Fuji Electric

Innovating Energy Technology

Integrated Controllers MICREX-SX Series

Programmable Logic Controller

SPE

FEI/SPE/020/R0

Compact size

Ideal for reducing control panel space.

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

Two programming languages

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

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

Large-capacity memory

Programming with rich memory

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

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

High-speed processing

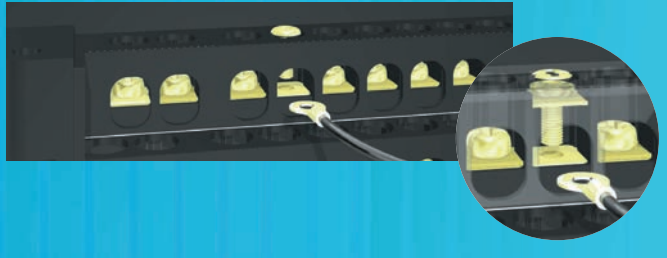
Ideal for small-size machines requiring fast processing.
Fast 0.44 µsec. per Sequence instruction and 2.19 µsec(N mode). and 1.50 µsec(SX mode). for Data instructions.

Many types of instructions

Many types of instructions allow ease of programming.
The program size can be reduced by effectively using a combination of instruction words.
SX mode: 202 types, N mode: 211 types.

Self-lifting terminal block & Finger protection

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



Online program edit function

Allows program modification without interrupting machine operation.

International standards conformity

SPE models conform to the UL/cUL standards as well as the CE mark standard. (Except specific types)

Two analog timers

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

Communication & Networking

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

MONITOUCH direct connection

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

Diversified functions for expanding applications

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

Adapted to analog control

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

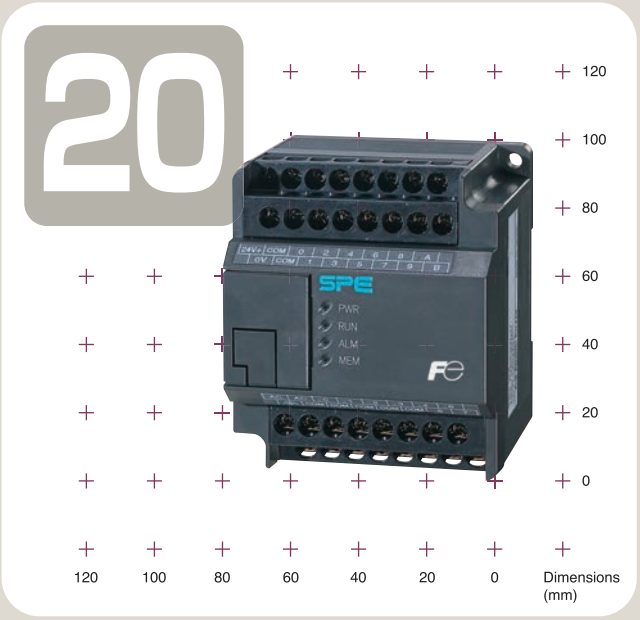
C o n t e n t s

SPE Lineups

Basic Unit

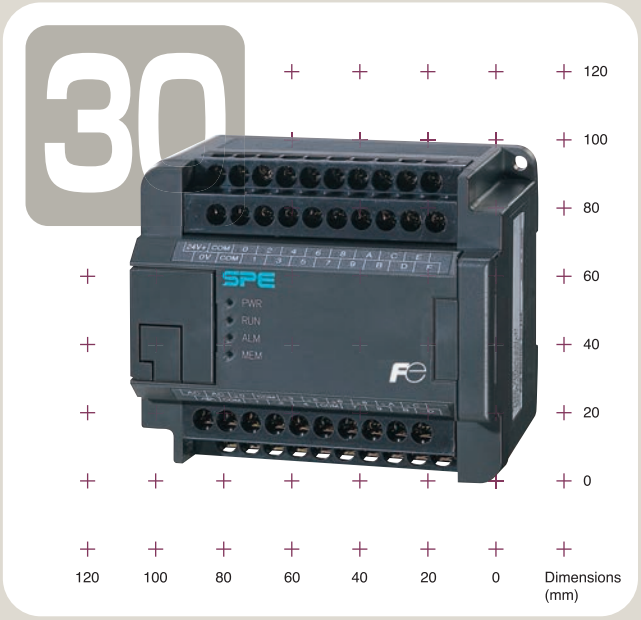
20-points Basic Unit: NW0P20 □-□ZSPE

Power voltage: 100-240V AC, 24V DC
Input: 12 points, Output: 8 points
Relay output, Transistor output
Stand alone unit no expansion



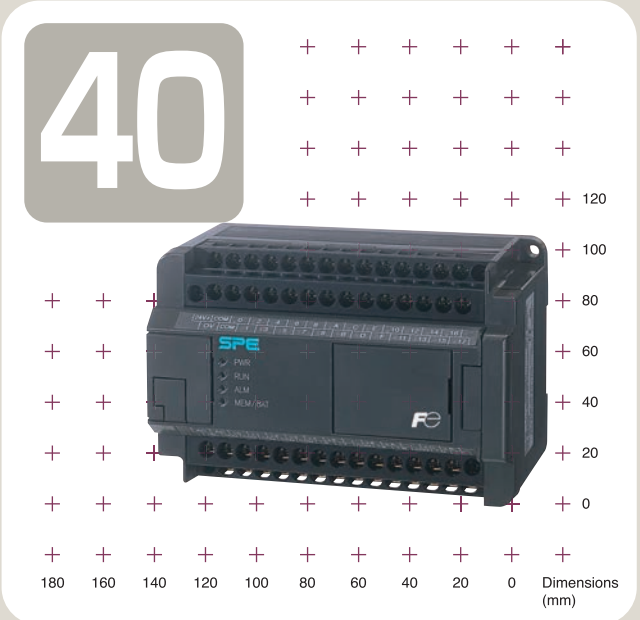
30-points Basic Unit: NW0P30 □-□ZSPE

Power voltage: 100-240V AC, 24V DC
Input: 16 points, Output: 14 points
Relay output, Transistor output
Connectable up to five expansion units



