Fuji Electric

Innovating Energy Technology

Fuji Integrated Controllers MICREX-SX Series

Programmable Controller SPF

Achieving Cost Efficiency and High Performance Processing

SPF

22B1-E-0020b

Achieves high cost performance
Flexibly supports machinery and systems

- **High processing performance corresponding to high-speed, high functioning**
- **Variety of extension units flexibly adapting to applications**
- **Realizing servo system with 4 axes of 200 kHz pulse output**

SPF

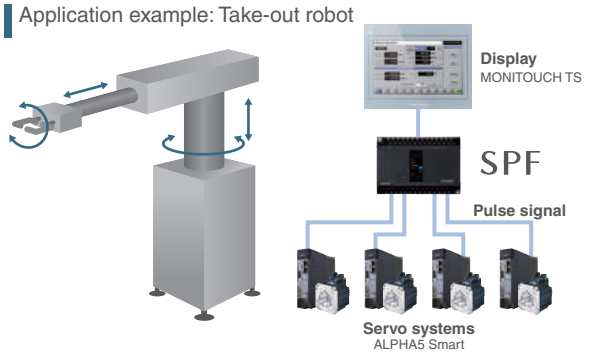
High-speed processing

The unit has impressive sequence processing performance for machine control operations, as well as enhanced data processing capabilities. Instruction execution time is as fast as 0.3 µs for basic instructions and 0.87 µs for data instructions, enabling the unit to achieve the highest performance of its class. This contributes to improving production capacity.

Positioning function

This function is compatible with a 200 kHz, 4-axis pulse output. It can be utilized for increasingly sophisticated and high-accuracy positioning.

Application example: Take-out robot



Two types of basic units for varying applications

SPF has two types of basic units: the high-functionality type basic unit (Type: NA0PA), which is suitable for positioning control while connected to a servo system; and the standard type basic unit (Type: NA0PB), which is suitable for the control of general equipment not supported by a servo system. It's possible to select a basic unit depending on applications.

Rich communication functions

RS-232C, RS-485 and Ethernet communication can be established by simply mounting a small board to the basic unit. Communication functions can also be achieved through use of an extension unit on the left side.

Operability Oriented Support Tool

SX-Programmer standard is a support tool, which is based on ladder programming basis. Function blocks (FB) can also be used corresponding to the control applications.

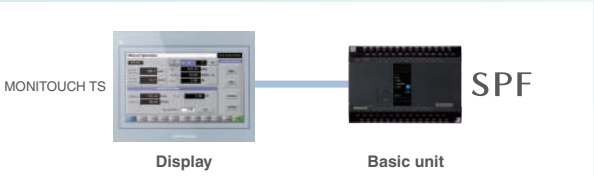
Internal large-capacity memory

With enhancements to the functional system and increased data processing, the unit comes with a large-capacity program and data memory.

Model	Memory capacity	
	Program	Data
14 points	8 k steps	20 k words
24 points		
32 points	20 k steps	40 k words
40 points		
60 points		

MONITOUCH connection function

SPF can be connected to the MONITOUCH via the loader port. It does not require any special communication equipment.



Connection cable (option) Types: D9-FU-SPFCPU-☐M
MJ-FU-SPFCPU-☐M

Load cell unit

We offer a unique lineup of modules compatible with load cells used for metering and weighing systems, tank scales, etc. They can be applied to wide range of applications such as cement plants.

Standard calendar function

A calendar function comes standard as an essential function for monitoring machinery and systems.

