

Integrated Controllers **MICREX-SX** Series

# Programmable Logic Controller

# SPB



# Compact and Full of Functions!



30-points basic unit  
(Actual size)

High Performance SPB Programmable Logic Controller is Packed with Many Useful Functions in a Compact Body.

## 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

Type	Memory capacity			
	Program memory		Data memory	
	SX mode <sup>*1</sup>	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				

<sup>\*1</sup> There are Included the initiated value of the retain memory.

## High-speed processing

Ideal for small-size machines requiring fast processing.

Fast 0.44  $\mu$ sec. per Sequence instruction and 2.19  $\mu$ sec(N mode). and 1.50  $\mu$ sec(SX mode). for Data instructions.

## Many types of instructions

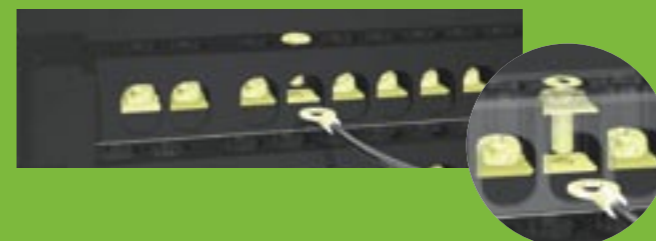
Many types of instructions allow ease of programming.

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

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

## Two analog timers

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

## Communication & Networking

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

## POD direct connection

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

## Diversified functions for expanding applications

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

## Adapted to analog control

Multi-range (voltage / current) adapted. 3 types of analog unit with detachable terminal blocks are added to the lineup.

Capable of analog control, such as temperature control by PID instruction.

## C o n t e n t s

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# SPB Lineups

## Basic Unit

### 20-points Basic Unit: NW0P20 □-□

Power voltage: 100-200V AC, 24V DC  
 Input: 12 points, Output: 8 points  
 Relay output, Transistor output  
 Stand alone unit no expansion

### 30-points Basic Unit: NW0P30 □-□

Power voltage: 100-200V AC, 24V DC  
 Input: 16 points, Output: 14 points  
 Relay output, Transistor output  
 Connectable up to five expansion units



### 40-points Basic Unit: NW0P40 □-□

Power voltage: 100-200V 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 □-□

Power voltage: 100-200V 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 □-3**  
Input: 8 points, Output: 8 points  
Relay output, Transistor output
- 16-points Input Expansion Unit: NW0E16X**  
Input: 16 points
- 16-points Output Expansion Unit: NW0E16 □-0**  
Relay output, Transistor output
- 32-points I/O Expansion Unit: NW0E32 □-3**  
Input: 16 points, Output: 16 points  
Relay output, Transistor output
- 60-points I/O Expansion Unit: NW0E60R-31**  
Power voltage: 100-200V AC  
Input: 32 points, Relay output: 28 points

### ● Analog Unit

- Analog Input Unit: NW0AX04-MR**  
Multi-range input: 4ch
- Analog Output Unit: NW0AY04-MR**  
Multi-range output: 4ch
- Analog I/O Unit: NW0AW03-MR**  
Multi-range input: 2ch  
Multi-range output: 1ch
- Thermocouple Input Module: NW0AX04-TC**  
Input: 4ch
- Resistance Bulb Input Module: NW0AX04-PT**  
Input: 4ch



## Communication Adapter

- RS-232C Adapter: NW0LA-RS2**  
General-purpose communication mode: RS-232C  
1ch
- RS-485 Adapter: NW0LA-RS4**  
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

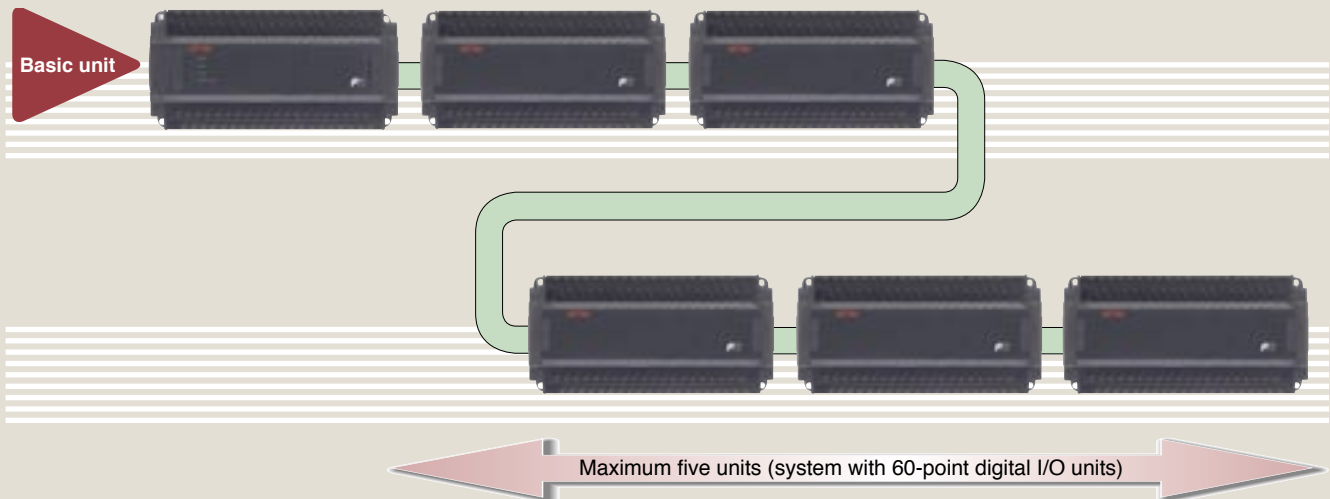
For the SPB, the number of I/O points can be increased up to 360 by adding digital I/O units to the basic unit. Up to five digital I/O units can be added.

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

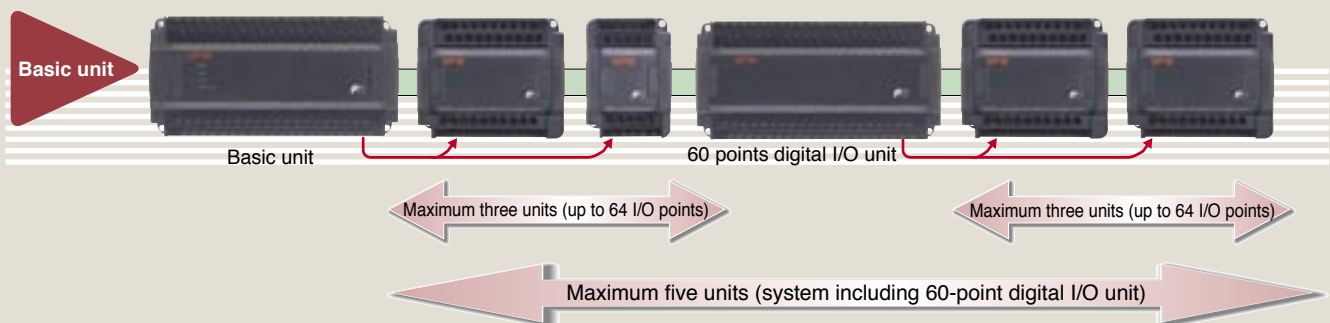
### System with 60-point digital I/O units

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)



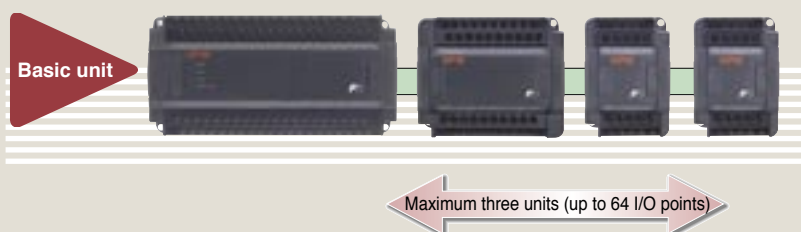
### System with a combination of 16- 32- and 60-point digital I/O units



\* 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.

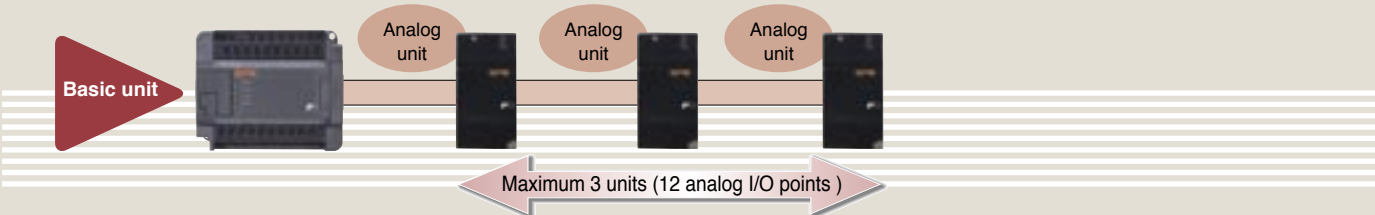




## Expansion Analog System

### System expanded only with analog units

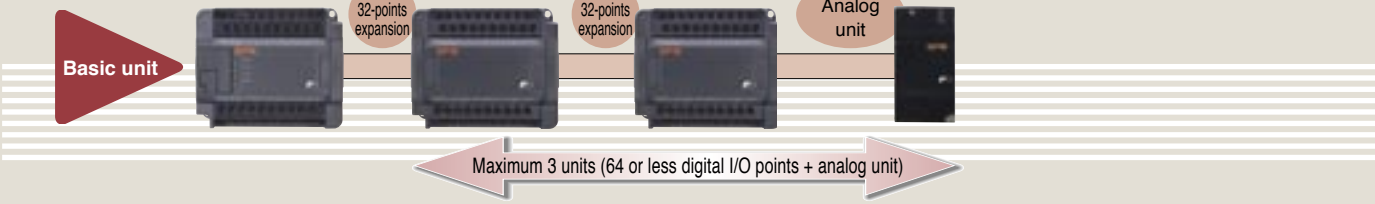
For the SPB, up to three analog units can be added to the basic unit. By doing so, the number of analog I/O points can be increased up to 12.



