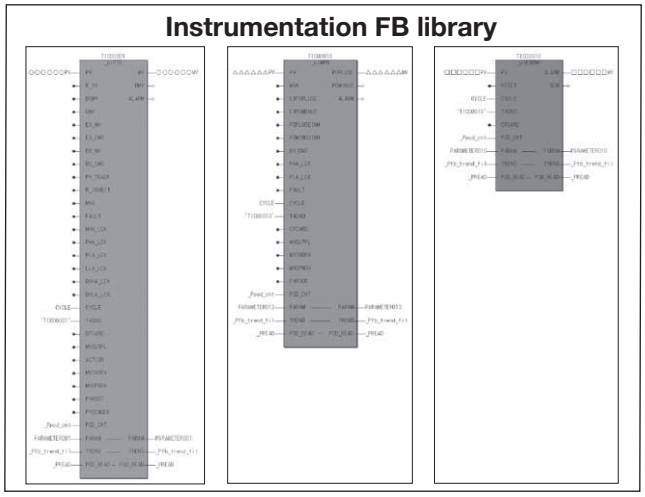


This software can be downloaded from our homepage at no charge.

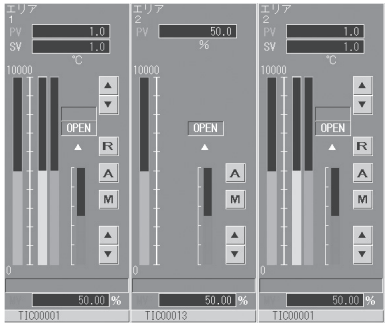
SX Instrumentation Package: NP4N-IPAC

■ 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.

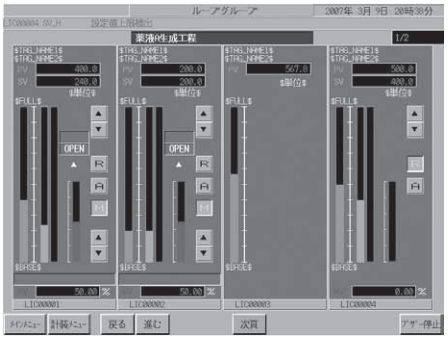


Easily Generated

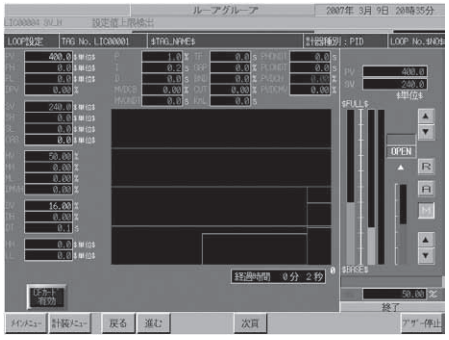


- **Abundant instrument FB libraries**

Overview

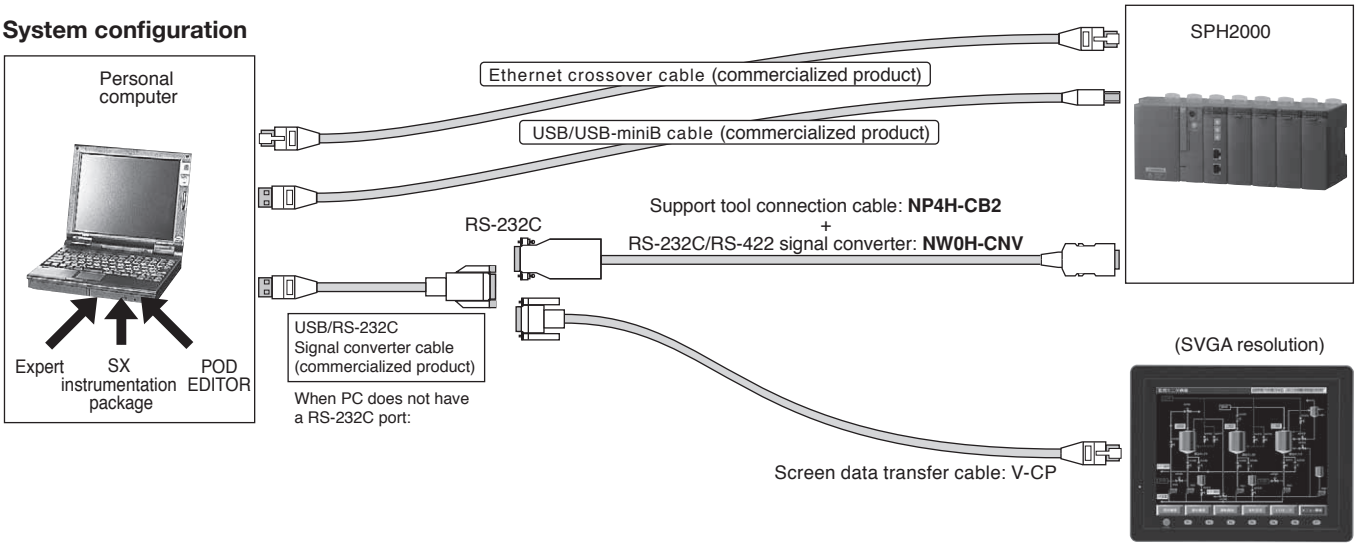


Group monitoring



Loop tuning

■ System configuration



Handy Monitor: NW0H-S3ES

NW0H-S3ES
KDD07-001

■ Features

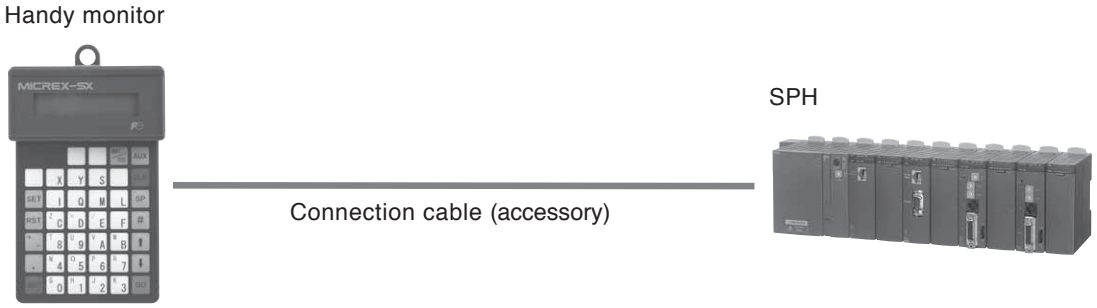
- **Portable tool during maintenance**
  Allows you to monitor and set up the data without the knowledge of programming support tool. As it is dedicated hardware with handy design for ease of use, you can easily bring it out and install it.
- **Support for SPH**
  Supports SPH which did not have a handy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

■ Performance specification

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

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

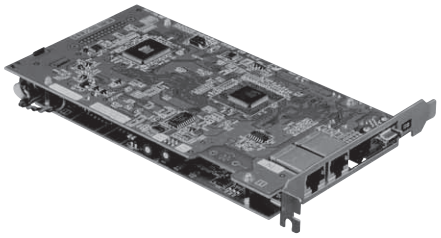
■ System configuration



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

■ Features

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



NP3PS-SX1PCS32
KDD07-011

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

■ Performance specifications

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

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

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

■ Operating environment

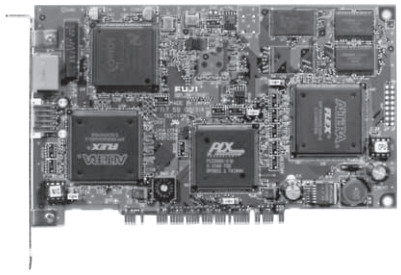
Item	Specification
Hardware	IBM-AT compatible * 1
CPU	Intel Pentium 233MHz or higher
Hard disk	Free space of 10M bytes or more (and necessary disk capacity for Expert (D300win) too)
CD-ROM unit	At least 1 unit, (x 4 speed or faster recommended), media: ISO 9660 format
Memory capacity	32M bytes or more (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 The board size supports a full-size PCI slot (For more information, refer to the Dimensions “PCI-bus based board” on this catalog).

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

■ Features

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



NP3L-FL3PCS
AF02-80

■ Performance specifications

Performance and specifications of the built-in board type FL-net board NP3L-FL3PCS are equivalent to those of the module type NP1L-FL3.