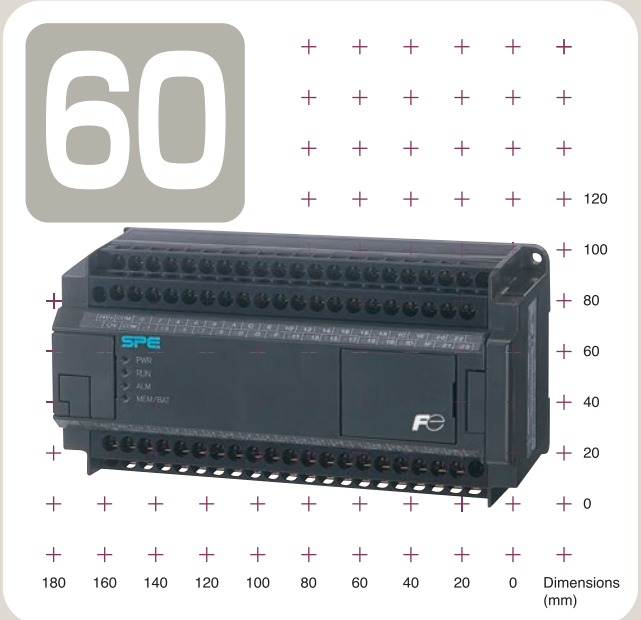
40-points Basic Unit: NW0P40 □-□ZSPE

Power voltage: 100-240V AC, 24V DC
Input: 24 points, Output: 16 points
Relay output, Transistor output
Connectable up to five expansion units
Calendar function (year, month, day, hour, minute, second, day of week) (different type)



60-points Basic Unit: NW0P60 □-□ZSPE

Power voltage: 100-240V AC, 24V DC
Input: 36 points, Output: 24 points
Relay output, Transistor output
Connectable up to five expansion units
Calendar function (year, month, day, hour, minute, second, day of week) (different type)



Expansion Unit

●Digital I/O Unit

16-points I/O Expansion Unit: NW0E16□-3ZSPE
Input: 8 points, Output: 8 points
Relay output, Transistor output

16-points Input Expansion Unit: NW0E16XZSPE
Input: 16 points

16-points Output Expansion Unit: NW0E16□-0ZSPE
Relay output, Transistor output

32-points I/O Expansion Unit: NW0E32□-3ZSPE
Input: 16 points, Output: 16 points
Relay output, Transistor output

60-points I/O Expansion Unit: NW0E60R-31ZSPE
Power voltage: 100-240V AC
Input: 32 points, Relay output: 28 points

●Analog Unit

Analog Input Unit: NW0AX04-MRZSPE
Multi-range input: 4ch

Analog Output Unit: NW0AY04-MRZSPE
Multi-range output: 4ch

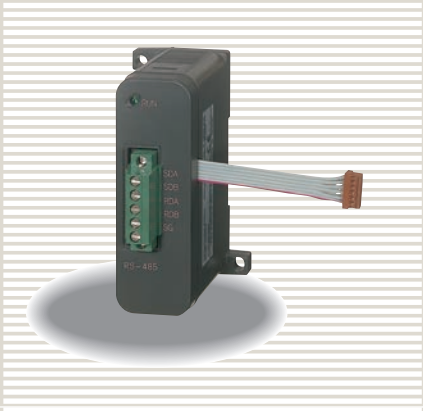
Analog I/O Unit: NW0AW03-MRZSPE
Multi-range input: 2ch
Multi-range output: 1ch

Resistance Bulb Input Module: NW0AX04-PTZSPE
Input: 4ch

Communication Adapter

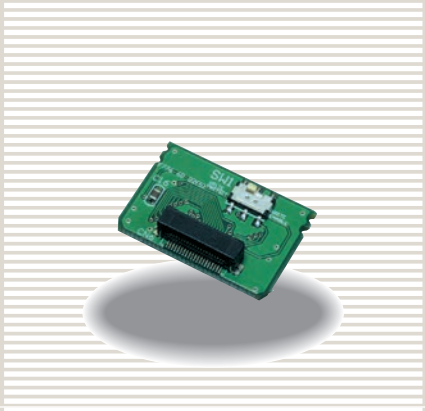
RS-232C Adapter: NW0LA-RS2ZSPE
General-purpose communication mode: RS-232C
1ch

RS-485 Adapter: NW0LA-RS4ZSPE
General-purpose communication mode: RS-485
Simplified CPU link mode
1ch