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

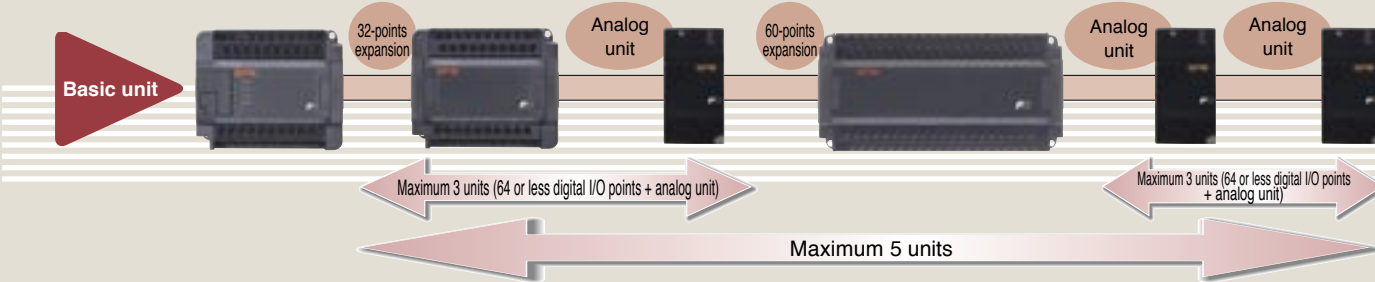
#### System without 60-point digital I/O units

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

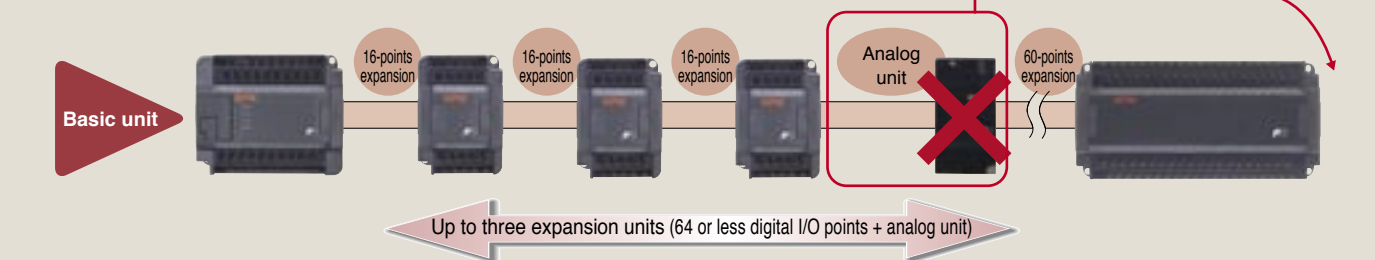
When the basic unit is used in combination with 60-point digital I/O units and/or analog units, a maximum of five units can be added (up to three analog units).



## 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.

Connect this unit at a position where power can be supplied from the 60-point digital I/O unit.



### Basic unit and maximum number of expansion units

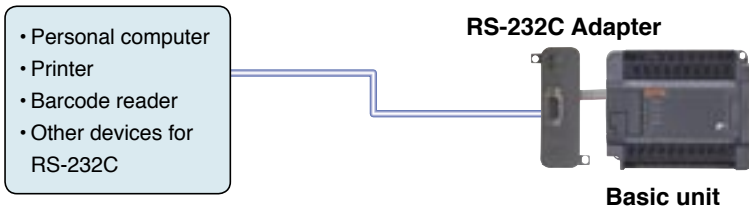
- The 20-point basic unit does not allow connecting expansion units.
- The maximum number of expansion units varies depending on the basic unit and digital I/O unit versions.
- Note that some basic unit versions do not allow connecting analog units. See the table given on the right for details.

		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

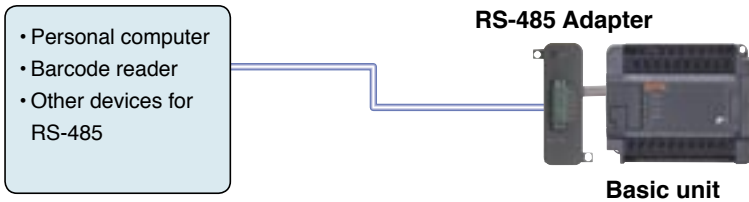
### ● System based on RS-232C Adapter: NW0LA-RS2



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

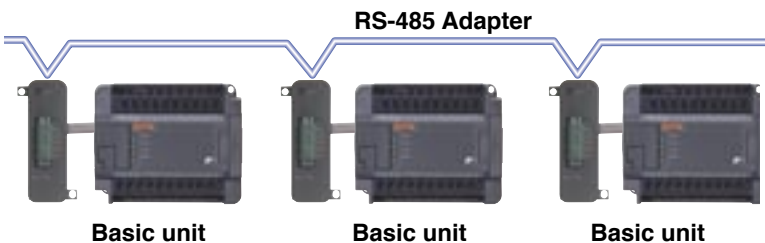
### ● System based on RS-485 Adapter: NW0LA-RS4

#### 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

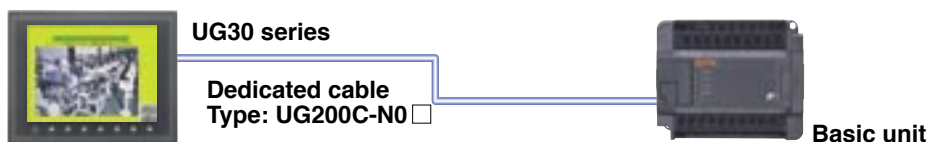


Item	Specification
Electrical specifications	RS-485
Communication specifications	NP link micro
Connection form	Bus
Transmission rate	125kbps max.
Transmission distance	500m max.
Number of units connected	16 units max.
Data amount	32 words/station max.

### ● POD Connections

#### 1) Loader port connection

The programmable operation display (POD) can directly be connected to the loader port.



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

#### 2) General-purpose communication connection

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



# Specifications



## Basic Unit / Expansion Unit Specifications

### General Specifications

Item	Specification	
Physical environment	Operating ambient temperature	0 to +55°C
	Storage (transport) temperature	-25 to +70°C
	Relative humidity	20 to 95% RH no condensation
	Pollution level	Level 2 (IEC61131-2)
	Corrosive gas	Free from corrosive gases, not stained with organic solvents
	Altitude/Atm.	2000m or less above sea level (Transport condition : 70kPa or more)
Mechanical operating condition	Vibration resistance	Half amplitude 0.15mm, Constant acceleration 19.6m/s <sup>2</sup> , 2 hours in each direction, 6 hours in total
	Impact resistance	Peak acceleration 147m/s <sup>2</sup> (IEC conformance), 3 times in each direction
Electrical operating condition	Electrostatic discharge resistance	± 6 kV: contact discharge, ± 8 kV: aerial discharge (class 3)
	Radiation resistance	10V/m (80 to 1,000MHz)
	Noise immunity	Noise simulator method, rising 1ns, Pulse width 1μs, 1.5kV
Grounding method	Type D grounding (ground resistance 100Ω)	
Structure	Panel-mounted type IP30	
Installation method	Installation direction: Vertical	
	Fixing method: Direct installation (M4 screws) or installation with JIS/IEC (35mm wide) support rail	
Cooling method	Ambient air-cooled	

### Performance Specifications (N mode)

Item	Specification	
Calculation control	Stored program repeated calculation method	
I/O control method	Batch refresh method/Direct method	
Program language	Ladder, mnemonic	
Program capacity	Basic unit 20/30 points : 4K steps (flash memory built in) Basic unit 40/60 points : 8K steps (flash memory built in)	
No. of instructions	Sequence instruction	45 types
	Applied instruction	166 types
Instruction processing speed	Basic instruction 0.44μs or more Applied instruction 2.19μs or more	
I/O relay	X,Y 1024 points	
Internal relay	M 1024 points	
Expanded internal relay	M 3072 points	
Latch relay	L 1024 points	
Expanded latch relay	L 3072 points	
Special relay	M 512 points	
Timer	(10 ms base) T	384 points (T000 to T17F)
	(1 ms base) T	128 points (T180 to T1FF)
Counter (increment)	C 256 points	
Register	Data register D	8192 words
	Special register D	256 points
	File register R	Uses the program area depending upon the setting
Pointer	For branching P	256 points
	For interrupt I	10 points
Input filter time	Variable (No filter, 3ms/3ms (default), 10ms/10ms)	
High-speed counter	Single-phase, 100kHz, 2points (unsigned 16-bit) or Two-phase, 50kHz, 1point (signed 32-bit)	
Pulse output	1 to 100kHz, 2points (transistor output type basic unit only)	
Self-diagnostic function	Memory check, watchdog timer, etc.	
Memory backup	Program (including file registers), parameters • Built-in RAM + capacitor and built-in flash (20/30-points unit) • Built-in RAM + battery and built-in flash (40/60-points unit) Data memory (power failure retaining area) • Built-in RAM + capacitor (20/30-points unit) • Built-in RAM + battery (40/60-points unit) Backup time of the memory • Built-in RAM + capacitor backup time: About 2 weeks (at 25°C) • Built-in RAM + battery backup time: About 5 years (at 25°C) • Number of updates of built-in flash: About 100,000 times	
Calendar	Accuracy ± 27 seconds/month (at 25°C) (Calendar function adapted type only)	