For details on performance and specifications, refer to “FL-net (OPCN-2) Ver. 2.0 Module: NP1L-FL3” on this catalog.
This board conforms, however, only to the transmission specification 10BASE-T, 100BASE-TX, and not to 10BASE5.

■ Operating environment

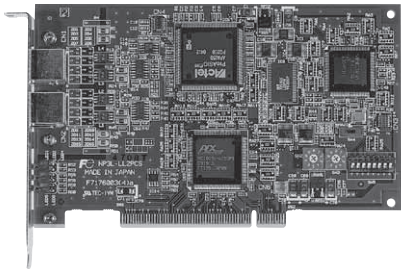
Item	Specification
Hardware	IBM-AT compatible * 1
CPU	Intel Pentium 233MHz or higher
Hard disk	Free space of 10M bytes or more (and necessary disk capacity for Expert (D300win) too)
CD-ROM unit	At least 1 unit, (x 4 speed or faster recommended), media: ISO 9660 format
Memory capacity	64M bytes or more (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
	Microsoft Visual C++
Others	TCP/IP protocol

* 1 The board size supports a full-size PCI slot (For more information, refer to the Dimensions “PCI-bus based board” on this catalog).

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

■ Features

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



NP3L-LL2PCS
KD04-018

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

■ Performance specifications

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

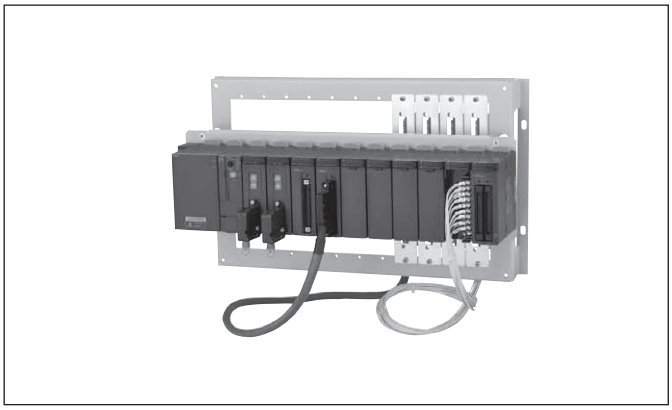
However, the board cannot be made redundant.
For details on performance and specifications, refer to “LE-net loop 2 Module: NP1L-LL2” on this catalog.

■ Operating environment

Item	Specification
Hardware	IBM-AT compatible * 1
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 development language	Microsoft Visual Basic
	Microsoft Visual C++
Others	TCP/IP protocol

* 1 The board size supports a full-size PCI slot (For more information, refer to the Dimensions “PCI-bus based board” on this catalog).

Renewal Tool : NP8REFS □ - □□



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

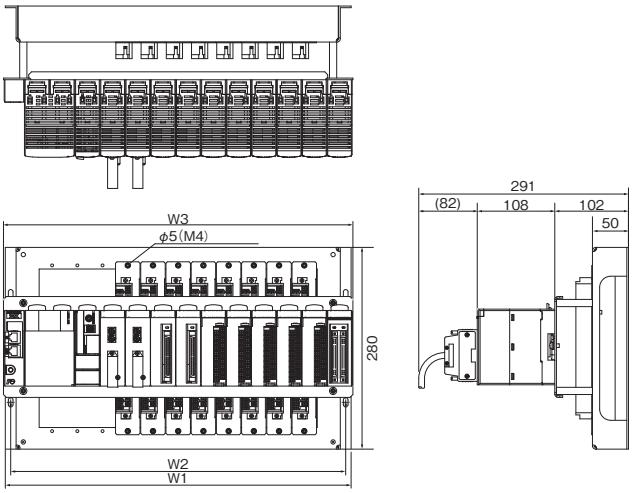
■ Features

- Significantly reduced I/O wiring work
  Since I/O wiring is usable as it is, wiring work and checking can be omitted, and wiring work time can be significantly reduced to 1/5.
- Speedy board modifications on site
  The dimensions of the frame of the renewal tool are the same as those of the MICREX-F series base board. You do not have to perform any on-site additional work such as drilling.
- Easy mounting and replacement, easy checking of state indication LEDs
  SX series modules are designed to be mounted on the renewal tool and can be replaced with a single motion. The state indication LEDs can also be checked.
- Flexible layout
  SPH modules can be mounted not only on but also beside and above the renewal tool. You can arrange them any way that you wish according to the field layout.

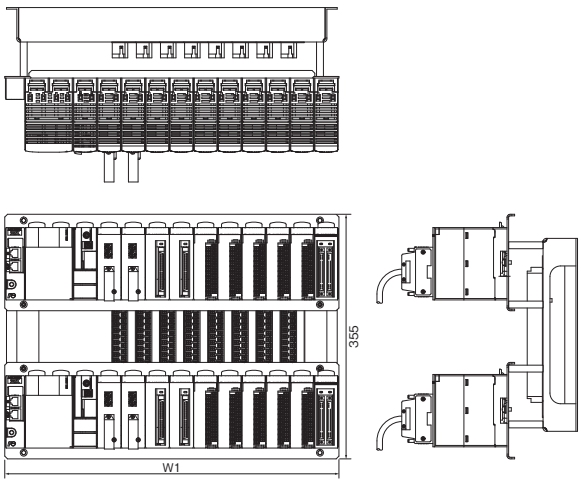
Item	Type	Specification outline
Frame set (SPH mounting board + base unit)	**NP8REFSS-0**□	Set of 1 NP8REFSF-0□ and 1 NP8REFSB-0□
SPH mounting board	**NP8REFSF-0**□	SPH mounting board for base unit NP8REFSB-0□
base unit	**NP8REFSB-0**□	Unit for mounting conversion adapter
Conversion adapter	**NP8REFSA-**□□□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

Frame set (SPH mounting board + base unit)

・base unit (mounting 1 SX base unit)



・base unit (mounting 2 SX base unit)



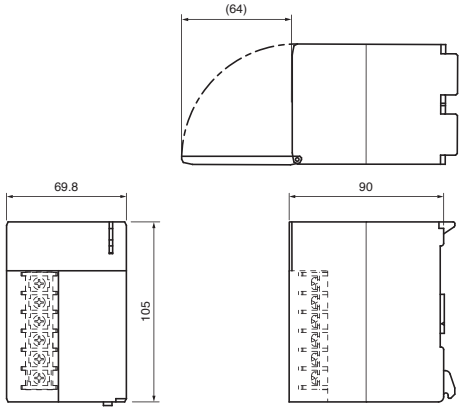
〔mm〕

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

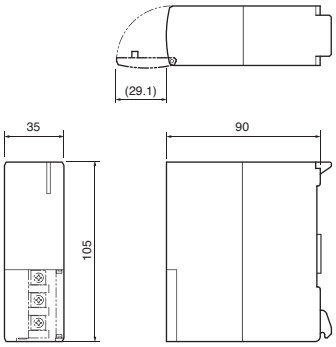
■ Dimensions, mm

(1) Power supply module

1) **NP1S-22**, **NP1S-42**

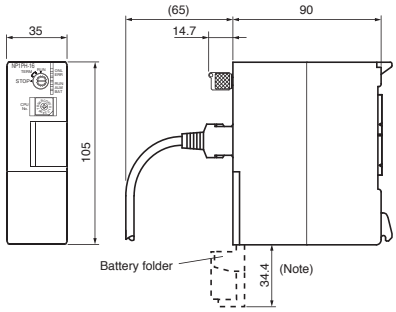


2) **NP1S-91**, **NP1S-81**



(2) CPU module

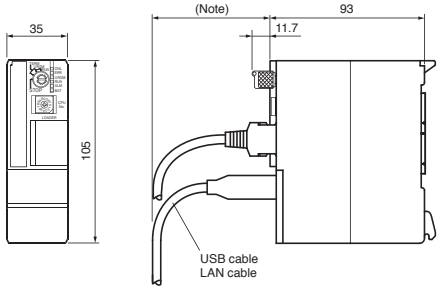
1) SPH200 **NP1PH-16**, **NP1PH-08**



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

2) SPH300/SPH2000/SPH3000

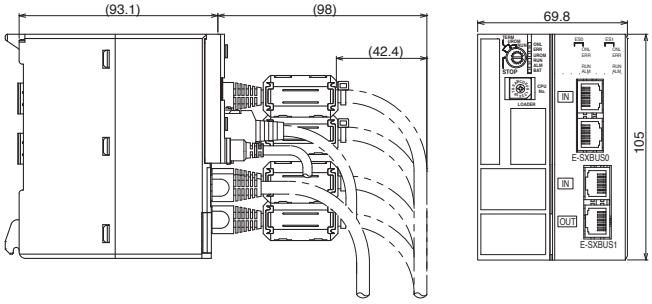
NP1PS-32/32R, NP1PS-74R, NP1PS-117R, NP1PS-245R, NP1PM-48R/48E, NP1PM-256E, NP1PM-256H, NP1PU-048E/256E