MODEL LINEUP

Basic unit (CPU unit)

14 points
Basic unit

NA0PA-14T-34C
Power supply voltage: 24 V DC
DI/O: input 8 points, output 6 points
Output type: Tr sink output
Detachable terminal block

NA0PB-14R-34C
Power supply voltage: 24 V DC
DI/O: input 8 points, output 6 points
Output type: Ry output

24 points
Basic unit

NA0PA-24T-□C
Power supply voltage: 100 to 240 V AC or 24 V DC
DI/O: input 14 points, output 10 points
Output type: Tr sink output
Detachable terminal block

NA0PB-24R-34C
Power supply voltage: 24 V DC
DI/O: input 14 points, output 10 points
Output type: Ry output

32 points
Basic unit

NA0PA-32T-□C
Power supply voltage: 100 to 240 V AC or 24 V DC
DI/O: input 20 points, output 12 points
Output type: Tr sink output
Detachable terminal block

NA0PB-32R-34C
Power supply voltage: 24 V DC
DI/O: input 20 points, output 12 points
Output type: Ry output

40 points
Basic unit

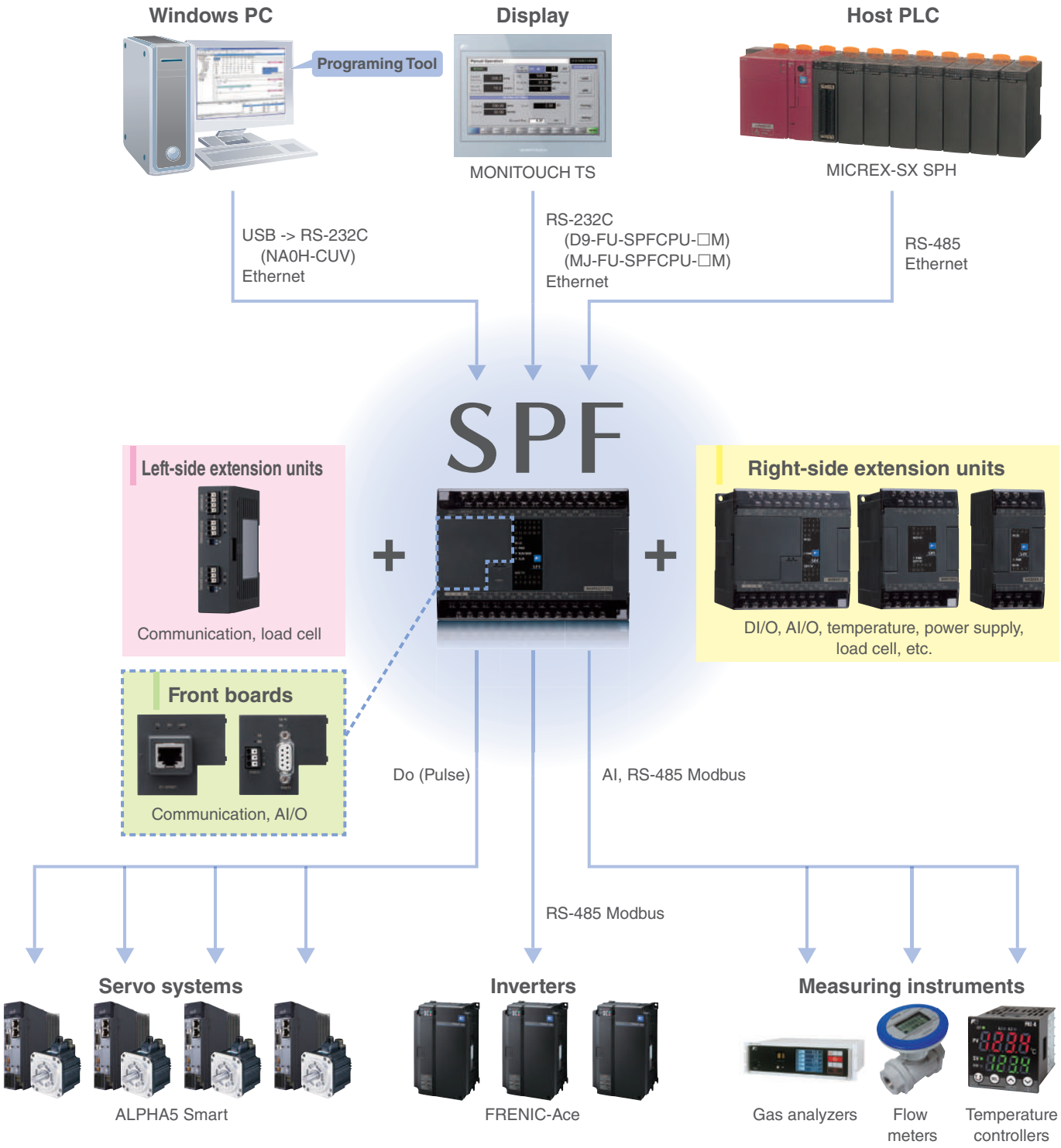
NA0PA-40T-□C
Power supply voltage: 100 to 240 V AC or 24 V DC
DI/O: input 24 points, output 16 points
Output type: Tr sink output
Detachable terminal block