### Performance Specifications (SX mode)

Item	Specification			
Calculation control	Stored program, Cyclic scanning system (default task), periodic task, event task			
I/O control method	Whole: Scanning and batch refresh method Digital I/O: Synchronous refresh with task method			
Program language (Based on IEC 61131-3)	IL, ST, LD, FBD, SFC			
Program capacity	4K steps	2K steps		
No. of instructions	202 types			
Instruction processing speed (dimensions in μs)	Sequence instructions: Contact: 0.44~, Coil: 0.50~ Addition and subtraction instructions: 2.56~ Multiplications and division instructions: 3.88~ Timer instructions: 18.44~ Counter instructions: 13.88~			
No. of tasks	Default task: 1 Periodic task, event task: total 4			
No. of POU's	Program: 8 User FB: 16 User FCT: 16			
Data types *1	BOOL, WORD, DWORD, INT, DINT, UINT, UDINT, TIME, DT, Array data types (The array number are possible to the variable setting), Structured data types.			
Basic unit	60-points basic unit	40-points basic unit	30-points basic unit	20-points basic unit
Data memory capacity	8.5K words	5K words		
I/O memory (IQ) <Fixed>	512 words (The direct connected digital I/O are possible to synchronous refresh with task)			
System memory (SM) <Fixed>	512 words			
Standard memory (M) <Variable>	2.5K words (High-speed memory: 512 words fixed)	1.5K words (High-speed memory: 512 words fixed)		
Retain memory (RM) <Variable>	1K words	512 words		
User FB memory (FM) <Variable>	0K words (Max. 1.5K words)	0K words (Max. 1.5K words)		
System FB memory (SFM) <Variable>	4K words	2K words		
Timer <Variable>	256 points	128 points		
Counter <Variable>	128 points	64 points		
Edge detection <Variable>	512 points	256 points		
Others <Variable>	512 words	256 words		
FM characteristic initiated value <Variable>	0K words (Max. 384+3K words)	0K words (Max. 192+1.5K words)		
Temporary memory capacity	1K words (Average: 42 words/POU)			
Input filter time	Variable (No filter, 3ms/3ms, 10ms/10ms) Default (3ms/3ms)			
High-speed counter	Single-phase, 100kHz, 2points (unsigned 16-bit) or Two-phase, 50kHz, 1point (signed 32-bit)			
Pulse output	1 to 100kHz, 2points (transistor output type basic unit only)			
Self-diagnostic function	Memory check, watchdog timer, etc.			
Memory backup	Program (including file registers), parameters • Built-in RAM + capacitor and built-in flash (20/30-points unit) • Built-in RAM + battery and built-in flash (40/60-points unit) Data memory (power failure retaining area) • Built-in RAM + capacitor (20/30-points unit) • Built-in RAM + battery (40/60-points unit) Backup time of the memory • Built-in RAM + capacitor backup time: About 2 weeks (at 25°C) • Built-in RAM + battery backup time: About 5 years (at 25°C) • Number of updates of built-in flash: About 100,000 times			
Calendar	Accuracy ± 27 seconds/month (at 25°C) (Calendar function adapted type only)			

\*1 Data types: REAL type, DATE type, TOD type, STRING type are unsupported.



# Specifications

## Basic Unit / Expansion Unit Specifications

### Power Source Specifications

Item	Specification	
	AC Power Type	DC Power Type
Rated voltage	100 to 240V AC	24V DC
Voltage tolerance	85 to 264V AC	19 to 30V DC
Rated frequency	50/60Hz	—
Frequency tolerance range	47 to 63Hz	—
Allowable instantaneous	1 cycle or less	5 ms or less
Waveform distortion rate	5% or less	—
Waveform ripple ratio	—	3-phase full-wave rectified waveform: 5% or less
Rated output voltage (Output voltage variation)	24V DC±10% (21.6 to 26.4V DC)	
24V DC externally supplied current	Basic unit 20 points: 200mA Basic unit 30/40 points: 250mA Basic unit 60 points: 300mA Expansion unit 60 points: 300mA	—
Power consumption	Basic unit 20 points: 35VA or less Basic unit 30/40 points: 60VA or less Basic unit 60 points: 75VA or less Expansion unit 60 points: 75VA or less	Basic unit 20 points: 10W or less Basic unit 30/40 points: 25W or less Basic unit 60 points: 3W or less
Leak current	0.25mA or less	0.25mA or less
Rush current	40 A <sub>o-p</sub> or less, 10ms or less	150 A <sub>o-p</sub> or less, 10ms or less
Dielectric strength	2830 Vrms AC for 1 min. entire external terminals and ground	510 Vrms AC for 1 min. entire external terminals and ground
Isolation method	Transducer isolation	
Insulation resistance	10MΩ or more with a 500 V DC megger	

### Input Specifications

Item	Specification	
	Fast DC Input	Normal DC Input
Input signal	Rated voltage	24V DC
	Voltage tolerance difference (min. to max.)	24V DC ±10% (including ripple)
Input circuit characteristics	Allowable ripple ratio	5%
	Input method	Both sink and source (bi-directional)
Input circuit characteristics	Rated current	Approx. 5mA (at 24V)
	Input impedance	Approx. 4.7kΩ
Input circuit characteristics	Standard ON voltage range operating range	15 to 26.4V
	OFF voltage range	0 to 5V
Input circuit characteristics	Input type	Conforms to Type 1
	Input delay time	25μs or less
Input circuit characteristics	Hardware	400μs
	Software	Can be set to No filter, 3ms/3ms, or 10ms/10ms by parameter (Default is 3 ms/3 ms)
Isolation method	Photocoupler isolation	
Dielectric strength	1500V AC for 1 min. (between entire input terminals and FG)	
Insulation resistance	10MΩ or more with a 500 V DC megger (between entire input terminals and FG)	

Note: Terminal Nos. 0 to 3 of the basic unit are for high-speed DC input; other terminal numbers are generally for DC input.

### Output Specifications

#### Relay Output

Item	Specification	
Output condition	Rated voltage	240V AC, 110V DC
	Max. allowable voltage	264V AC, 140V DC
Output circuit characteristic	Output method	Relay
	Rated current	240 V AC/30 V DC: 2 A/point, 8 A/common 110 V DC: 0.2 A/point, 1.6 A/common
	Output delay time	10ms or less
	Min. load voltage/current	5V DC, 1mA
Output protection method	Max. switching frequency	1800 times/hour
	Built-in fuse	None
	Output type	Relay
Output protection method	Surge suppress circuit	None
	Other output protection	None
Isolation method	Relay insulation	
Dielectric strength	2300V AC for 1 min. (between entire output terminals and FG)	
Insulation resistance	10MΩ or more with a 500 V DC megger (between entire output terminals and FG)	

#### Transistor output (sink output, source output)

Item	Specification		
Output power condition	Rated voltage	Normal output	24V DC
		High-speed output *1	5 to 24V DC
	Voltage tolerance difference	Normal output	19 to 30V DC (including ripple)
		High-speed output *1	4.5 to 26.4V DC
Output circuit characteristics	Rated current	Normal output	0.5A/1 point 0.8A/4 points common 1.6A/8 points common
		High-speed output *1	0.1A/1 point
	Output voltage drop	Normal output	1.5V or less (0.5A)
		High-speed output *1	1.5V or less (0.1A)
Output delay time*2	Normal output	1ms or less	
	High-speed output *1	5μs or less	
Output protection method	Leakage current at off	0.1mA or less	
	Surge current resistance	2A max. (10ms)	
	Max. switching frequency	1800 times/hour (inductive load)	
Output protection method	Built-in fuse	None	
	Surge suppress circuit	Zener diode	
	Other output protection	None	
External connection	Terminal board M3 fastened by screws		
Isolation method	Photocoupler isolation		
Dielectric strength	1500V AC for 1 min. (between entire output terminals and FG)		
Insulation resistance	10MΩ or more with a 500V DC megger (between entire output terminals and FG)		

\*1 Bits 0 and 1 are enabled for high-speed output.

\*2 ON time/OFF time changes when output frequency is high. For details, refer to Pulse Commands/Function Commands (FEH406) User's Manual.



## Analog Unit Specifications

### ● Analog Input Unit: NW0AX04-MR

Item	Specification				
Type	<b>NW0AX04-MR</b>				
Number of input channels	4 channels				
Input impedance	1MΩ		250Ω		
Input tolerance	Voltage input: ±15 V		Current input: ±30mA		
Input range	0 to 5V 1 to 5V 0 to 10V	-10 to 10V	-20 to 20mA	0 to 20mA	4 to 20mA
Digital value *1	0 to 16000 (DEC)				
Max. resolution	Voltage: 1.25mV		Current: 5μA		
Overall accuracy (full scale)	±0.1% or less (23°C±5°C)				
	±0.3% or less (0 to 55°C), 1-5V range		±0.4% or less (0 to 55°C)		
	±0.2% or less (0 to 55°C), other ranges				
Sampling time	0.27ms x (Number of conversion enabled channels + 1)				
Input filtering time	Approx. 200μs (hard filter: time constant of primary delay)				
Input delay time *2	Max. 1.5ms/4 points + scan time (ms)				
Connection	External connection Detachable terminal block: M3 screw, 20 poles				
	Applicable wire size AWG#22-18 (Use shielded twisted pair cable.)				
Isolation method	Photocoupler isolation (no isolation between channels)				
Dielectric strength	500V AC for 1min. (between entire analog input terminals and FG (short-circuit current: 5mA))				
Insulation resistance	10MΩ or more with a 500V DC megger (between entire analog input terminals and FG)				
External current consumption (24V DC)	24V DC (+10%, -15%), full-wave rectification unavailable 100mA or less				
Rush current	5A or less				
Treatment of unused channel	Basically short-circuited (between V+ and COM)				
Number of occupied words	8 words (input: 6 words, output: 2 words)				
Mass	Approx. 250g				

\*1 When the "-10 to 10V" or "-20 to 20mA" input range is used, the digital output range can be expanded to "-8,000 to 8,000" with the scaling function.

\*2 For step response, input filtering time needs to be considered.

Note 1: The maximum deviation of noise is ±1% of full scale.

Note 2: At shipment the range is set to "0 to 10V".

### ● Analog Output Unit: NW0AY04-MR

Item	Specification				
Type	<b>NW0AY04-MR</b>				
Number of output channels	4 channels				
Output range	0 to 5V 1 to 5V	0 to 10V	-10 to 10V	0 to 20mA	4 to 20mA
External load impedance	1kΩ or more	2kΩ or more	2kΩ or more	500Ω or less	
Digital value *1	0 to 16000 (DEC)				
Maximum resolution	Voltage: 1.25mV		Current: 5μA		
Overall accuracy (full scale)	±0.1% or less (23°C±5°C)				
	±0.3% or less (0 to 55°C), 1-5V range		±0.4% or less (0 to 55°C)		
	±0.2% or less (0 to 55°C), other ranges				
Sampling time	1.0ms or less/4 points				
Output delay time	1.0ms or less/4 points + scan time (ms)				
Load short-circuit protection	Provided			—	
	External connection Detachable terminal block: M3 screw, 20 poles				
Connection	Applicable wire size AWG#22-18 (Use shielded twisted pair cable.)				
	Isolation method Photocoupler isolation (no isolation between channels)				
Dielectric strength	500V AC for 1 min. (between entire analog input terminals and FG (short-circuit current: 5mA))				
Insulation resistance	10MΩ or more with a 500V DC megger (between entire analog input terminals and FG)				
External current consumption (24V DC)	200mA or less		240mA or less		
Rush current	5A or less				
Treatment of unused channel	Basically open				
Number of occupied words	8 words (input: 2 words, output: 6 words)				
Mass	Approx. 250g				

\*1 When the "-10 to 10V" output range is used, the digital input range can be expanded to "-8,000 to 8,000" with the scaling function.