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

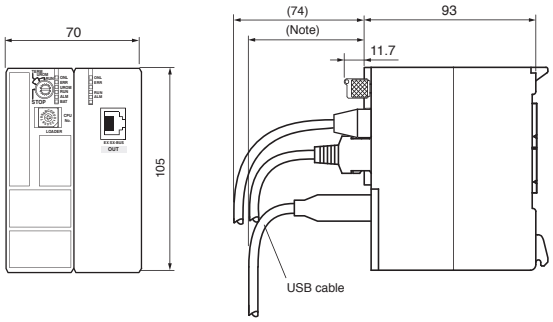
3) SPH3000MM

NP1PU2-048E/256E



4) SPH300EX

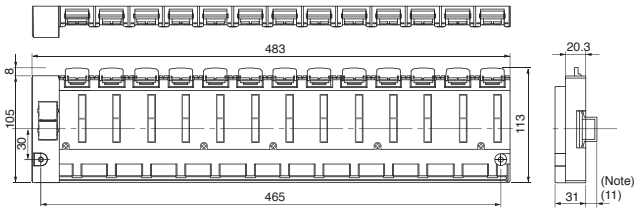
NP1PS-74D



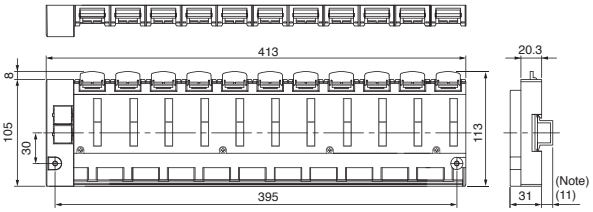
Note: For bend radius, check the specification for the loader cable you use.

(3) Base board

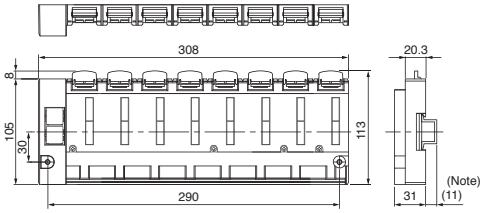
1) **NP1BP-13, NP1BS-13, NP1BP-13S, NP1BS-13S, NP1BS-13D, NP1BP-13D**



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

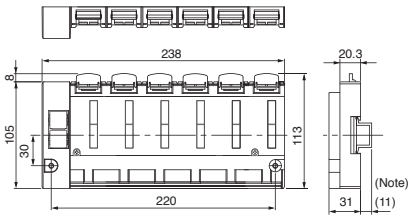


3) **NP1BS-08, NP1BS-08S, NP1BS-08D**

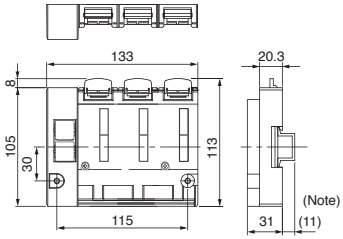


Dimensions

4) **NP1BS-06**



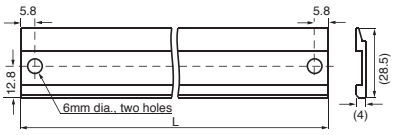
5) **NP1BS-03**



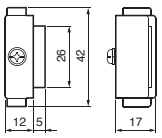
Note: ( ) means to use the rail (**TH35-15AL)** made by FUJI.

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

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

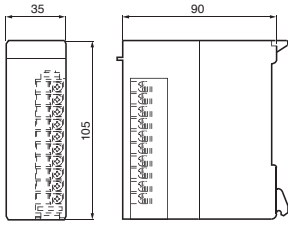


(5) Base board mounting stud **NP8B-ST**



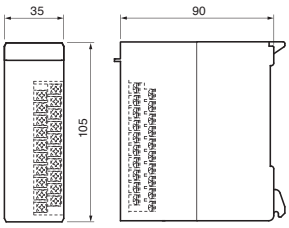
(6) I/O module

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

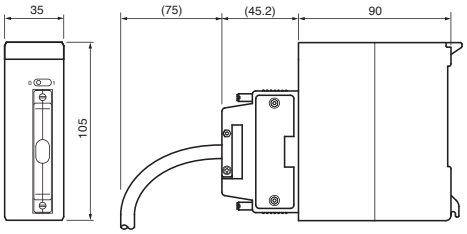


Note: Transistor sink 8-point output type (NP1Y08T0902) and SSR 8-point output type (NP1Y08S) are equivalent to the 16-point module below.

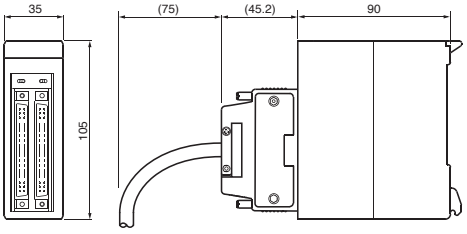
2) 16-point module (digital) / Analog input module / Analog output module (**NP1AY□2-MR**, **NP1AX□4-MR**, **NP1AX08V-MR, NP1AX08I-MR**)



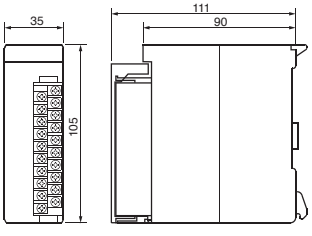
3) 32-point module



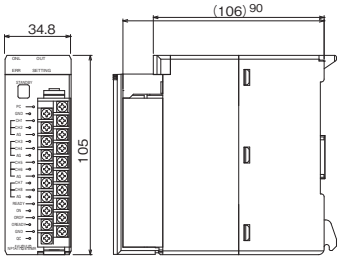
4) 64-point module



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**, **NP1AYH4□G-MR**, **NP1AYH4□-MR**, **NP1AWH6-MR**),
Distributor module **NP1AXH4DG-MR**,
Flow meter F/AD conversion module **NP1F-PI4**

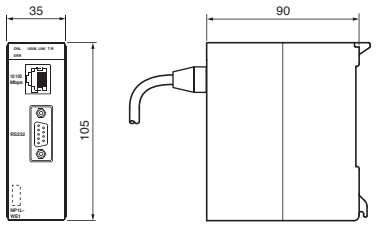


6) Duplex analog output module **NP1AYH8VHR-MR**



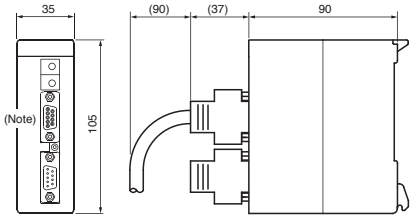
(7) Communication module

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



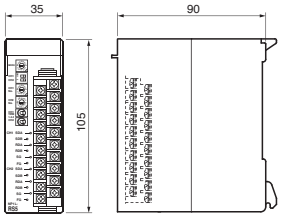
Note: This differs by type, whether or not connectors and switches exist, but outside dimensions are the same for all types.

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

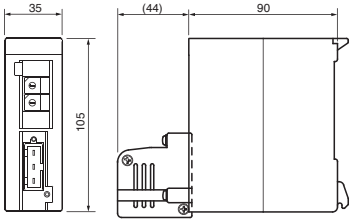


Note: This differs by type, whether or not connectors and switches exist, but outside dimensions are the same for all types.