60 points
Basic unit

NA0PA-60T-□C
Power supply voltage: 100 to 240 V AC or 24 V DC
DI/O: input 36 points, output 24 points
Output type: Tr sink output
Detachable terminal block

NA0PB-60R-34C
Power supply voltage: 24 V DC
DI/O: input 36 points, output 24 points
Output type: Ry output

Flexible system construction by using extension units

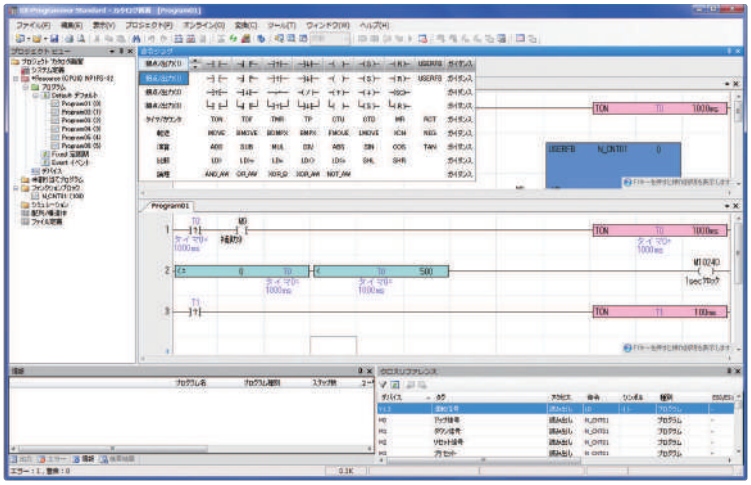


Constructing optimal systems using Fuji components

Improves Programming Development Efficiency

Programming Support Tools: SX-Programmer Standard

Operability Oriented Support Tools



Usage

Ladder operation for on-site maintenance personnel

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

Utilization of programming resources

Program and comment resources of the models MICREXF series and FLEX-PC series of Fuji Electric can be reused. Screens, operability, and programming can be handled as if you were using a personal computer loader with which you are already familiar.

Features

Multi-language support

- The SPH supports not only ladder diagrams but also ST and FBD.
- It allows the programmer to select the proper programming language for the control target.

Intuitive screen operation

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

Simulation function

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

Resume function

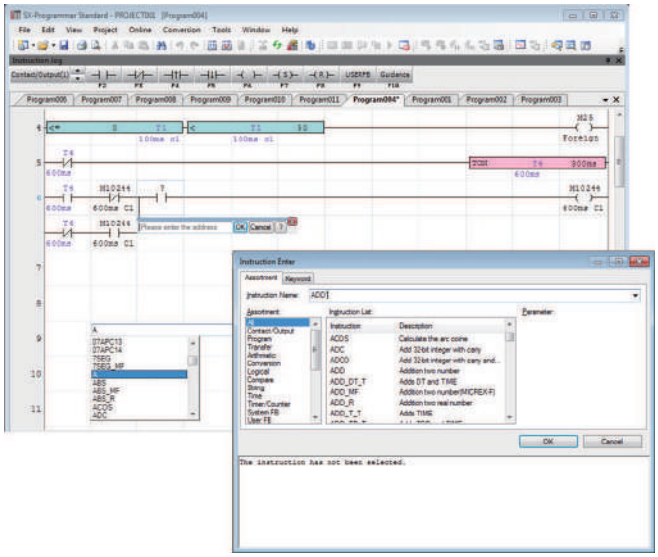
- When the SPH starts to run, it automatically displays the position last edited or monitored.
- In online mode, the SPH displays the position last monitored and starts monitoring.
- In offline mode, the SPH displays the position last monitored and enters Edit mode.