Note 1: The maximum deviation of noise is ±1% of full scale.

Note 2: At shipment the range is set to "0 to 10V".

### ● Analog I/O Unit: NW0AW03-MR

Item	Specification			
Type	<b>NW0AW03-MR</b>			
Input	Number of channels	2 channels		
	Input impedance	100kΩ	250Ω	
	Input tolerance	Voltage input: ±15 V		
	Input range	0 to 5V	0 to 20mA	
		1 to 5V	4 to 20mA	
Overall accuracy (full scale)	±1% or less (0 to 55°C)			
Conversion rate *1	8ms/2 channels			
Input filtering time	Approx. 2.2ms (hard filter: time constant of primary delay)			
Output	Number of channels	1		
	Output range	0 to 5V	0 to 20mA	
		1 to 5V	4 to 20mA	
		0 to 10V		
	External load impedance	2kΩ or more	500Ω or more	
	Conversion rate *2	8ms/channel		
Load short-circuit protection	Provided	—		
Overall accuracy (full scale)	±1% or less (0 to 55°C)			
Digital value	0 to 1000 (DEC)			
Maximum resolution	Voltage: 4mV		Current: 16μA	
	External connection Detachable terminal block: M3 screw, 20 poles			
Connection	Applicable wire size AWG#22-18 (Use shielded twisted pair cable.)			
	Isolation method Photocoupler isolation (no isolation between channels)			
Dielectric strength	500V AC for 1min. (between entire analog input terminals and FG (short-circuit current: 5mA))			
Insulation resistance	10MΩ or more with a 500V DC megger (between entire analog input terminals and FG)			
External current consumption (24V DC)	200mA or less 24V DC (+10%, -15%), full-wave rectification unavailable			
Rush current	5A or less			
Treatment of unused channel	Input channel shall basically be short-circuited (between V+ and COM); output channel shall basically be open.			
Number of occupied words	8 words (input: 4 words, output: 4 words)			
Mass	Approx. 250g			

\*1 For step response, input filtering time needs to be considered.

\*2 Can respond by 0 to 90%

Note 1: The maximum deviation of noise is ±1% of full scale.

Note 2: At shipment the range is set as follows:

- Analog input: 0 to 10V
- Analog output: 0 to 10V

# Specifications

## Thermocouple Input Module Specifications

### ●NW0AX04-TC Specifications

Item	Specification
Types	<b>NW0AX04-TC</b>
Number of input channels	4 channels
Accuracy	0.3% or less (23°C 5°C) 0.7% or less (0 to 55°C) *1
Cold contact compensation accuracy	1°C
Noise	0.7% or less (when the shielding compensation cable used)
Effects of external resistance	Approx. 0.35V/
Resolution	K, T: 0.2°C, E, J, U, L: 0.1°C B, R, S, N, PL II, W5Re, W26Re: 1°C
Input filter	Hardware filter (primary delay time constant): 50ms or less
Sampling interval	Approx. 100ms or less / 4 channels
Response time	Approx. 100ms or less / 4 channels + Scanning interval (ms)
Occupied words	8 words (Input: 6 words, output: 2 words)
Isolation method	Between analog input terminals and FG: Isolated Between analog input terminals and channels: Isolated
Dielectric strength	500V AC 1 minute Between thermocouple input module terminals and FG Between thermocouple input module terminals and channels
External power supply	24V DC (+10 to -15%) (Full wave rectification power supply cannot be used.)
External current consumption	24V DC: 150mA or less
Inrush current	24V DC: 5A or less
Used to the cable	Shielding compensation cable
Mass	Approx. 250g
External connections	Detachable screw terminal block (M3) 20 poles

\* 1 Precision not assured for B0-399°C.

### ●Types and Ranges of the Thermocouple Input Module

Types of thermocouple input	Celsius (°C)			Fahrenheit (°F)		
	Setting No.	Measuring temperature range	Resolution data	Setting No.	Measuring temperature range	Resolution data
K	00	0-1300	1	27	32-2372	1
	01	0-500	0.1	28	32-932	0.1
	02	0-800		29	32-1472	
	03	0.0-500.0	30	32.0-932.0	0.1	
04	0.0-800.0	31	32.0-1472.0			
B	05	0-1800	1	32	32-3272	1
R	06	0-1700	1	33	32-3092	1
S	07	0-1700	1	34	32-3092	1
E	08	0-400	1	35	32-752	1
	09	0-700	0.1	36	32-1292	0.1
	10	0.0-700.0		37	32.0-1292.0	
J	11	0-500	1	38	32-932	1
	12	0-800	0.1	39	32-1472	0.1
	13	0.0-500.0		40	32.0-932.0	
	14	0.0-800.0	41	32.0-1472.0		
T	15	-50-400	1	42	-58-752	1
	16	-50.0-400.0	0.1	43	-58.0-752.0	0.1
N	17	0-1300	1	44	32-2372	1
U	18	0-400	1	45	32-752	1
	19	0-600	0.1	46	32-1112	0.1
	20	0.0-600.0		47	32.0-1112.0	
	21	0-400	48	32-752	1	
L	22	0-900	0.1	49	32-1652	0.1
	23	0.0-400.0		50	32.0-752.0	
	24	0.0-900.0	51	32.0-1652.0		
	PL II	25	0-1200	1	52	32-2192
W5Re, W26Re	26	0-2300	1	53	32-4172	1

## Resistance Bulb Input Module Specifications

### ●NW0AX04-PT Specifications

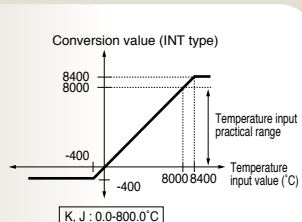
Item	Specification
Types	<b>NW0AX04-PT</b>
Number of input channels	4 channels
Accuracy	0.3% or less (23°C 5°C) 0.7% or less (0 to 55°C)
Noise	0.7% or less (when the shielding compensation cable used)
Allowable resistance of input wire (per wire)	10 or less
Resolution	0.1°C
Input filter	Hardware filter (primary delay time constant): Approx. 200ms or less
Sampling interval	500ms/ 4 channels
Response time	500ms or less / 4 channels + Scanning interval (ms)
Occupied words	8 words (Input: 6 words, output: 2 words)
Isolation method	Between analog input terminals and FG: Isolated Between analog input terminals and channels: Unisolated
Dielectric strength	500V AC 1 minute Between thermocouple input module terminals and FG
External power supply	24V DC (+10 to -15%) (Full wave rectification power supply cannot be used.)
External current consumption	24V DC: 150mA or less
Inrush current	24V DC: 5A or less
Used to the cable	Shielding compensation cable
Mass	Approx. 250g
External connections	Detachable screw terminal block (M3) 20 poles

### ●Types and Ranges of the Resistance Bulb Input Module

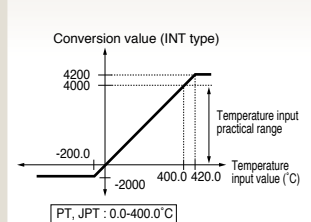
Types of thermocouple input	Celsius (°C)			Fahrenheit (°F)		
	Setting No.	Measuring temperature range	Resolution data	Setting No.	Measuring temperature range	Resolution data
PT	00	0-200	1	20	32-392	1
	01	-50-150		21	-58-302	
	02	0-400		22	32-752	
	03	-200-200		23	-328-392	
	04	-200-600	0.1	24	-328-1112	0.1
	05	0.0-200.0		25	32.0-392.0	
	06	-50.0-150.0		26	-58.0-302.0	
	07	0.0-400.0		27	32.0-752.0	
	08	-200.0-200.0		28	-328.0-392.0	
09	-200.0-600.0	29	-328.0-1112.0			
JPT	10	0-200	1	30	32-392	1
	11	-50-150		31	-58-302	
	12	0-400		32	32-752	
	13	-200-200		33	-328-392	
	14	-200-500	0.1	34	-328-932	0.1
	15	0.0-200.0		35	32.0-392.0	
	16	-50.0-150.0		36	-58.0-302.0	
	17	0.0-400.0		37	32.0-752.0	
	18	-200.0-200.0		38	-328.0-392.0	
	19	-200.0-500.0		39	-328.0-932.0	

### ●Characteristic Diagrams (Example)

#### (Thermocouple)



#### (Resistance Bulb)





## Communication Adapter Specifications

### ●RS-485 Adapter: NW0LA-RS4

#### <General-purpose communication, basic specifications>

Item	Specification		
Transmission standard	RS-485		
External interface	Port	1 channel	
	Transmission mode	Half-duplex transmission	
	Synchronization mode	Start-stop transmission	
	Transmission rate	1,200/2,400/4,800/9,600/19,200/38,400 bps	
	Transmission distance	1km or less (with a transmission rate of 19,200 bps or less)	
	Number of units connected	1:31 (max.)	
	Connection method	European type removable terminal board (5 pins)	
Cable	Twisted pair cable with shield		
Transmission specifications	Transmission procedure	Nonsequenced transmission / command set type transmission	
	Transmission control code	Binary (without code conversion) or ASCII (with code conversion), EBCDIC (with code conversion)	
	Error control	Hardware	Vertical parity (parity bit), framing, overrun error
		Software	Horizontal parity (BCC)
	Bit send-out order	Sent from LSB to MSB	
	Data length that can be sent/received at a time (seen from SPB)	Max. 512 bytes (depends on mode)	
	Start code	None, data with a length of 1 to 5 bytes	
	End code	Data with a length of 1 to 5 bytes	
	Character configuration	Start bit	1 bit
		Data bit	7 or 8 bits
Parity bit		None, odd, even	
Stop bit	1 or 2 bits		

### ●RS-232C Adapter: NW0LA-RS2

Item	Specification		
Transmission standard	RS-232C		
External interface	Port	1 channel	
	Transmission mode	Half-duplex transmission	
	Synchronization mode	Start-stop transmission	
	Transmission rate	1,200/2,400/4,800/9,600/19,200/38,400 bps *1	
	Transmission distance	15m or less	
	Number of units connected	1: 1	
	Connection method	D-Sub 9 pins, male	
Transmission specifications	Transmission procedure	Nonsequenced transmission / command set type transmission	
	Transmission control code	Binary (without code conversion) or ASCII (with code conversion), EBCDIC (with code conversion)	
	Error control output type	Hardware	Vertical parity (parity bit), framing, overrun error
		Software	Horizontal parity (BCC)
	Bit send-out order	Sent from LSB to MSB	
	Data length that can be sent/received at a time (seen from SPB)	Max. 512 bytes (depends on mode)	
	Start code	None, data with a length of 1 to 5 bytes	
	End code	Data with a length of 1 to 5 bytes	
Character configuration	Start bit: 1 bit Data bit: 7 or 8 bits Parity bit: None, odd, even Stop bit: 1 or 2 bits		

\*1 When using transmission rate 38400 bps, mount a ferrite core to the communication cable. For details, refer to RS-232C/RS-485 Communication Adapter (FEH405) User's Manual.