Option

Memory Card: NW8PMF-8
Flash ROM for 40/60-points basic unit



System Configurations

Expansion Digital I/O System

●Basic Unit + Digital I/O Unit

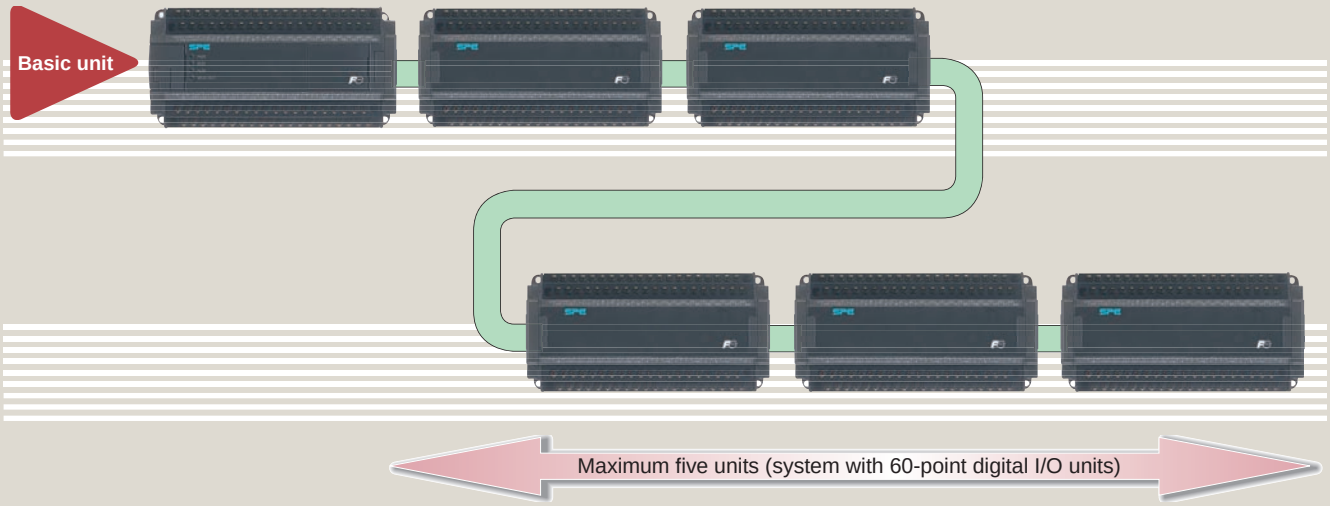
For the SPE, the number of I/O points can be increased up to 360 by adding digital I/O units to the basic unit. Up to five digital I/O units can be added.

	I/O Points	Max. digital I/O points
NW0P20□-3□ZSPE	20 points	20 points
NW0P30□-3□ZSPE	30 points	330 points
NW0P40□-3□ZSPE	40 points	340 points
NW0P60□-3□ZSPE	60 points	360 points

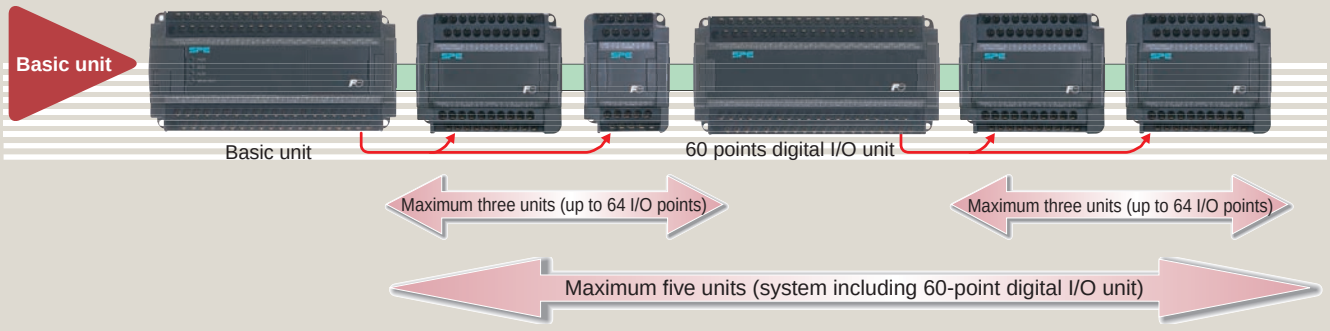
System with 60-point digital I/O units

A maximum of five 60-point digital I/O units, or 300 digital I/O points can be added.

360 points (60+60+60+60+60+60)



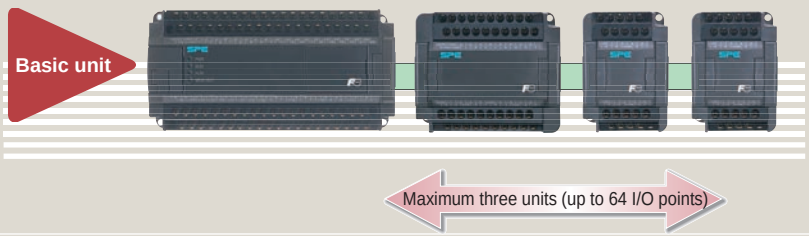
System with a combination of 16- 32- and 60-point digital I/O units



* The basic unit and 60-point digital I/O unit require a power supply. The 16-/32-point digital I/O units are supplied the power from the basic unit and 60-point digital I/O unit as indicated with an arrow (→). One basic unit or one 60-point digital I/O unit can supply power to a maximum of three expansion units (64 or fewer I/O points).