Device editor and collation function

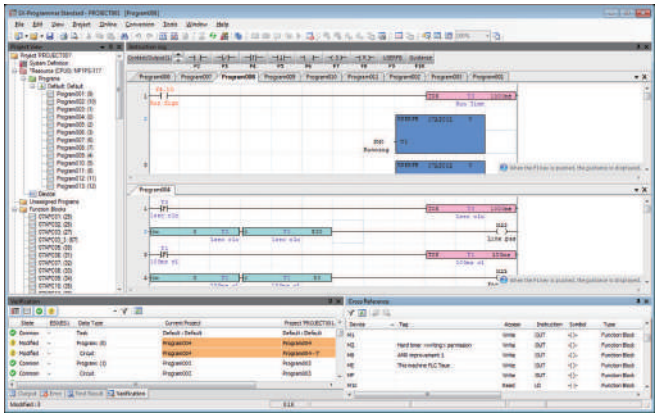
- Device information is displayed on a single screen, for example, in the form of a list of the operating states of devices, enabling you to save time in memory management.
- You can display details of different points on programs and edit by referring to collation results.

Screen Sample

●Entering instruction



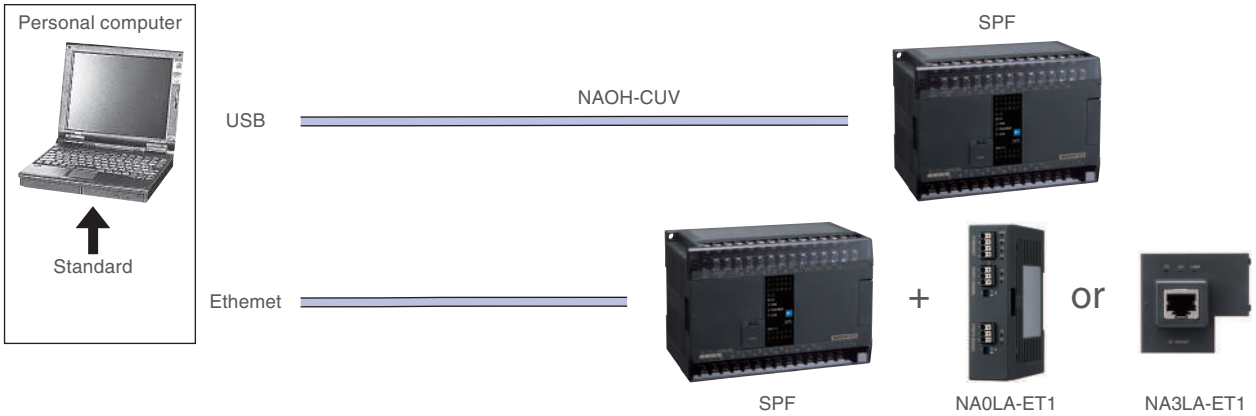
●Collation function



■ Operating environment

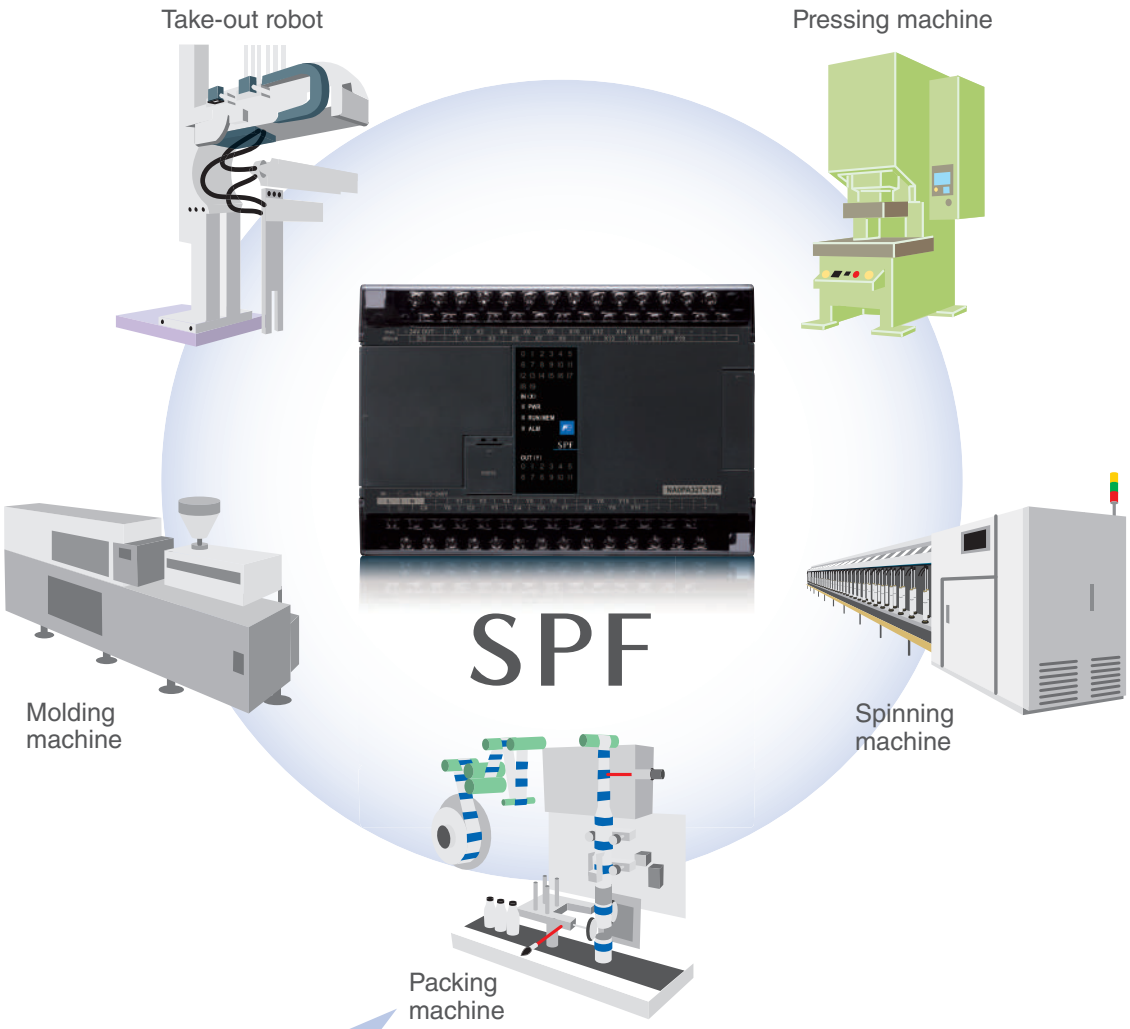
Item		Specifications
Hardware		IBM-PC/AT compatible
CPU		Intel Pentium 233 MHz or higher (800 MHz or higher recommended)
Hard disk		Free space of 200 Mbytes or more
CD-ROM unit		1 unit (x 4 speed or faster), media: ISO 9660 format
Memory capacity		64 Mbytes or more (128 Mbytes or more recommended)
Keyboard		101 English 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	Ethernet	Possible
	USB	Possible
OS		Windows XP, Vista, 7, 8, 10
Environmental durability		Depends on environmental conditions of commercial personal computer.