General purpose communication module **NP1L-RS5**

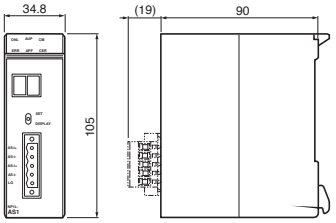


3) T-link master module **NP1L-TL1**,
T-link slave module **NP1L-TS1**,
T-link interface module **NP1L-RT1**,
P-link module **NP1L-PL1**, PE-link module **NP1L-PE1**,
OPCN-1 master module **NP1L-JP1**,
OPCN-1 slave module **NP1L-JS1**,
OPCN-1 interface module **NP1L-RJ1**

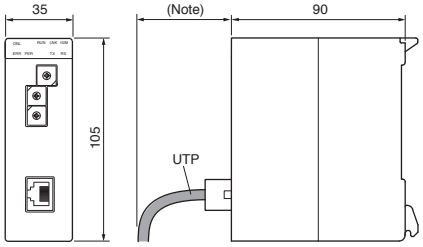


Note: This differs by type, whether or not connectors and switches exist, but outside dimensions are the same for all types.

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

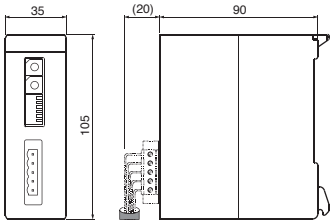


5) FL-net (OPCN-2) module **NP1L-FL3**

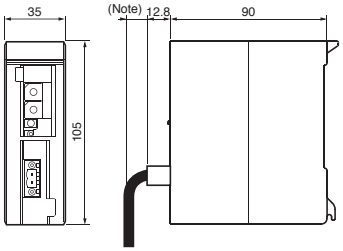


Note: For AUI and UTP cables, you need to take connector dimensions and cable bend into consideration. (For bend radius, check the specification for the cable you use.)

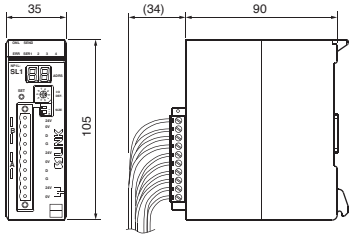
6) DeviceNet master module **NP1L-DN1**,
DeviceNet slave module **NP1L-DS1**,
DeviceNet interface module **NP1L-RD1**



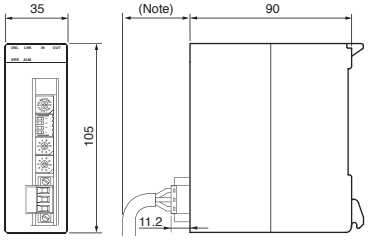
7) LONWORKS interface module **NP1L-LW1**



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

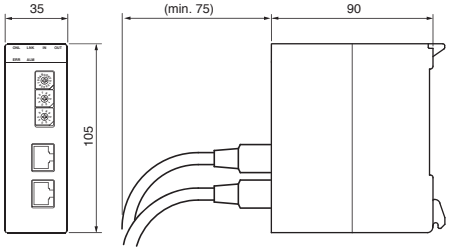


9) LE-net module **NP1L-LE1**

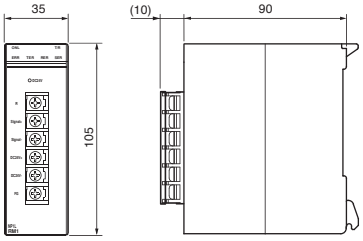


Note: Consider the bend of the cable you use.

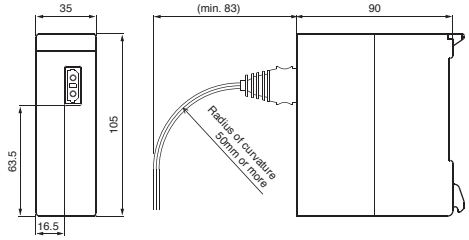
10) LE-net loop 2 module **NP1L-LL2**



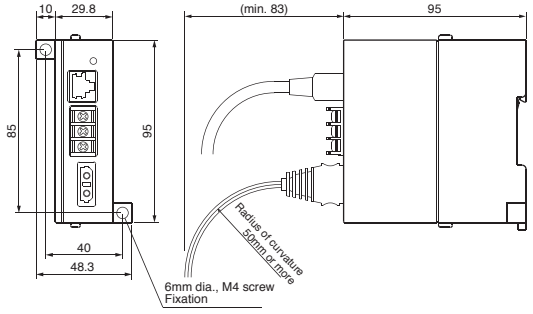
11) Remote terminal master/slave module **NP1L-RM1**



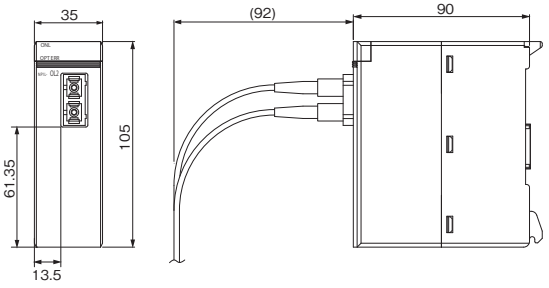
12) SX bus optical link module **NP1L-OL1**



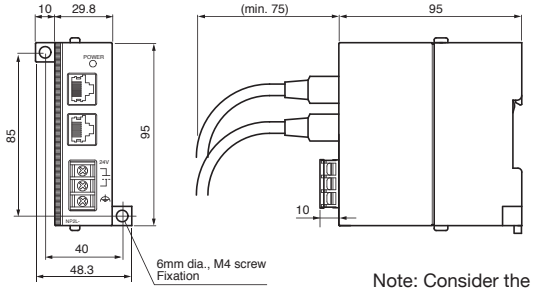
13) SX bus optical link converter
NP2L-OE1



NP2L-OE2

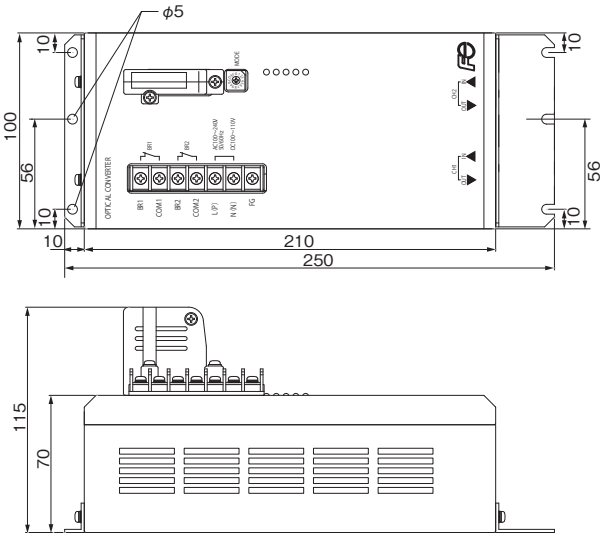


14) SX bus electrical repeater **NP2L-RP1**



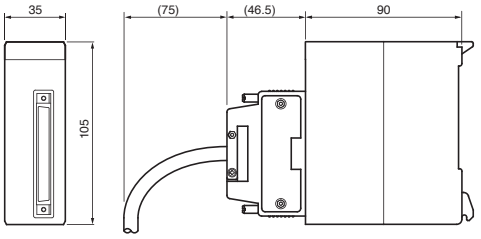
Note: Consider the bend of the cable you use.