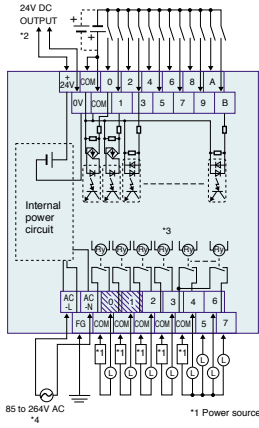
#### <Simplified CPU link, basic specifications>

Item	Specification		
System specifications	Connection target	<ul style="list-style-type: none"> <li>• SPB series basic unit</li> <li>• FLEX-PC NB series NP link micro, only with data link function</li> </ul>	
	Number of units connected	16 units max.	
	Link capacity (1 station)	N mode: Variable: selected to 2, 4, 8, 16, or 32 words (through parameter setting) SX mode: Fixed to 8 words (when operating mode 21H is selected)	
	Link area	Data register (D) area is used. (D1E00 to D1FFF)	
	Communication form	Bus	
	Refresh time	130ms or less/16 stations, 32 words for each station (When the SX mode is selected, with a scan time of 5ms or less), excluding the case when the loader network function is used	
Communication specifications	Communication between link	Communication access mode	Polling/selecting mode
		Transmission level	Conforms to EIA standard, RS-485.
		Transmission mode	Half-duplex transmission
		Synchronization mode	Start-stop transmission
		Transmission rate	115,200 bps (when the SX mode is selected) 19,200 bps (when the NB compatible mode is selected)
		Transmission distance	500m or less
		Connection method	European type removable terminal board (5 pins)
	Others	Cable	Twisted pair cable with shield
		Master station	Fixed to station 0 (station number set by parameters)
		Configuration registration	Whether configuration is registered or not can be selected. (Registered to station 0 only when the SX mode is selected)
Self diagnosis	Communication monitoring (omitted data bits, addition)		
	Insertion and removal of active wire	Insertion and removal of link active wire are possible.	

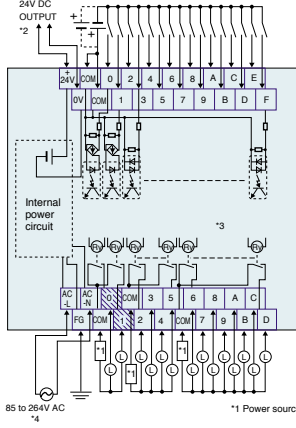
# External Connection Diagrams

## External Connection Diagrams

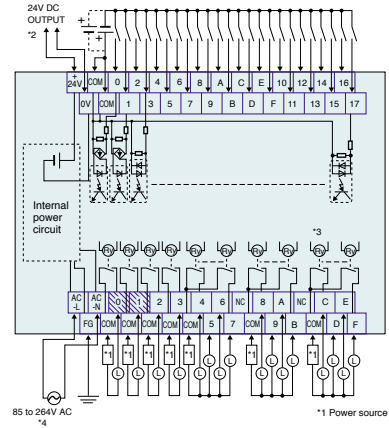
20-points Basic Unit



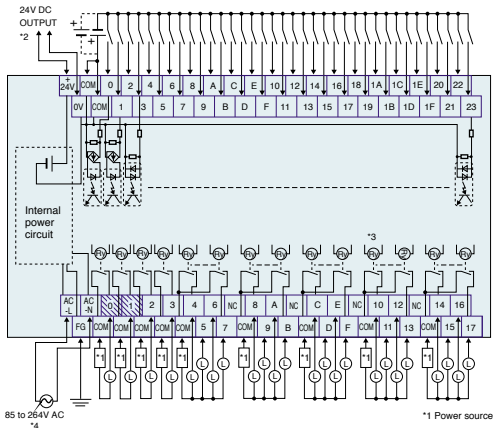
30-points Basic Unit



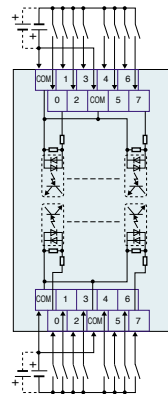
40-points Basic Unit



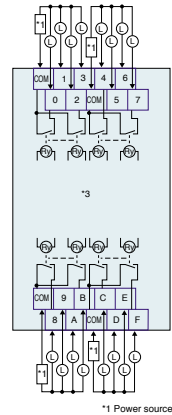
60-points Basic Unit



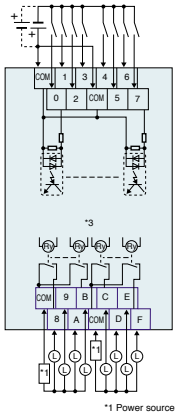
16-points Input Expansion Unit



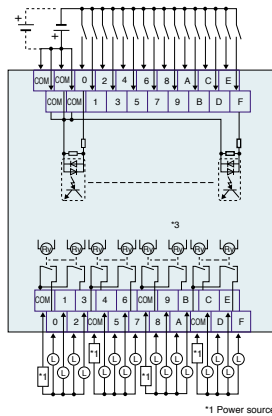
16-points Output Expansion Unit



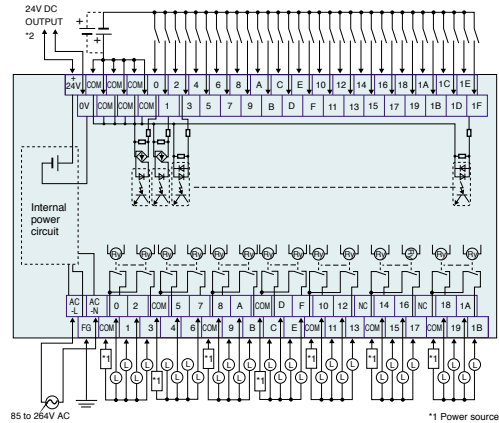
16-points I/O Expansion Unit



32-points I/O Expansion Unit



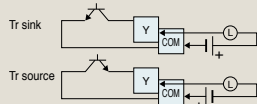
60-points I/O Expansion Unit



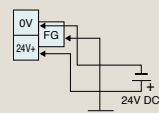
Note: 1 The figure above indicates external connection of the AC power supply/Ry output type.

\*2 The DC power supply is not applicable to service power supply.

\*3 The transistor type connection is shown below.



\*4 The terminal arrangement of the DC power supply is shown below.



Note: 2 The output terminal (with a diagonal line) can be used as a pulse output terminal in the case of transistor output.

Note: 3 For external connection of communication adapters, refer to RS-232C/RS-485 Communication Adapter (FEH405) User's Manual.

Note: 4 For external connection of analog unit, refer to Analog Unit (FEH407) User's Manual.

# Control Functions



## Enabling various controls with standard functions

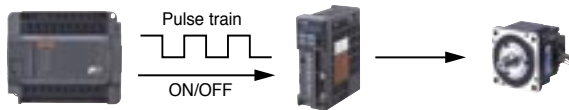
### Pulse Train Output Function

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.

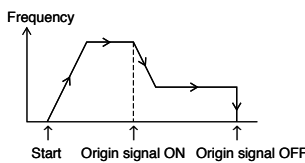
#### ●Pulse Train Output

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.

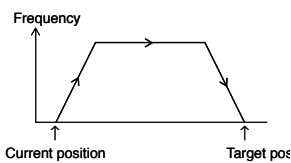


#### <Operation Patterns>

##### Return to origin



##### Relative positioning Absolute positioning



Number of output pulses  
Rotational direction signal  
ON: Forward OFF: Reverse

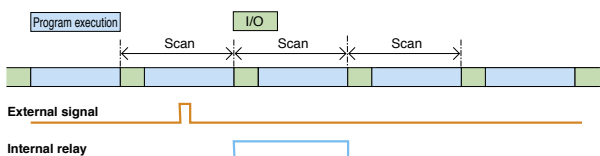
#### ●Pulse Width Modulation

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 SPB 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

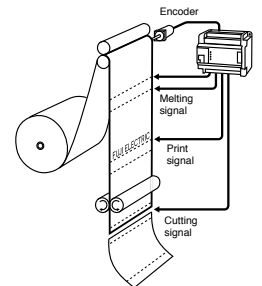
The SPB has a built-in high-speed counter which can count pulses at a maximum rate of 100kHz for a single phase or 50kHz for two phases.