System with a combination of 16- and 32-point digital I/O units

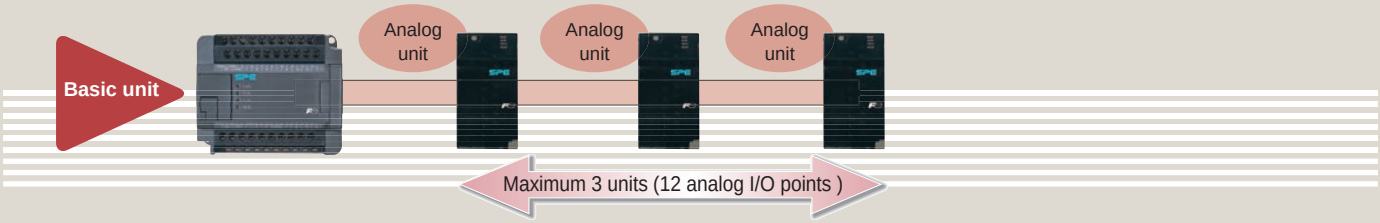
The system with no 60-point digital I/O units allows addition of a maximum of three units, or 64 digital I/O points.



Expansion Analog System

●System expanded only with analog units

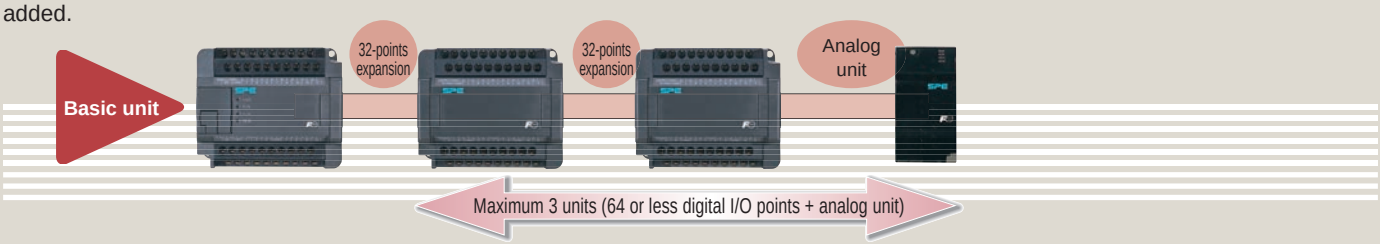
For the SPE, up to three analog units can be added to the basic unit.
By doing so, the number of analog I/O points can be increased up to 12.



●System expanded with a combination of digital I/O unit and analog unit

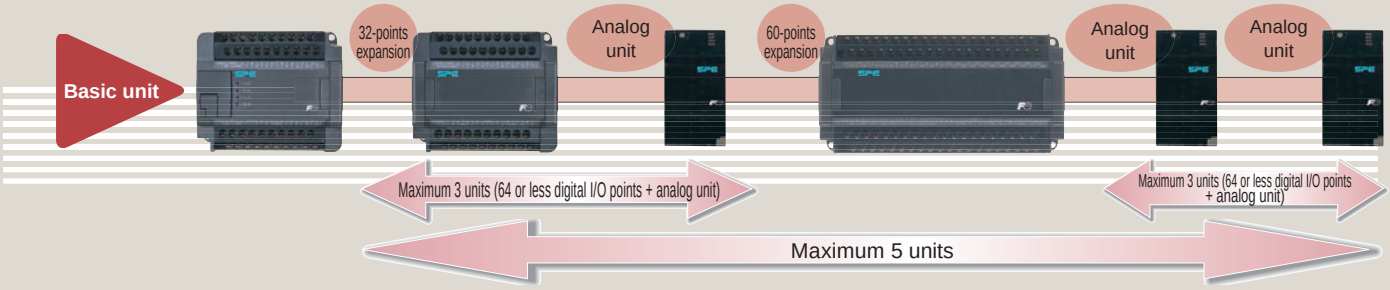
System without 60-point digital I/O units

Also when the basic unit is used in combination with 16-/32-point digital I/O units and/or analog units, a maximum of three units can be added.



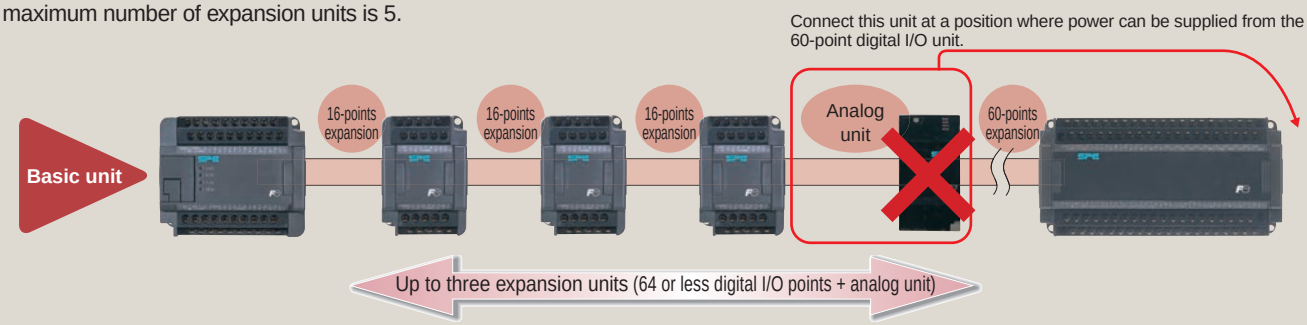
System with 60-point digital I/O units

When the basic unit is used in combination with 60-point digital I/O units and/or analog units, a maximum of five units can be added (up to three analog units).



Points for system expansion

To each of the basic unit and 60-point digital I/O unit, a maximum of three units can be added (64 or fewer I/O points + analog unit). Note that the maximum number of expansion units is 5.