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

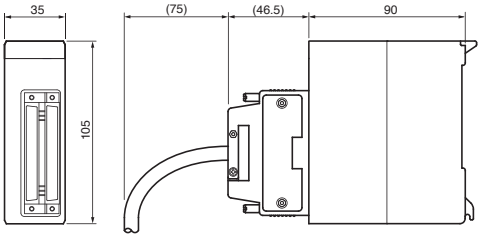


(8) Positioning control module / Unit

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

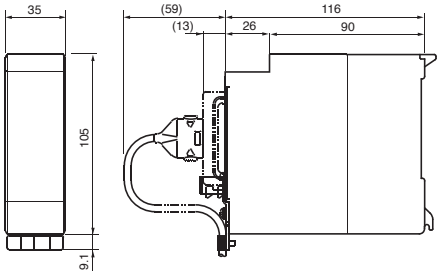


2) Positioning control module **NP1F-MA2**, **NP1F-MP2**, **NP1F-HP2**

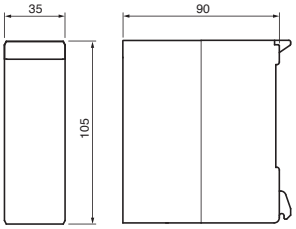


(9) Function module / Unit

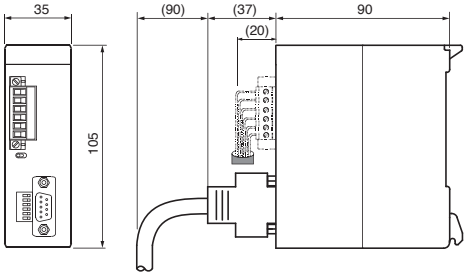
1) Memory card interface module **NP1F-MM1**



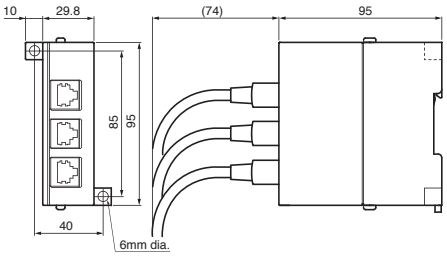
2) Dummy module **NP1F-DMY**



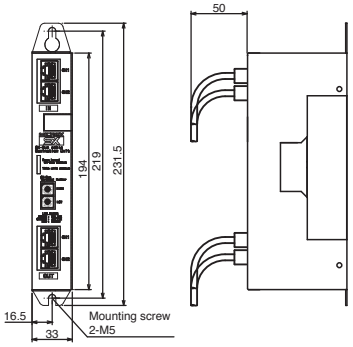
3) Multi-use communication module **NP1F-MU1**



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

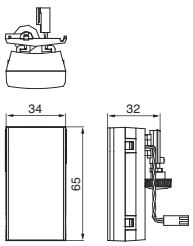


5) SX bus duplication unit **NP2L-BH1**

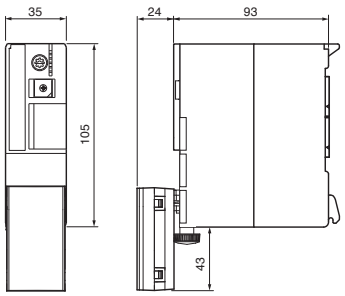


(10) Oputions

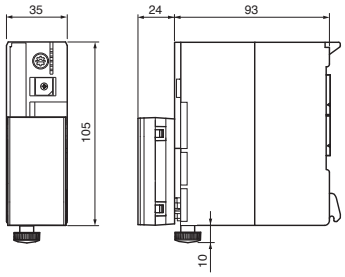
1) Battery box **NP8P-BTS**



• Dimension at lower installation

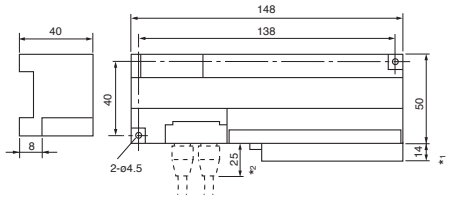


• Dimension at upper installation



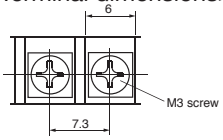
(11) I/O Terminal

1) NR1 series **NR1** □

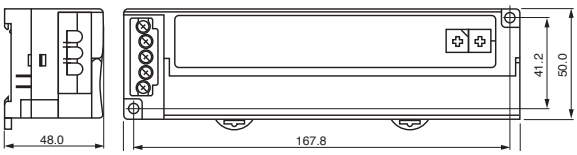


*1) When the extension terminal block is mounted.
*2) When the SX bus-adapted unit is connected.

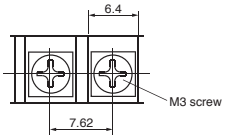
<Terminal dimensions>



2) NR2 series **NR2** □

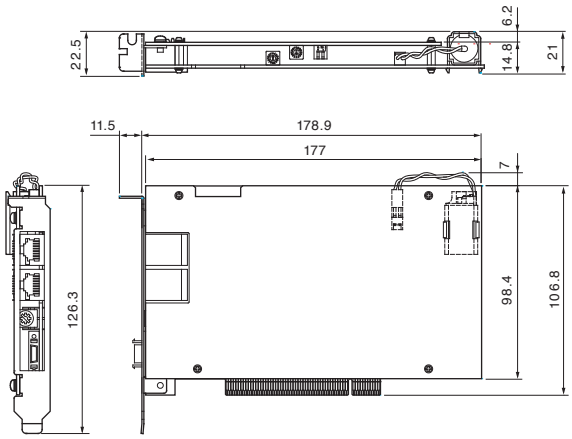


<Terminal dimensions>

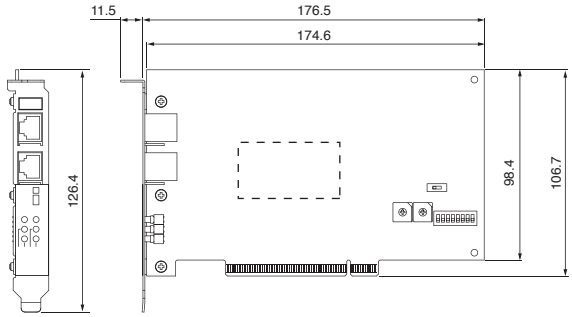


(12) PCI-bus-based board

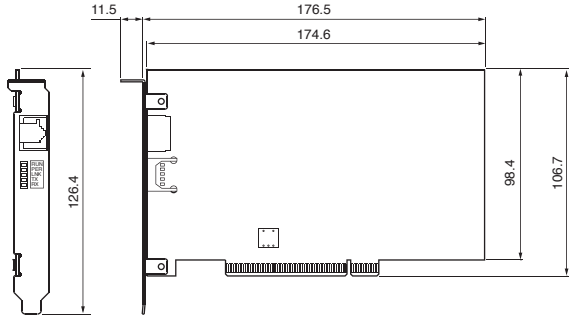
1) SPH300 CPU board **NP3PS-SX1PCS □□**



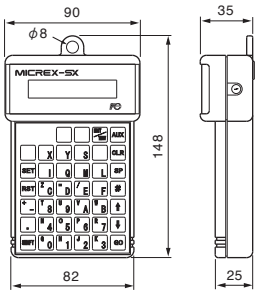
2) LE-net loop2 board **NP3L-LL2PCS**



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

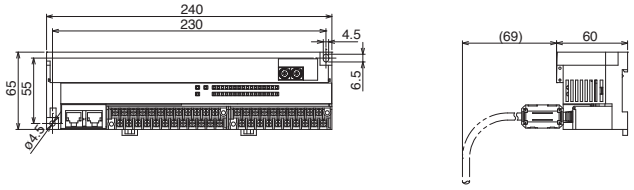


(13) Handy monitor **NW0H-S3ES**

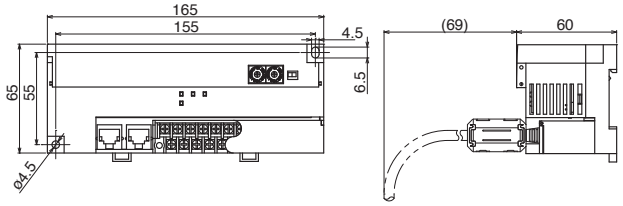


(14) E-SX bus based

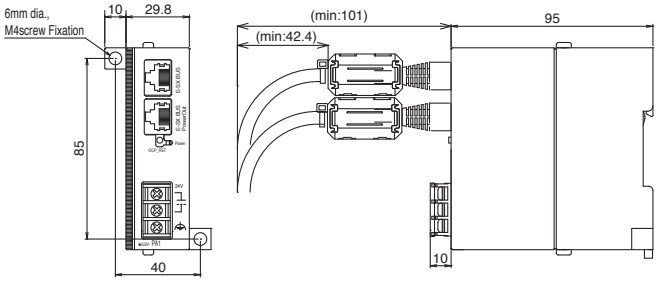
1) Digital input/output unit **NU2X3206-W/NU2Y32T09P6**