#### ●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	

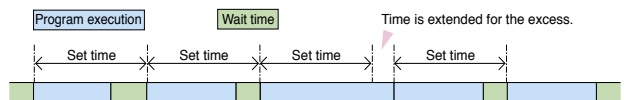
#### <Sample Application for Packing Machine>

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



Analog Timer

# 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

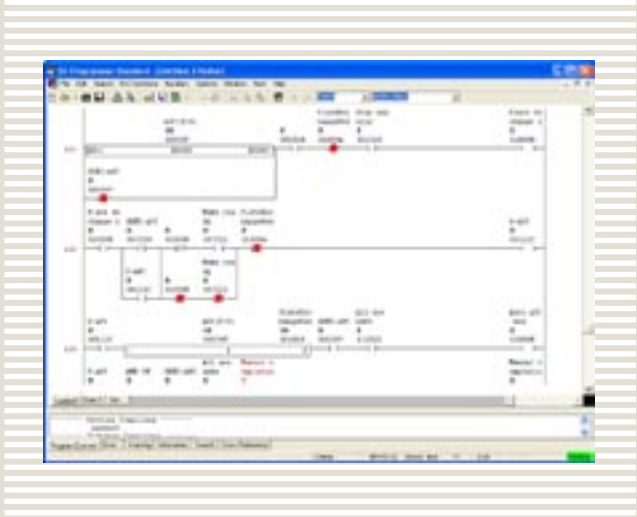
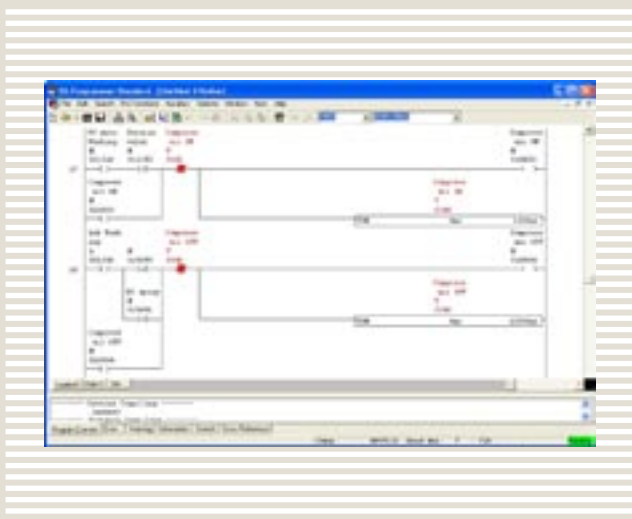
Standard provides a choice of SX mode and N mode. In SX mode, create programs that comply with the IEC 61131-3 international standard (JIS B 3503). In N mode, leverage your program file and comment file assets for our FLEX-PC PLC series without modification.

#### ●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.

#### ●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.

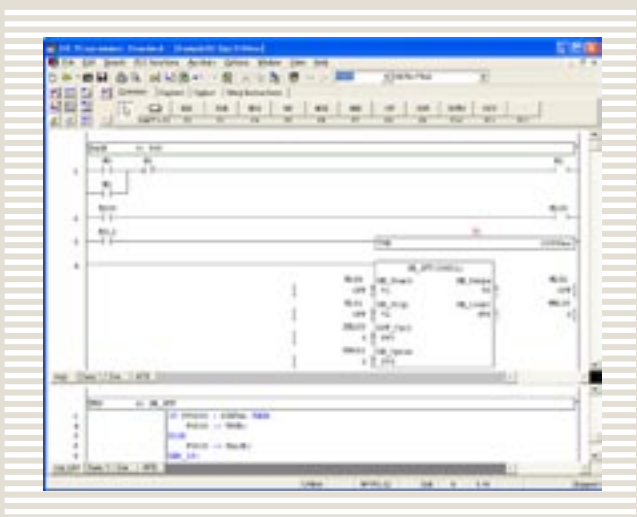


#### ●Full-fledged programming environment

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

#### ●Support for multiple programming languages

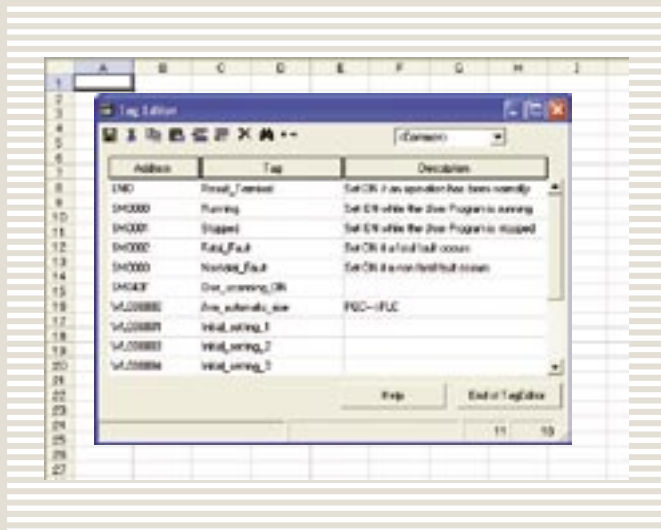
SX mode supports ladder as well as ST language, while N mode supports mnemonic language. Select the programming language suited to the type of control you wish to perform.





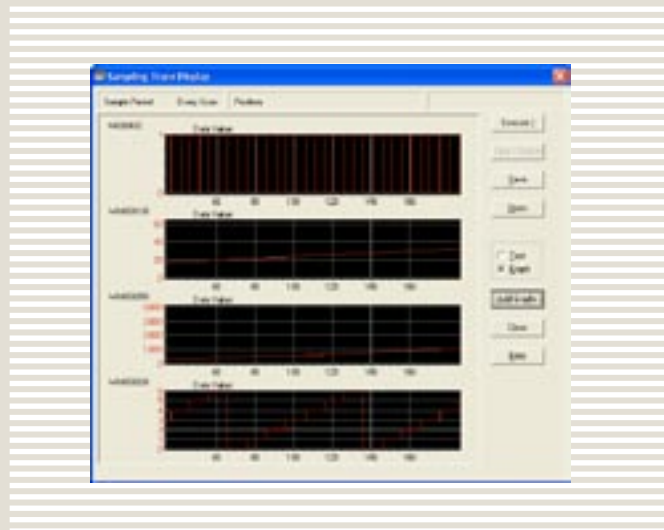
### ●Link with spreadsheet program

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



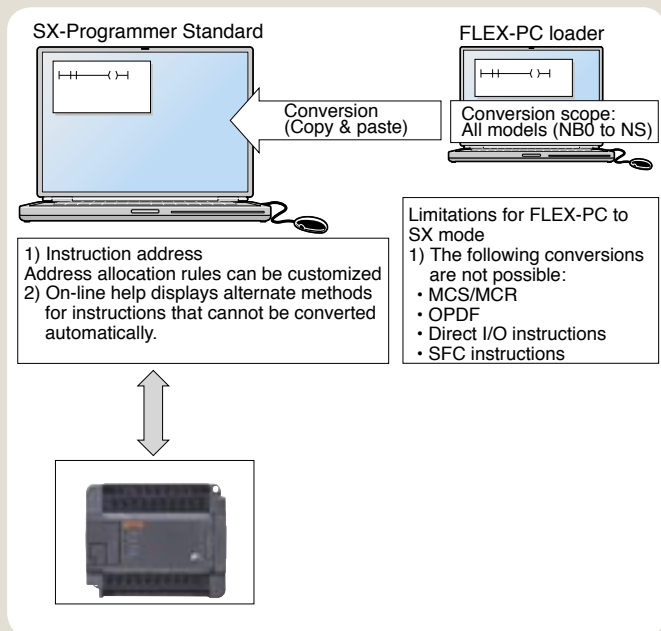
### ●Debugging features

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



### ●Leverage your program assets

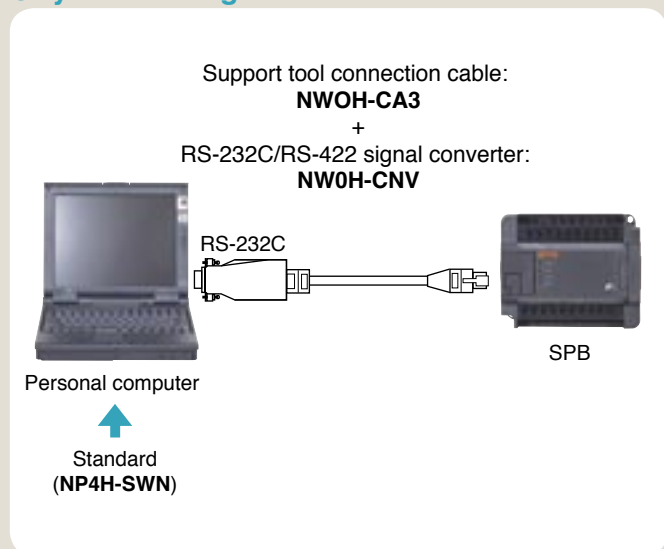
In SX mode, you can copy and paste your programs from our FLEX-PC series PLCs. On-line help describes alternate methods for circuits and instructions that cannot be pasted in. In N mode, use your program and comment files as-is.



### ●Operation environment

Item	Specification
Hardware	IBM-PC/AT compatible
CPU	Intel Pentium 233MHz or higher (350MHz or higher recommended.)
Hard disk	Free space of 220M bytes or more
CD-ROM unit	1 unit (x 4 speed or faster), media: ISO 9660 format
Memory capacity	64M bytes or more
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: 9,600bps to 57,600k bps (Transmission speed is set automatically by the model for resource.)
OS	Windows95, 98, Me, NT4.0(SP6 or higher), 2000, XP
Portability	Depends on a commercial mobile personal computer.
Environmental durability	Depends on environmental condition of a commercial personal computer.

### ●System Configuration





# 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

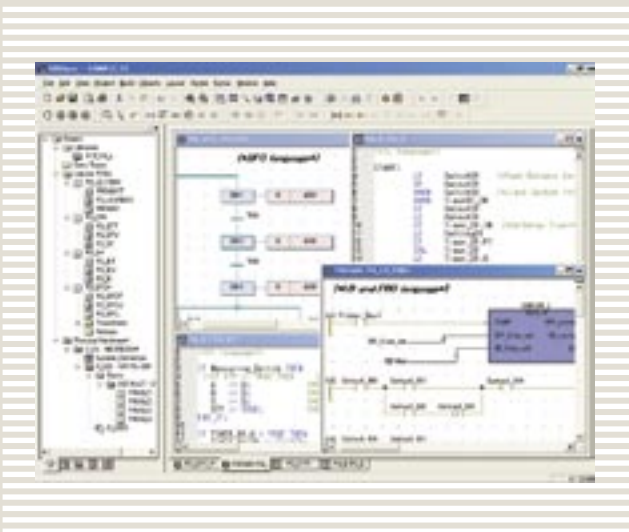
Program using the same methods as on a microcomputer/PC

#### ●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.

#### ●Simulation features

Expert (D300win) has a built-in software PLC especially for simulations. Use this feature to test your program logic without using an actual machine. The ability to monitor or forcibly turn on or off any signal should allow you to program and debug the SX series much faster.