Basic unit and maximum number of expansion units

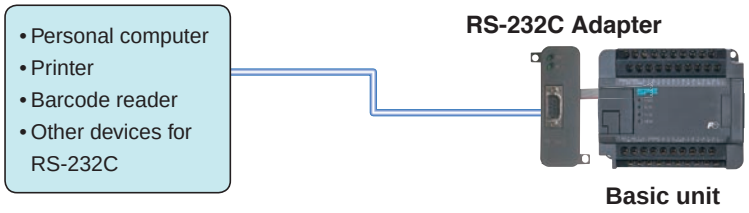
- The 20-point basic unit does not allow connecting expansion units.
- The maximum number of expansion units varies depend ing on the basic unit and digital I/O unit versions.
- Note that some basic unit versions do not allow connecting analog units. See the table given on the right for details.

		Max. number of connectable expansion units		Connection of analog unit
		Digital I/O unit Older than version 10	Digital I/O unit Version 10 or later	
Versions of basic unit	Older than version 10.07	2 units	2 units	Impossible
	10.07 to 20.10	2 units	3 units	Possible
	Version 20.11 or later	2 units	5 units	Possible

System Configurations

Communication Systems

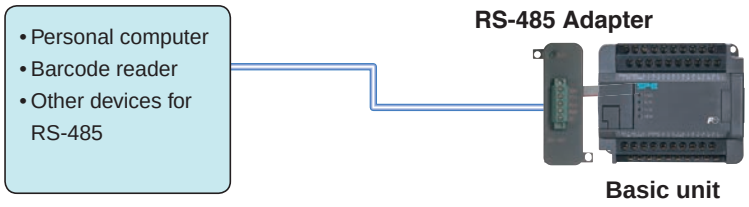
●System based on RS-232C Adapter: NW0LA-RS2ZSPE



Item	Specification
Electrical specifications	RS-232C
Communication specifications	Half-duplex transmission
Connection form	1:1
Transmission rate	38.4kbps max.
Transmission distance	15m max.
User interface	Nonsequenced transmission/ command set type transmission

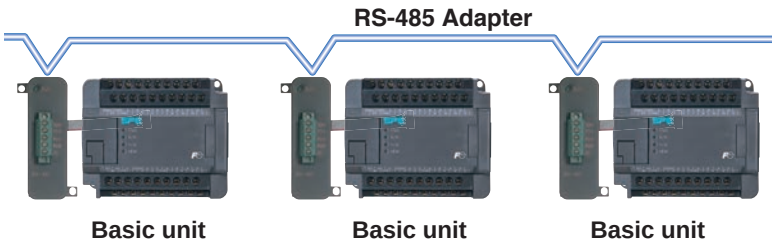
●System based on RS-485 Adapter: NW0LA-RS4ZSPE

1) RS-485 mode



Item	Specification
Electrical specifications	RS-485
Communication specifications	Half-duplex transmission
Connection form	1:31 (max.)
Transmission rate	38.4kbps max.
Transmission distance	1km max.
User interface	Nonsequenced transmission/ command set type transmission

2) Simplified CPU link mode



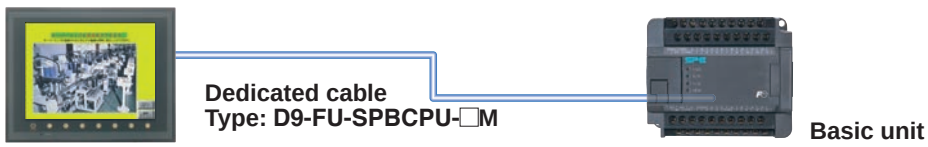
Item	Specification
Electrical specifications	RS-485
Communication specifications	NP link micro
Connection form	Bus
Transmission rate	125kbps max.
Transmission distance	500m max.
Number of units connected	16 units max.
Data amount	32 words/station max.

* When connecting with the NB series, the transmission rate is limited to 19.2 kbps and the data amount to 8 words/station.

●MONITOUCH Connections

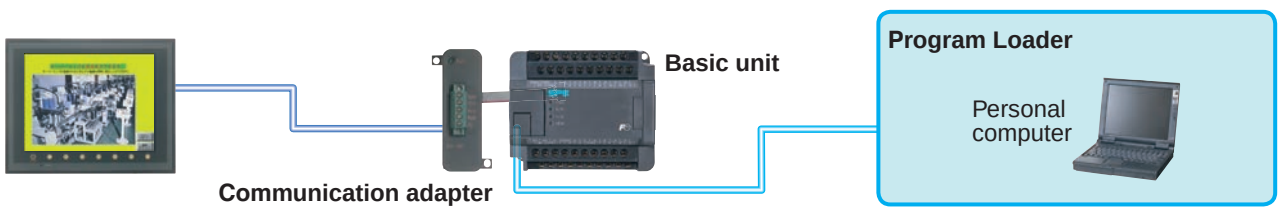
1) Loader port connection

MONITOUCH can directly be connected to the loader port.



2) General-purpose communication connection

Connection through the RS-232C/RS-485 adapter is possible.



Control Functions

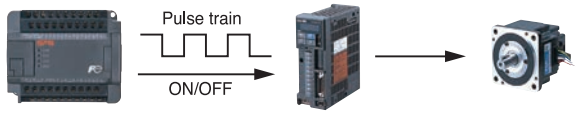
Enabling various controls with standard functions

Pulse Train Output Function

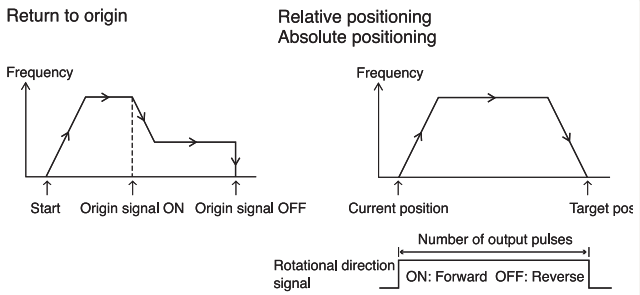
With basic units of the Tr output type, the terminal for output bits 0 and 1 can be used not only as a usual external output but as pulse output with up to 100kHz.
The pulse output can be operated with dedicated instructions, allowing easy control based on pulse train output and pulse width modulation.