2) Analog input/outoput unit **NU2AXH2-MR/NU2AYH2V-MR**



3) Auxiliary power supply unit **NU2V-PA1**



■ Types/Ordering codes

• SPH3000MM E-SX bus product

Names		Types (Ordering codes)	Specifications, Names			Standards CE *2	UL cUL	LR *3	NK
CPU module	SPH3000MM	**NP1PU2-048E**	SPH3000MM Program memory capacity 48K step User ROM/USB adapted, Max.No. of I/O Points 139264 Points	Accessories: Data backup battery (Built-in) SX bus terminating plug 2 pieces Screwdriver (for the CPU setting)	Basic instruction execution speeds 9ns or more				
		NP1PU2-256E	SPH3000MM Program memory capacity 256K step User ROM/USB/Ethermet adapted, Max.No. of I/O Points 139264 Points						
E-SX bus extension cable *1		**NU1C-P3**	300mm cable			—			
		NU1C-P6	600mm cable			—			
		NU1C-P8	800mm cable			—			
		NU1C-02	2,000mm cable			—			
		NU1C-05	5,000mm cable			—			
		NU1C-10	10,000mm cable			—			
		NU1C-15	15,000mm cable			—			
		NU1C-25	25,000mm cable			—			
		NU1C-50	50,000mm cable			—			
		NU1C-A0	100,000mm cable			—			
Communication module		**NP1L-RU1**	E-SX bus integrated type interface module			Upcoming			
E-SX bus separate mounting unit		**NU2X3206-W**	DC24V, 32 points, 7mA, 0 to 100ms variable		Screw terminal				
		NU2Y32T09P6	Tr sink, 12 to 24V DC, 32 points, 0.6A/point, 4A/common		Screw terminal				
		NU2AXH2-MR	High-speed multiple-range input 2ch,resolution:15 bits , 25µs conversion period		Screw terminal				
		NU2AYH2V-MR	High-speed multiple-range output, 2ch, resolution:15-bit(voltage), 25µs conversion period		Screw terminal				
		NU2F-HC2	High-speed counter module, 4Mbps (line driver), 1Mbps (open collector 5V DC/12V/24V)			Upcoming			
		NU2V-PA1	Auxiliary power unit E-SX bus built-in 24V DC power supply						
ROM card		**NP8PSD-002**	User ROM card SD memory card for the SPH3000/SPH3000MM, Capacity 2GB			—	—	—	—

• SPH product

Names		Types (Ordering codes)	Specifications, Names			Standards CE *2	UL cUL	LR *3	NK
CPU module	SPH200	**NP1PH-08**	SPH200 Program memory capacity 8K steps Max. No. of I/O points 8192 points	Accessories: Data backup battery (Built-in) SX bus terminating plug 2 pieces Screwdriver (for the CPU setting)	Basic instruction execution speeds 70ns or more	○	○	○	○
		NP1PH-16	SPH200 Program memory capacity 16K steps Max. No. of I/O points 8192 points			○	○	○	○
	SPH300	**NP1PS-32**	SPH300 Program memory capacity 32K steps Max. No. of I/O points 8192 points		Basic instruction execution speeds 20ns or more	○	○	○	○
		NP1PS-32R	SPH300 Program memory capacity 32K steps User ROM/USB adapted, Max. No. of I/O points 8192 points			○	○	○	○
		NP1PS-74R	SPH300 Program memory capacity 74K steps User ROM/USB adapted, Max. No. of I/O points 8192 points			○	○	○	○
		NP1PS-117R	SPH300 Program memory capacity 117K steps User ROM/USB adapted, Max. No. of I/O points 8192 points			○	○	○	○
		NP1PS-245R	SPH300 Program memory capacity 245K steps User ROM/USB adapted, Max. No. of I/O points 8192 points			○	○	○	○
	SPH300EX	**NP1PS-74D**	SPH300EX Program memory capacity 74K steps x 2 User ROM/USB adapted, Max. No. of I/O points 8192 points x 2			○	○		
	SPH2000	**NP1PM-48R**	SPH2000 Program memory capacity 48K steps User ROM/USB adapted, Max. No. of I/O points 8192 points		Basic instruction execution speeds 30ns or more	○	○	○	○
		NP1PM-48E	SPH2000 Program memory capacity 48K steps User ROM/USB/Ethernet adapted, Max. No. of I/O points 8192 points			○	○	○	○
		NP1PM-256E	SPH2000 Program memory capacity 256K steps User ROM/USB/Ethernet adapted, Max. No. of I/O points 8192 points			○	○	○	○
		NP1PM-256H	SPH2000 Program memory capacity 256K steps, Redundantly function adapted, User ROM/USB adapted, Max. No. of I/O points 8192 points			○	○	○	○
	SPH3000	**NP1PU-048E**	SPH3000 Program memory capacity 48K steps User ROM/USB/Ethernet adapted, Max. No. of I/O points 8192 points		Basic instruction execution speeds 9ns or more	○	○		
		NP1PU-256E	SPH3000 Program memory capacity 256K steps User ROM/USB/Ethernet adapted, Max. No. of I/O points 8192 points			○	○		
Power supply module		**NP1S-22**	Input 100/240V AC, output 35W			○	○*4	○	○
		NP1S-91	Input100 to 120V AC, output 15W			○	○		
		NP1S-81	Input200 to 240V AC, output 15W			○	○*5		
		NP1S-42	24V DC Input power supply, output capacity 35W, Accessories: Connector for ALM contact			○	○*6	○	○
Base board		**NP1BS-03**	For 3 slots Processor buses 2 slots		Accessories: Base board mounting bracket	○	○*7	○	○
		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			○	○	○	○

○ Applicable | — Not applicable

*1 Any length of cable is applicable. Contact our sales representatives.
*2 The compliance to the CE marking is confirmed for a single unit in the SX series. Be sure to check the compliance to the standard of the final product in which the SX series is built.
*3 To prevent the vibration, the module must be fixed for each of the base boards.
*4 The model NPS-22 A is UL-certified (cUL certification is not obtained).
*5 The model NP1S-91 A is UL Recognition-certified (cUL certification is not obtained).
*6 The model NP1S-81 A is UL Recognition-certified (cUL certification is not obtained).
*7 There is no cUL certification.