#### ●Modular programming

Improve your programming efficiency through component reuse.

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

#### ●Create function blocks of your own original circuits

Facilitate reuse of unchanging programs and circuits that you use frequently by converting them into function blocks. The creation of user function blocks does not require any special language: use any of the languages supported by Expert (D300win). Create libraries to effectively use just those features you want, without the need for debugging.

#### ●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

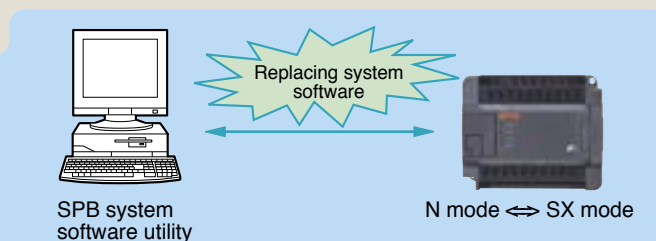
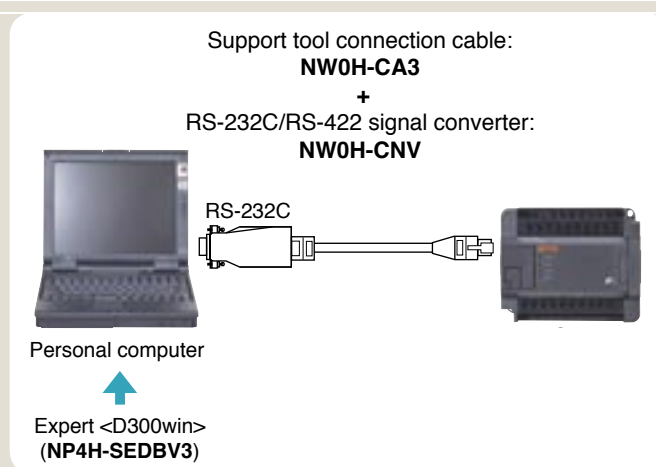
Item	Specification
Hardware	IBM-PC/AT compatible
CPU	Intel Pentium 233MHz or higher (350MHz or higher recommended)
Hard disk	Free space of 220M bytes or higher Expert (D300win) system software: 100M bytes or higher Standard expansion FB package: 120M bytes or higher
CD-ROM unit	1 unit (x 4 speed or faster), media: ISO 9660 format
Memory capacity	64M bytes or higher (when Windows XP used, 120M bytes or higher 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: 9,600bps to 57,600k bps (Transmission speed is set automatically by the model for resource.)
OS	Windows NT4.0 (SP6 or higher), 2000, XP
Portability	Depends on a commercial mobile personal computer.
Environmental durability	Depends on environmental condition of a commercial personal computer.

## Replacing system software

The SPB 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



## Handy Loader

### A “palm-top” handy loader and handy monitor for easy on-site use

Handy loader: NW0H-NE

Handy monitor: NW0H-S3E

## ●Basic Specifications

Item	Specification
Display section	LCD 16 characters x 2 lines with backlight
Keyboard section	40 embossed sheet keys with buzzer
User program memory	Built-in flash memory (handy loader only)
Processor connection	RS-422

- Handy loader: N mode supported .... Data monitoring, program editing
- Handy monitor: SX mode supported .... Data monitoring

## ●Palm size convenient for portable use

The units are extremely compact, measuring 90(W)x148(H)x38(D).

## ●Specially designed for easy data monitoring and setting use

The handy loader and the handy monitor are designed for easy portable use during maintenance and adjustment operations. They allow data for the SPB programmable controller to be monitored or set, and error messages to be displayed. Easy operation simplifies maintenance and adjustment work even for operators who have no knowledge of programming tools.

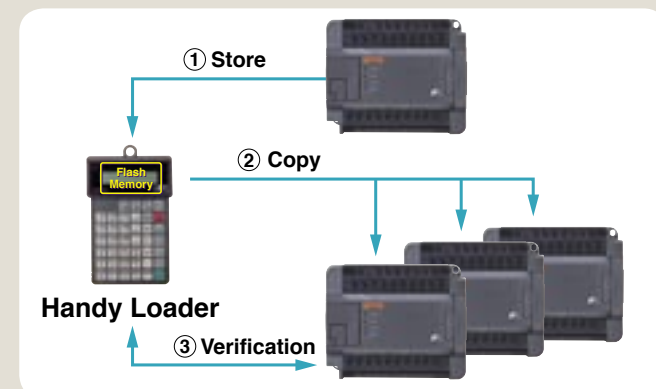
## ●Flash memory built in for user program storage

Two user programs with up to 32K steps can be stored in the internal memory of the handy loader. Stored programs can be copied to multiple basic units. The program in a basic unit can be



compared with the program in the handy loader, allowing easy secure copy operation.

\* Note that user data is not stored.



# Online Adapter

## Facilitating configuration of remote maintenance system

### Online Adapter: FOA-ALFA2

#### ●Features

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

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



Online Adapter

#### ●Specifications

##### General specifications

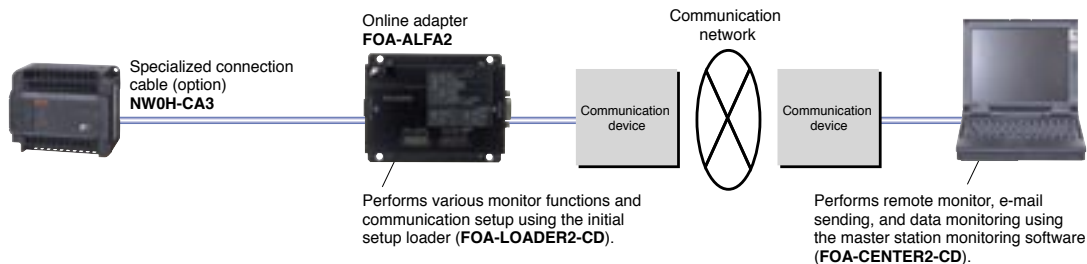
Item	Specification	
Physical environment	Operating ambient temperature	0 to 55°C (without condensation)
	Storage temperature	-20 to 70°C (without condensation)
	Relative humidity	20 to 90%RH (without condensation)
	Contamination	Contamination level 2
	Corrosion resistance	No corrosive gas is present, 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/s <sup>2</sup> , 2 hours for each direction, 6 hours total
	Resistance to shock	Peak acceleration: 294m/s <sup>2</sup> , 3 times for each direction
Electrical operating condition	Resistance to noise	Noise simulator method, rise time of 1ns, pulse width of 1s, 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 PC or 12V DC from AC adapter.
Current consumption		24V: 60mA or less 12V: 120mA or less
Mass		Approx. 320g
Calendar accuracy		90 seconds/month (25°C, conduction)
Battery type/operating life		Lithium primary battery 3.6V <b>NP8P-BT</b> (Fuji Electric FA Components & Systems Co., Ltd.)/ 5 years (ambient temperature of 25°C)

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

##### Functional specifications

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

#### ●System Configurations



#### ●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.

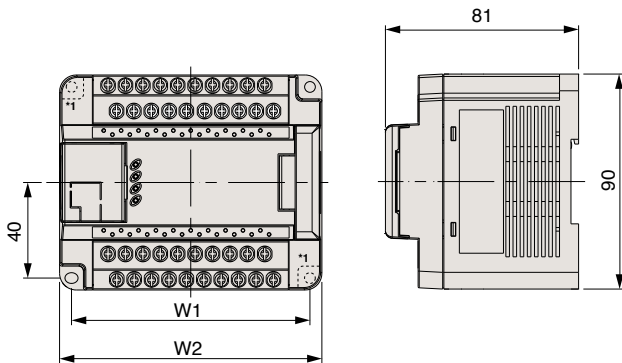
Other functions

- Saves receive data as CSV files.
- Monitors accumulated data in bar graph form.
- Upon reception of failure information, automatically transfers the failure information to E-mail-based mobile tool through the internet using the online adapter.

# Dimensions [mm]



## Basic Unit / Expansion Unit

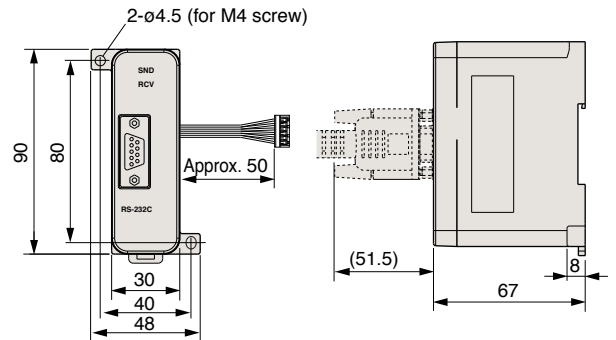


	W2	W1
20-point basic unit	80	70
30-point basic unit	110	100
40-point basic unit	140	130
60-point basic unit	180	170
16-point expansion unit	64	54
32-point expansion unit	110	100
60-point expansion unit	180	170

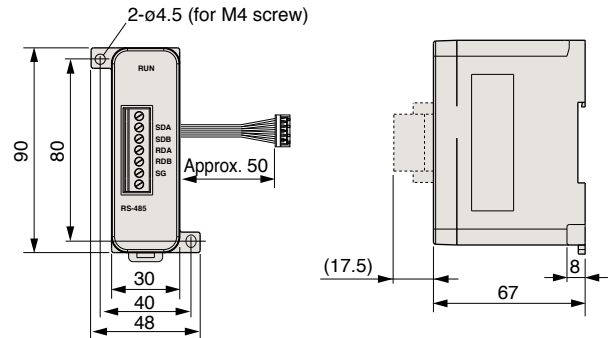
Note: The mounting hole of a basic unit/expansion unit of 60 point type is on four corners. Other units has not the mounting hole on " \*1 " part.