●Pulse Train Output

Positioning control with servo motors and stepping motors is possible without specialized units, based on the pulse train output instruction, return-to-origin instruction, relative positioning instruction, absolute positioning instruction, and other positioning instructions.

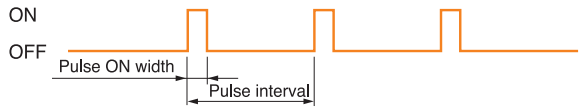


<Operation Patterns>



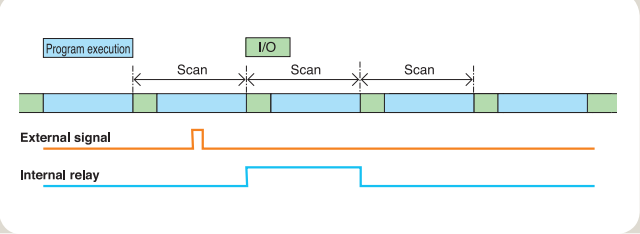
●Pulse Width Modulation

The pulse width modulation instruction allows pulse output with variable pulse ON width and pulse interval with the following specifications, enabling light control.



Pulse Catch Function

Regardless of the input filter time setting, the pulse catch function allows the SPE to detect a pulse (min. 50µsec.) shorter than the scan time and output it at the following scan. It can be used for detecting an object which moves at high speed.



High-speed Counter Function

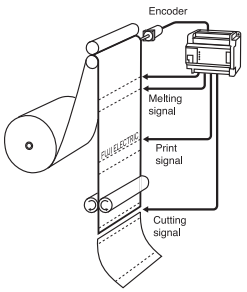
The SPE has a built-in high-speed counter which can count pulses at a maximum rate of 100kHz for a single phase or 50kHz for two phases.

●Specification

Item	Specification		
	1-phase	2-phase	
Method	Preset increment counter	Preset increment/decrement counter	
Count input signal	1-phase increment signal x 2 ch	90-deg.phase difference 2phase signal x 1 ch	Counting pulse + Direction input x 1ch
Control input	Reset		
Counting speed	Max. 100kHz	Max. 50kHz	
Counting range	Unsigned binary 16 bits	Signed binary 32 bits	
Multiplication	x1, x2	x2, x4	x1
Reset	Soft reset by control input and command register		
Preset	Soft reset by control command register		

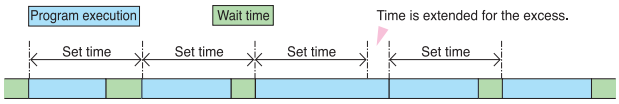
<Sample Application for Packing Machine>

The encoder output pulse can be input to the high-speed counter to control such a high-speed operation.



Constant Scan Function

For the control of a machine which outputs at constant intervals, constant scan can be set to suppress the irregular I/O operating times. Constant scan can be set in the range from 1 to 255 in units of 1 msec.

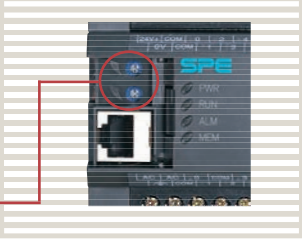


Interrupt Input Function

The SPE has an interrupt input function for interrupting normal program operation to initiate an interrupt program. It executes the interrupt program at the rise of the input from X0 to X3.

Analog Timer Function

The SPE has two analog timers as standard. Each timer value is converted to a digital value of 0 to 255 in the SPE and stored in the internal memories.



Programming Languages

Support for two programming languages on the same hardware

- SX mode: MICREX-SX support (IEC 61131-3 compliant language)
- N mode: FLEX-PC N support (non IEC 61131-3 compliant language)

SX-Programmer Standard Programming Support Tool

NP4H-SWN: N mode and SX mode programming support tool

A support tool with a focus on usability

Program identically to the FLEX-PC N series

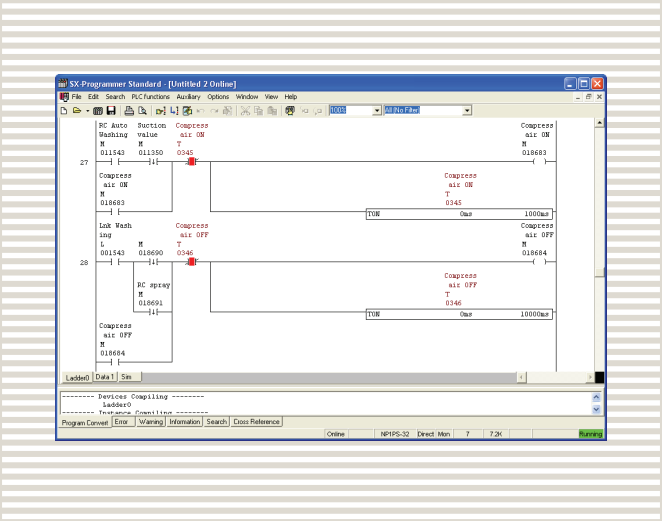
●Support for two different programming languages

Standard provides a choice of SX mode and N mode. In SX mode, create programs that comply with the IEC 61131-3 international standard (JIS B 3503). In N mode, leverage your program file and comment file assets for our FLEX-PC PLC series without modification.