Ordering Information

Names	Types (Ordering codes)	Specifications, Names		Standards CE *2	UL cUL	LR *3	NK
Base board	**NP1BS-13D**	Hot plug base with station number setup function For 11 slots Processor buses 3 slots	Accessories: Base board mounting bracket	○	○	○	○
	NP1BS-13D	Hot plug base with station number setup function For 13 slots Processor buses 3 slots		○	○	○	○
	NP1BP-13D	Hight performance hot plug base, with station number setup function For 13 slots Processor buses 10 slots		○	○	○	○
SX bus expansion cable *1	**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 *8	**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	○	○		
Digital output module *8	**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 *8	**NP1W1606T**	24V DC 8 points source input, 12 to 24V DC 8 points Tr sink output	Screw terminal	○	○	○	○
	NP1W1606U	24V DC 8 points sink input, 12 to 24V DC 8 points Tr source output	Screw terminal	○	○	○	○
	NP1W3206T	24V DC 16 points source input, 12 to 24V DC Tr sink 16 points output, Optional Connector	Connector	○	○	○	○
	NP1W3206U	24V DC 16 points sink input, 12 to 24V DC Tr source 16 points output, Optional Connector	Connector	○	○	○	○
	NP1W6406T	24V DC 32 points source input, 12 to 24V DC Tr sink 32 points output, Optional Connector	Connector	○	○	○	○
	NP1W6406U	24V DC 32 points interactive input, 12 to 24V DC Tr source 32 points output, Optional Connector	Connector	○	○		
Analog input module	**NP1AX04-MR**	Standard type multi-range input 4ch, resolution: 10 bits	Screw terminal	○	○	○	○
	NP1AXH4-MR	High speed type multi-range input 4ch, resolution: 14 bits	Screw terminal	○	○	○	○
	NP1AX08V-MR	Standard type multi-range input 8ch, resolution: 10 bits (voltage type)	Screw terminal	○	○	○	○
	NP1AX08I-MR	Standard type multi-range input 8ch, resolution: 10 bits (current type)	Screw terminal	○	○	○	○
	NP1AXH8V-MR	High speed type multi-range input 8ch, resolution: 14 bits (voltage type)	Screw terminal	○	○	○	○
	NP1AXH8I-MR	High speed type multi-range input 8ch, resolution: 14 bits (current type)	Screw terminal	○	○	○	○
	NP1AXH8VG-MR	High speed type multi-range input 8ch, between channels insulated, resolution: 16 bits (voltage type)	Screw terminal	○	○	○	○
	NP1AXH8IG-MR	High speed type multi-range input 8ch, between channels insulated, resolution: 16 bits (current type)	Screw terminal	○	○	○	○
	NP1AXH4-PT	Resistance thermometer element input (Pt100Ω/JPt100Ω) 4ch, accuracy: ± 0.3% (ambient temperature: 18 to 28°C), ± 0.7% (ambient temperature: 0 to 55°C)	Screw terminal	○	○	○	○
	NP1AXH6G-PT	High accuracy resistance thermometer element input (Pt100Ω/JPt100Ω) 6ch, accuracy: ± 0.05 to ± 0.07% (ambient temperature: 18 to 28°C), ± 0.239% (ambient temperature: 0 to 55°C)	Screw terminal	○	○	○	○
	NP1AXH4-TC	Thermo-couple input module 4ch, resolution: 14 bits accuracy: ± 0.3% (ambient temperature: 18 to 28°C), ± 0.7% (ambient temperature: 0 to 55°C)	Screw terminal	○	○	○	○
	NP1AXH8G-TC	High accuracy thermo-couple input module 8ch, accuracy: ± 0.05 to ± 0.26% (ambient temperature: 18 to 28°C), ± 0.3 to ± 0.6% (ambient temperature: 0 to 55°C)	Screw terminal	○	○	○	○
	NP1AXH4DG-MR	Distributor module, 4ch,between channels high dielectric strength insulated, resolution: 16 bits accuracy: ± 0.1% of F.S.R. (ambient temperature: 25°C)	Screw terminal				
Analog output module	**NP1AY02-MR**	Standard type multi-range output 2ch, resolution: 10 bits	Screw terminal	○	○	○	○
	NP1AYH2-MR	High speed type multi-range output 2ch, resolution: 14 bits	Screw terminal	○	○	○	○
	NP1AYH4V-MR	High speed type multi-range output 4ch, resolution: 14 bits (voltage type)	Screw terminal	○	○	○	○
	NP1AYH4I-MR	High speed type multi-range output 4ch, resolution: 14 bits (current type)	Screw terminal	○	○	○	○
	NP1AYH4VG-MR	High speed type multi-range output 4ch, between channels insulated, resolution: 14 bits (voltage type)	Screw terminal	○	○	○	○
	NP1AYH4IG-MR	High speed type multi-range output 4ch, between channels insulated, resolution: 14 bits (current type)	Screw terminal	○	○	○	○
	NP1AYH8V-MR	High speed type multi-range output 8ch, resolution: 14 bits (voltage type)	Screw terminal	○	○	○	○
	NP1AYH8I-MR	High speed type multi-range output 8ch, resolution: 14 bits (current type)	Screw terminal	○	○	○	○
	NP1AYH8VHR-MR	Duplex type multi-range output 8ch, resolution: 14 bits (voltage type)	Screw terminal				
Analog I/O module	**NP1AWH6-MR**	High speed type multi-range input/output, input 4ch, output 2ch, resolution: 14 bits	Screw terminal	○	○		

*8 Connectors (solder type) for digital input, output, I/O mixture and positioning module are separately sold.
Applicable connector type: Fujitsu FCN-361J040-AU (connector), FCN-360C040-B (cover), our product type: **NP8V-CN**

○ Applicable — Not applicable

Names	Types (Ordering codes)	Specifications, Names	Standards CE *2	UL cUL	LR *3	NK
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	○	○	○	○
	NP1L-RS1	General purpose communication module RS-232C (connector), RS-485 (connector) each 1ch	○	○	○	○
	NP1L-RS2	General purpose communication module RS-232C (connector) 1ch	○	○	○	○
	NP1L-RS3	General purpose communication module RS-232C (connector) 2ch	○	○		
	NP1L-RS4	General purpose communication module RS-485 (connector) 1ch	○	○	○	○
	NP1L-RS5	General purpose communication module RS-485 (screw terminal) 2ch	○	○	○	○
	NP1L-JP1	OPCN-1 master module Accessories: OPCN-1 connector, Terminating resistor 2 pieces	○	○	○	○
	NP1L-JS1	OPCN-1 slave module Accessories: OPCN-1 connector	○	○		
	NP1L-RJ1	OPCN-1 interface module Accessories: OPCN-1 connector, SX bus terminating plug 2 pieces	○	○	○	○
	NP1L-DN1	DeviceNet master module Accessories: Screw connector (for cable splicing)	○	○		
	NP1L-DS1	DeviceNet slave module 1ch Accessories: Screw connector (for cable splicing)	○	○		
	NP1L-RD1	DeviceNet interface module Accessories: Screw connector (for cable splicing), SX bus terminating plug 2 pieces	○	○		
	NP1L-TL1	T-link master module Accessories: T-link connector, T-link terminating resistor 2 pieces	○	○	○	○
	NP1L-RT1	T-link interface module Accessories: T-link connector, SX bus terminating plug 2 pieces	○	○	○	○
	NP1L-TS1	T-link slave module Accessories: T-link connector	○	○	○	○
	NP1L-PD1	PROFIBUS-DP master module Communication standard (IEC 66158, EN 50171, DIN 19245)	○	○		
	NP1L-PS1	PROFIBUS-DP slave module Communication standard (IEC 66158, EN 50171, DIN 19245)	○	○		
	NP1L-RP1	PROFIBUS-DP interface module Communication standard (IEC 66158, EN 50171, DIN 19245)	○			
	NP1L-AS2	AS-i master module Ver. 2.1 Accessories: Screw connector (for cable splicing)	○	○		
	NP1L-SL1	S-LINK master module 1ch Accessories: Screw connector (for cable splicing)				
	NP1L-RM1	Remote terminal master/slave module Accessories: Screw connector (for cable splicing) Functionate to the master/slave station of remote terminal RM20/RM21 series				
	NP1L-OL1	SX bus optical link module Accessories: SX bus terminating plug	○	○		
	NP1L-OL2	SX bus optical link module Accessories: SX bus terminating plug		○		
	NP2L-OE1	SX bus electrical - optical converter Accessories: SX bus terminating plug	○	○		
	NP2L-RP1	SX bus electrical - electrical repeater Accessories: SX bus terminating plug	○	○		
	NP2L-BH1	SX bus duplex connection unit				
	FNC160A-C20	T-link Optical Converter				
	FNC360A-C20	P/PE-link Optical Converter				
Positioning module * 8	**NP1F-HC2**	High speed counter module 500kHz x 2ch Input signal voltage: 5V DC Accessories: Optional Connector	○	○		
	NP1F-HC2MR	High speed counter module 200kHz x 2ch Input signal voltage: 5/12/24 DC Accessories: Optional Connector	○	○		
	NP1F-HC2MR1	High speed counter module 50kHz x 2ch Input signal voltage: 5/12/24 DC Accessories: Optional Connector	○	○		
	NP1F-HC8	Multi-channel high speed counter module 50kHz x 8ch Accessories: Optional Connector	○	○		
	NP1F-HP2	Pulse train output positioning control module Pulse train command 250kHz x 2ch Accessories: Optional Connector	○	○		
	NP1F-MP2	Pulse train positioning control combined module Output pulse: 250kHz x 2ch, Feedback pulse: 500kHz, Accessories: Optional Connector	○	○		
	NP1F-MA2	Analog command positioning control combined module Feedback pulse: 500kHz x 2ch, Accessories: Optional Connector	○	○		
Function module	**NP1F-MM1**	Memory card interface module Memory card interface 1ch, Accessories: Memory card mounting bracket, Dummy card	○	○		
	NP1F-DMY	Dummy module	○	○	○	○
	NP1F-MU1	Multi-use communication module RS-232C x 1ch, RS-485 x 1ch Communication by the arbitrary protocol	○	○		
	NP1F-PI4	Flowmeter F/AD conversion module 10kHz x 4ch, between channels insulated				
Extended FB software package	**NP4N-IPAC**	SX instrumentaion package (Japanese version)	—	—	—	—
	NP4N-ITGR	Fuji Integrated support tool (@E.Integrator)	—	—	—	—
Personal computer loader * 10	**NP4H-SEDBV3**	Programming support tool based on IEC 61131-3 Expert (D300win) software package Version 3	—	—	—	—
	NP4H-SWN	Programming support tool based on IEC 61131-3 Standard	—	—	—	—
Handy monitor	**NW0H-S3ES**	SPH applicable English type, Accessories: Loader cable (length: 1m)				
Loader connecting cable	**NP4H-CB2**	Programming support tool connection cable for AT compatible personal computer (Necessary to the signal converter: **NW0H-CNV**)	—	—	—	—
	NW0H-CNV	Programming support tool for AT compatible personal computer. Signal converter for CPU module connecting (It used to with combined the loader connecting cable (**NP4H-CB2**, Optional).	○	—	—	—
ROM cassette	**NP8PMF-16**	User ROM cassette for the SPH200, Capacity: 16MB	—	—	—	—
	NP8PCF-256	User ROM card compact flash memory for the SPH300/SPH2000, Capacity: 256MB	—	—	—	—
	NP8PSD-002	User ROM card SD memory card for the SPH3000/SPH3000MM, Capacity: 2GB	—	—	—	—