## Communication Adapter

### •RS-232C Adapter: **NW0LA-RS2**

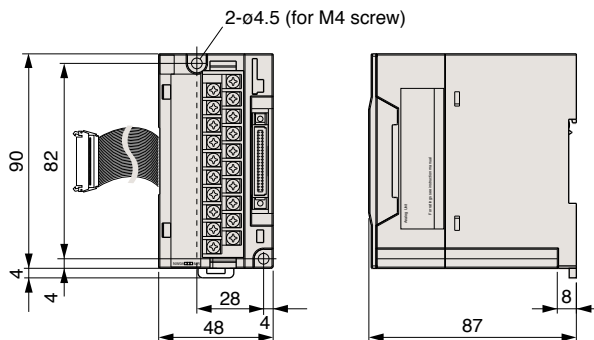


### •RS-485 Adapter: **NW0LA-RS4**



## Analog Unit

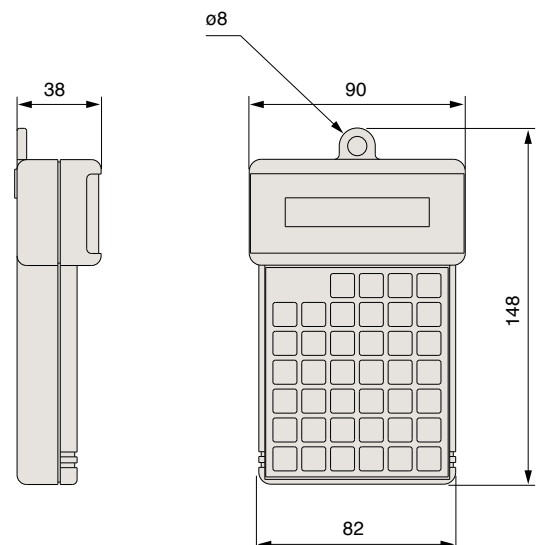
- Analog Input Unit: **NW0AX04-MR**
- Analog Output Unit: **NW0AY04-MR**
- Analog I/O Unit: **NW0AW03-MR**
- Thermocouple Input Module: **NW0AX04-TC**
- Resistance Bulb Input Module: **NW0AX04-PT**



Note: When analog unit and basic unit are installed and connected together, the distance between them must be approx. 10 to 20 mm.

## Handy Loader / Handy Monitor

- **NW0H-NE**
- **NW0H-S3E**



# Ordering Informations

Standards	○	Certificated	△	Under planing	No planing	-	Exceptions
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Products names	Types (= Ordering codes)	Specifications				Standards			RoHS *3
		Power specifications	Input specifications	Output specifications	Calendar function	CE	UL/cUL	LR	
20-points basic unit	NW0P20R-31	100 to 240V AC	24V DC 12 points	Ry 8 points	Built-in	○	○	○	○
	NW0P20T-31			Tr sink 8 points	Non	○	○	○	○
	NW0P20U-31			Tr source 8 points		○	○	○	○
	NW0P20R-34	24V DC		Ry 8 points		○	○	○	
	NW0P20T-34			Tr sink 8 points		○	○	○	
	NW0P20U-34			Tr source 8 points		○	○	○	
30-points basic unit	NW0P30R-31	100 to 240V AC	24V DC 16 points	Ry 14 points		○	○	○	○
	NW0P30T-31			Tr sink 14 points		○	○	○	○
	NW0P30U-31			Tr source 14 points		○	○	○	
	NW0P30R-34	24V DC		Ry 14 points		○	○	○	
	NW0P30T-34			Tr sink 14 points		○	○	○	
	NW0P30U-34			Tr source 14 points		○	○	○	
40-points basic unit	NW0P40R-31	100 to 240V AC	24V DC 24 points	Ry 16 points		○	○	○	○
	NW0P40T-31			Tr sink 16 points		○	○	○	○
	NW0P40U-31			Tr source 16 points		○	○	○	
	NW0P40R-31C	24V DC		Ry 16 points		○	○	○	○
	NW0P40T-31C			Tr sink 16 points		○	○	○	
	NW0P40U-31C			Tr source 16 points		○	○	○	
	NW0P40R-34	24V DC	Ry 16 points		○	○	○		
	NW0P40T-34		Tr sink 16 points		○	○	○		
	NW0P40U-34		Tr source 16 points		○	○	○	○	
	NW0P40R-34C		Ry 16 points		○	○	○		
	NW0P40T-34C		Tr sink 16 points		○	○	○		
	NW0P40U-34C		Tr source 16 points		○	○	○		
	NW0P40R-34C					○	○	○	
	60-points basic unit	NW0P60R-31	100 to 240V AC	24V DC 36 points	Ry 24 points		○	○	○
NW0P60T-31		Tr sink 24 points				○	○	○	
NW0P60U-31		Tr source 24 points				○	○	○	
NW0P60R-31C		24V DC	Ry 24 points			○	○	○	○
NW0P60T-31C			Tr sink 24 points			○	○	○	
NW0P60U-31C			Tr source 24 points			○	○	○	
NW0P60R-34		24V DC	Ry 24 points		○	○	○		
NW0P60T-34			Tr sink 24 points		○	○	○		
NW0P60U-34			Tr source 24 points		○	○	○		
NW0P60R-34C			Ry 24 points		○	○	○		
NW0P60T-34C			Tr sink 24 points		○	○	○		
NW0P60U-34C			Tr source 24 points		○	○	○		
NW0P60R-34C						○	○	○	
16-points expansion unit *1		NW0E16X	No power source	24V DC 16 points	-		○	○	○
	NW0E16R-0	-		Ry 16 points		○	○	○	○
	NW0E16T-0			Tr sink 16 points		○	○	○	○
	NW0E16U-0			Tr source 16 points		○	○	○	
	NW0E16R-3	24V DC 8 points		Ry 8 points		○	○	○	
	NW0E16T-3			Tr sink 8 points		○	○	○	
	NW0E16U-3			Tr source 8 points		○	○	○	
32-points expansion unit *1	NW0E32R-3	Provided power source	24V DC 16 points	Ry 16 points		○	○	○	○
	NW0E32T-3			Tr sink 16 points		○	○	○	
	NW0E32U-3			Tr source 16 points		○	○	○	
60-points expansion unit *1	NW0E60R-31	Provided power source	24V DC 32 points	Ry 28 points		○	△		○
Analog Input Unit	NW0AX04-MR	Multi-range input: 4ch, Resolution: 14 bits (voltage / current)				○	○	○	○
Analog Output Unit	NW0AY04-MR	Multi-range output: 4ch, Resolution: 14 bits (voltage / current)				○	○	○	○
Analog I/O Unit	NW0AW03-MR	Multi-range input: 2ch, Multi-range output: 1ch, Resolution: 10 bits (voltage / current)				○	○	○	○
Thermocouple Input Module	NW0AX04-TC	Input: 4ch				○	△		○
Resistance Bulb Input Module	NW0AX04-PT	Input: 4ch				○	△		○
RS-232C adapter	NW0LA-RS2	RS-232C 1 channel (general-purpose communication mode, loader interface mode)				○	○	○	○
RS-485 adapter	NW0LA-RS4	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				-	-	-	
Loader software package for personal computer	NN4NWN-SB	For N mode, CD-ROM, English/Japanese edition				-	-	-	
Handy loader	NW0H-NE	English type: Loader cable (Type: NB-EC0100 1000mm) supplied as accessory					○		
Handy monitor	NW0H-S3E	English type: Loader cable (Type: NW0H-CA3 1000mm) supplied as accessory							
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)				-	-	-	○
Online adapter	FOA-ALFA2 (NP1L-FOA) *2	Adapted to MICREX-SX SPH/SPB (SX mode) series.							
Initial setup loader software <Japanese version>	FOA-LOADER2-CD (NL4N-WNOL) *2	CD-ROM, (Adapted to SPH versions: LV3.00.25 or higher)				-	-	-	
Master station monitoring software <Japanese version>	FOA-CENTER2-CD (NL4N-WNOC) *2	CD-ROM, (Adapted to SPH versions: LV3.00.24 or higher)				-	-	-	

Note: Pulse train output and PWM output are not available for relay output.

\*1 50mm expansion cable is supplied as accessory.

\*2 The order code is shown in ( ).

\*3 For more information about RoHS based on products, please contact our sales section.

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# Product Warranty



## Dear Customers of Fuji Electric Controller,

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

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

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

### 1. Period and coverage of the warranty

#### 1-1 Period

- (1) The period of the warranty is effective until the earliest of either a year from the date of purchase or, eighteen (18) months from the date of manufacture printed on the plate.
- (2) The above period may not be applicable in case the particular environment, conditions or frequency of use affects the lifetime of the product.
- (3) The warranty for the parts repaired by Fuji Electric service department is effective for six months from the date of repair.

#### 1-2 Coverage

- (1) If malfunction occurs in the period of warranty due to Fuji Electric, the malfunctioning parts are exchanged or repaired for free at the point of purchase or delivery. However, the warranty does not apply to the following cases.
  - 1) The malfunction occurs due to inappropriate conditions, environment, handling or usage that is not instructed in a catalogue, instruction book or user's manual.
  - 2) The malfunction is caused by the factors that do not originate in the purchased or delivered product.
  - 3) The malfunction is caused by other devices or software design that does not originate in Fuji Electric products.
  - 4) The malfunction occurs due to an alteration or repair that is not performed by Fuji Electric.
  - 5) The malfunction occurs because the expendable parts listed in an instruction book or catalogue were not maintained nor exchanged in an appropriate manner.
  - 6) The malfunction occurs due to factors that were not foreseeable by the practical application of science and technology at the time of purchase or delivery.
  - 7) The malfunction occurs because the product is used for an unintended purpose.
  - 8) The malfunction occurs due to a disaster or natural disaster that Fuji Electric is not responsible for.
- (2) The warranty is only applicable to the single purchased delivered product.
- (3) The warranty covers only the area stated in above (1). Any damage induced by the malfunction of the purchased or delivered product, including the damage or loss to a device or machine and passive damages, is not covered by the warranty.

#### 1-3 Malfunction diagnosis

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

### 2. Liability for opportunity loss

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

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

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

### 4. Delivered term

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

### 5. Service

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

### 6. Scope of application

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

## Safety Considerations

- For safe operation, before using the product read the instruction manual or user manual that comes with the product carefully or consult the Fuji sales representative from which you purchased the product.
- Products introduced in this catalog 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 catalog 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 catalog 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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