●Familiar user interface

The user interface and ladder programming support SPB programming equivalent to a FLEX-PC Windows-compatible PC loader.

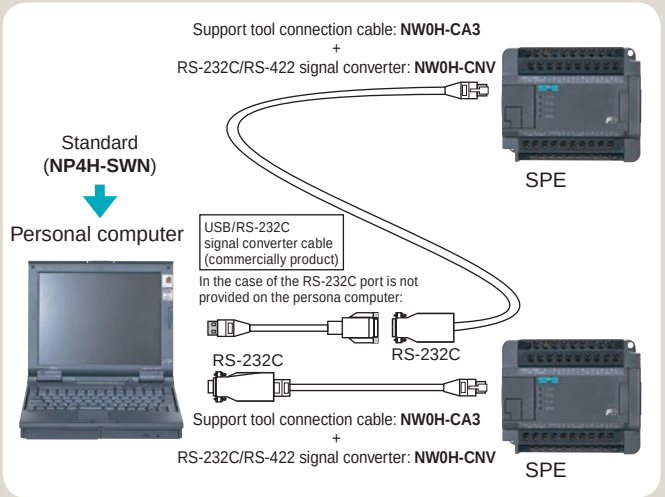
Support for full-keyboard operation is also handy for on-site debugging and maintenance. With a whopping 202 different instruction words, the possibilities for your programs are limited only by your imagination.



●Operation environment

Item	Specification
Hardware	IBM-PC/AT compatible
CPU	Intel Pentium 400MHz or higher (800MHz 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
Keyboard	106 keyboard (101-key keyboard for English version of OS)
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: 9,600bps to 57,600k bps (Default setting that depends on the resources selected)
OS	Windows XP/Vista/7
Portability	Depends on a commercial mobile personal computer.
Environmental durability	Depends on environmental condition of a commercial personal computer.

●System Configuration



●Support for multiple programming languages

SX mode supports ladder as well as ST language, while N mode supports mnemonic language. Select the programming language suited to the type of control you wish to perform.

Programming Languages

SX-Programmer Expert (D300win) Programming Support Tool

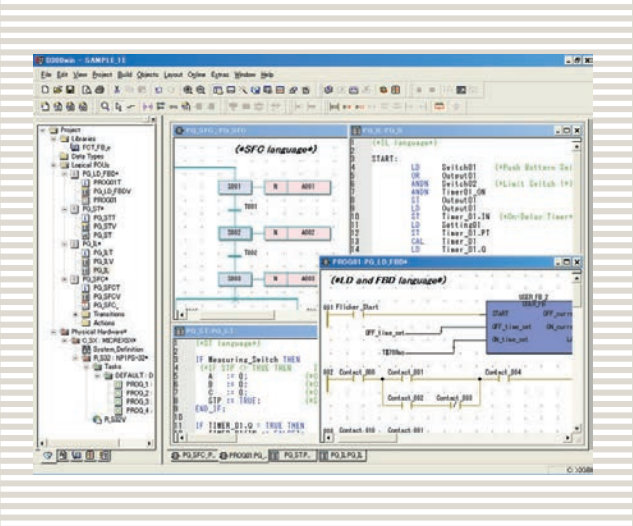
NP4H-SEDBV3: SX mode programming support tool

A support tool with a focus on development efficiency

Program using the same methods as on a microcomputer/PC

●Develop software more efficiently

Complete compliance with IEC 61131-3 enables you to use programming at the POU/worksheet level to create a structured design divided by feature or process. This enables you to break up your design among multiple designers, greatly reducing program development time.



●Modular programming

Improve your programming efficiency through component re-use.

- Programming with levels (variables)
- Create components through function blocks (FBs)

●Multiple programming languages supported

The five programming languages specified by the IEC standard (IL, ST, LD, FBD, and SFC) are all supported. Write your programs in the combination of languages that best expresses the type of control you want to perform.

Instruction List (IL) language:
Minimize application size
Structured Text (ST) language:
A high-level language (IF-THEN-ELSE, etc.)
Ladder Diagram (LD) language:
Relay-box replacement
Function Block Diagram (FBD) language:
Data processing language
Sequential Function Chart (SFC) language:
Application structure notation

●A rich set of instruction words

With a whopping 202 different instruction words available, your ability to create programs is limited only by your imagination.

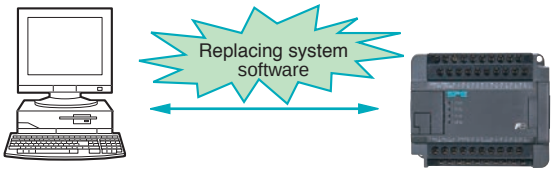
●Operation environments

Item	Specification
Hardware	IBM-PC/AT compatible
CPU	Intel Pentium 400MHz or higher (when Windows XP used, 800MHz or higher recommended)
Hard disk	Free space of 220M bytes or higher Expert (D300win) system software: 100M bytes or higher Standard expansion FB package: 120M bytes or higher
CD-ROM unit	1 unit (x 4 speed or faster), media: ISO 9660 format
Memory capacity	64M bytes or higher (when Windows XP used, 128M bytes or higher recommended)
Keyboard	106 keyboard (101-key keyboard for English version of OS)
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: 9,600bps to 57,600k bps (Default setting that depends on the resources selected)
OS	Windows XP/Vista/7
Portability	Depends on a commercial mobile personal computer.
Environmental durability	Depends on environmental condition of a commercial personal computer.