○ Applicable — Not applicable

*2 The compliance to the CE marking is confirmed for a single unit in the SX series. Be sure to check the compliance to the standard of the final product in which the SX series is built.
*3 To prevent the vibration, the module must be fixed for each of the base boards.
*8 Connectors (solder type) for digital input, output, I/O mixture and positioning module are separately sold.
Applicable connector type: Fujitsu FCN-361J040-AU (connector), FCN-360C040-B (cover), our product type: **NP8V-CN**
*9 Ask our sales representative for the English version and the Chinese version.
*10 The OS and the Japanese conversion software are not included.

Ordering Information

Names			Types (Ordering codes)	Specifications, Names		Standards CE *2	UL cUL	LR *3	NK
Online adapter and Relational software			OA-ALFA2	Online adapter (Necessary for the NP4H-CB2 on connection to personal computer)					
			FOA-LOADER2-CD	Initial setting loader software for the online adapter (Japanese version)		—	—	—	—
			FOA-CENTER2-CD	Master station monitoring software for the online adapter (Japanese version)		—	—	—	—
Auxiliaries			NP8P-BT	Data backup battery (Battery type: Lithium primary battery)		—	—	—	—
			NP8P-BT1	Data backup for high-capacity battery (Battery type: Lithium primary battery)		—	—	—	—
			NP8P-BTS	Data backup for high-capacity battery box (NP8P-BT1 + storage box)		—	—	—	—
			NP8B-BP	SX bus terminating plug (1 piece)		—	—	—	—
			NP8B-ST	Base board mounting stud (DIN rail type(2 pieces))		—	—	—	—
			NP8V-CN	I/O, positioning control module connector (solder type)		—	—	—	—
			NP8P-KY	CPU mode selection key switch		—	—	—	—
			FTC120T	T link / OPCN-1 connector		—	—	—	—
			FTC120P	P/PE link connector		—	—	—	—
			FRT120A100	T link / OPCN-1 terminating resistor		—	—	—	—
			FRT220A75	P/PE link terminating resistor		—	—	—	—
I/O terminals	NR1 type	OPCN-1	NR1JX-1606DT	No polarity, input 24V DC, 16 points, detachable terminals		○	○		
			NR1JY-08R07DT	Ry output 240V AC / 110V DC, 8 points, detachable terminals		○	○		
			NR1JY-16T05DT	Tr sink output 24V DC, 16 points, detachable terminals		○	○		
			NR1JW-16T65DT	Source input 24V DC, 8 points, Tr sink output 24V DC, 8 points, detachable terminals		○	○		
		DeviceNet	NR1DX-1606DT	No polarity, input 24V DC, 16 points, detachable terminals		○	○		
			NR1DY-08R07DT	Ry output 240V AC / 110V DC, 8 points, detachable terminals		○	○		
			NR1DY-16T05DT	Tr sink output 24V DC, 16 points, detachable terminals		○	○		
			NR1DW-16T65DT	Source input 24V DC, 8 points, Tr sink output 24V DC, 8 points, detachable terminals		○	○		
		T-LINK	NR1TX-1606DT	No polarity, input 24V DC, 16 points, detachable terminals		○	○	○	○
			NR1TY-08R07DT	Ry output 240V AC / 110V DC, 8 points, detachable terminals		○	○	○	○
			NR1TY-16T05DT	Tr sink output 24V DC, 16 points, detachable terminals		○	○	○	○
			NR1TW-16T65DT	Source input 24V DC, 8 points, Tr sink output 24V DC, 8 points, detachable terminals		○	○	○	○
		SX bus	NR1SX-1606DT	No polarity, input 24V DC, 16 points, detachable terminals		○	○		
			NR1SY-08R07DT	Ry output 240V AC / 110V DC, 8 points, detachable terminals		○	○		
			NR1SY-16T05DT	Tr sink output 24V DC, 16 points, detachable terminals		○	○		
			NR1SW-16T65DT	Source input 24V DC, 8 points, Tr sink output 24V DC, 8 points, detachable terminals		○	○		
			NR1SF-HP4DT	Pulse train output Pulse train command: 250kHz 4 axes (2 points/1 axes)		○			
		LonWorks	NR1LX-1606DT	No polarity, input 24V DC, 16 points (included the 4 pulse input points), detachable terminals	Accessories: Neuron ID seal				
			NR1LY-08R07DT	Ry output 240V AC / 110V DC, 8 points, detachable terminals					
			NR1LW-11R80DT	Source input 24V DC, 9 points (included the 4 pulse input points), Ry output 240V AC / 110V DC, 2 points, detachable terminals					
		Optional	NR1XV-CB1	Common extension bar (9 pins)		—			
	NR2 type	DeviceNet	NR2DX-3206DT	No polarity, input 24V DC, 32 points, detachable terminals		○	○		
			NR2DY-32T05DT	Tr sink output 24V DC, 32 points, detachable terminals		○	○		
			NR2DY-16R07DT	Ry output 240V AC / 120V DC, 16 points, detachable terminals		○	○		
			NR2DW-32T65DT	No polarity, input 24V DC, 16 points, Tr sink output 24V DC, 16 points, detachable terminals		○	○		
		OPCN-1	NR2JAX-08VMRDT	Multi-range input 8ch, resolution: 13 bits (voltage type), detachable terminals		○			
			NR2JAX-08IMRDT	Multi-range input 8ch, resolution: 13 bits (current type), detachable terminals		○			
			NR2JAY-04VMRDT	Multi-range output 8ch, resolution: 13 bits (voltage type), detachable terminals		○			
			NR2JAY-04IMRDT	Multi-range output 8ch, resolution: 13 bits (current type), detachable terminals		○			
CPU board			NP3PS-SX1PCS32	PCI bus based on SPH300 CPU board Program memory capacity: 32K steps	Accessories: Driver (CD version), Data backup battery,	○			
			NP3PS-SX1PCS74	PCI bus based on SPH300 CPU board Program memory capacity: 74K steps	SX bus terminating plug 2 pieces CPU mode selection key switch, Name and use seal	○			
Interface board			NP3L-LL2PCS	PCI bus based on LE-net loop2 board	Accessories: Driver (CD version)			○	○
			NP3L-FL3PCS	PCI bus based on FL-net board Ver. 2.0 (10/100Mbps based on)	Accessories: Driver (CD version), Name and use seal				

○ Applicable — Not applicable

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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 1 year from the date of purchase or, 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 6 months from the date of repair.

1-2 Coverage

(1) If malfunction occurs in the period of warranty due to Fuji Electric's responsibility 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 7 years from the date of discontinuation. Also, most spare parts used for repair are provided for 7 years from the date of discontinuation. However, some electric parts may not be obtained due to their short life cycle. In this case, repair or provision of the parts may be difficult in the above period. Please contact Fuji Electric or its service providers for further information.

4. Delivered term

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

5. Service

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

6. Scope of application

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

⚠ Safety Considerations

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

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

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