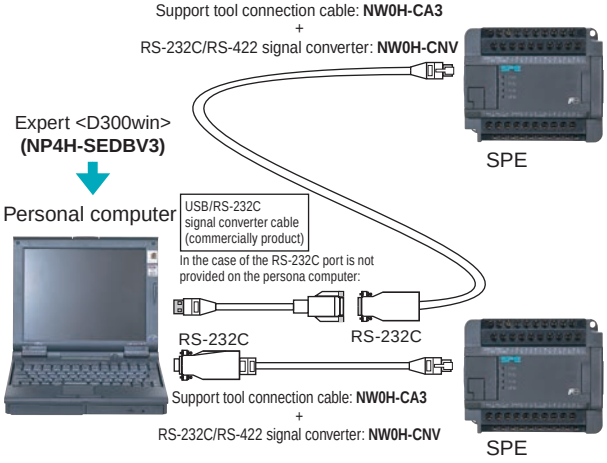
●Replacing system software

The SPE ships from the factory with N mode system software. In order to use it in SX mode, download the SX mode system software using the Standard or Expert (D300win) system utility version 3.1 or higher.

Note: The SX mode is enabled for SPB main unit version of V**10 or up.



●System Configurations



Ordering Informations

Standards	○	Certificated	△	Under planing		No planing	–	Exceptions

Products names	Types (= Ordering codes)	Specifications				Standards	
		Power specifications	Input specifications	Output specifications	Calendar function	CE	UL/cUL
20-points basic unit	**NW0P20R-31ZSPE**	100 to 240V AC	24V DC 12 points	Ry 8 points	Non	○	○
	NW0P20T-31ZSPE			Tr sink 8 points		○	○
	NW0P20T-34ZSPE	24V DC		Tr sink 8 points		○	○
30-points basic unit	**NW0P30R-31ZSPE**	100 to 240V AC	24V DC 16 points	Ry 14 points		○	○
	NW0P30T-31ZSPE			Tr sink 14 points		○	○
	NW0P30R-34ZSPE	24V DC		Ry 14 points		○	○
40-points basic unit	**NW0P40R-31ZSPE**	100 to 240V AC	24V DC 24 points	Ry 16 points		○	○
	NW0P40T-31ZSPE			Tr sink 16 points		○	○
	NW0P40R-31CZSPE			Ry 16 points	Built-in	○	○
	NW0P40R-34ZSPE	24V DC		Ry 16 points	Non	○	○
	NW0P40T-34ZSPE			Tr sink 16 points		○	○
60-points basic unit	**NW0P60R-31ZSPE**	100 to 240V AC	24V DC 36 points	Ry 24 points	Non	○	○
	NW0P60R-31CZSPE			Ry 24 points	Built-in	○	○
	NW0P60T-31CZSPE			Tr sink 24 points		○	○
	NW0P60R-34ZSPE	24V DC		Ry 24 points	Non	○	○
	NW0P60T-34ZSPE			Tr sink 24 points		○	○
16-points expansion unit *1	**NW0E16XZSPE**	No power source	24V DC 16 points	–		○	○
	NW0E16T-0ZSPE			Tr sink 16 points		○	○
	NW0E16R-3ZSPE		24V DC 8 points	Ry 8 points		○	○
32-points expansion unit *1	**NW0E32R-3ZSPE**		24V DC 16 points	Ry 16 points		○	○
60-points expansion unit *1	**NW0E60R-31ZSPE**	Provided power source	24V DC 32 points	Ry 28 points		○	
Analog Input Unit	**NW0AX04-MRZSPE**	Multi-range input: 4ch, Resolution: 14 bits (voltage / current)				○	
Analog Output Unit	**NW0AY04-MRZSPE**	Multi-range output: 4ch, Resolution: 14 bits (voltage / current)				○	
Analog I/O Unit	**NW0AW03-MRZSPE**	Multi-range input: 2ch, Multi-range output: 1ch, Resolution: 10 bits (voltage / current)				○	
Resistance Bulb Input Module	**NW0AX04-PTZSPE**	Input: 4ch				○	
RS-232C adapter	**NW0LA-RS2ZSPE**	RS-232C 1 channel (general-purpose communication mode, loader interface mode)				○	○
RS-485 adapter	**NW0LA-RS4ZSPE**	RS-485 1 channel (general-purpose communication mode, loader interface mode, simplified CPU link mode)				○	○
Memory card	**NW8PMF-8**	Flash ROM (for 40/60-points basic unit)				–	–
Battery	**NW8P-BT**	Lithium battery for backup				–	–
Expansion cable	**NW8C-EP6**	Expansion cable: 600 mm (For 60-points expansion unit, only one cable can be used by one system)				–	–
SX-Programmer Standard	**NP4H-SWN**	For N mode/ SX mode, CD-ROM, English/Japanese edition				–	–
SX-Programmer Expert	**NP4H-SEDBV3**	For SX mode, CD-ROM, English/Japanese edition, Version 3				–	–
PC connection adapter (Signal converter)	**NW0H-CNV**	For personal computer loader-basic unit connection, RS-232C/RS-422 conversion, (combined with the optional loader cable: NW0H-CA3)				–	–
Loader cable	**NW0H-CA3**	Connection cable for personal computer loader-basic unit: 3000 mm straight cable (combined with the optional PC connection adapter: NW0H-CNV)				–	–

Note: 1) Pulse train output and PWM output are not available for relay output.
Note: 2) For more information about RoHS based on products, please contact our sales section.
*1 50mm expansion cable is supplied as accessory.

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