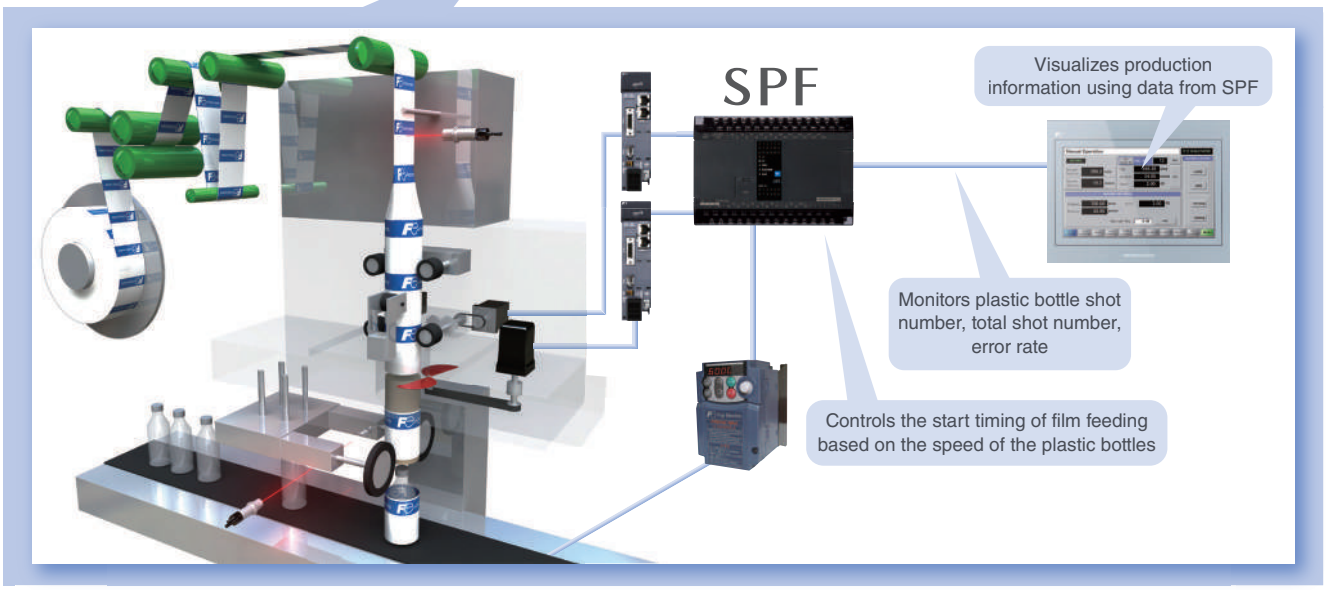
■ System configuration



APPLICATION EXAMPLES

Flexibly supports machinery and systems



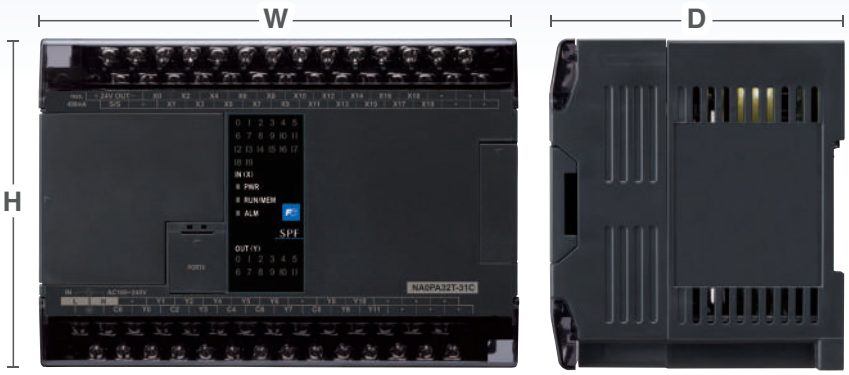


SPECIFICATIONS

Outline drawing

Unit: mm

	14 points	24 points	32 points	40 points	60 points
W	90	90	130	130	175
H	90	90	90	90	90
D	80	80	80	80	80



General specifications

Item		Specifications
Physical environment	Operating ambient temperature	0 to +55˚C
	Storage (transportation) temperature	-20 to +70˚C
	Relative humidity	20 to 95% RH, No condensation (5 to 95% RH during transportation, No condensation)
	Pollution degree	Pollution degree 2 Note 1)
	Corrosion resistance	No corrosive gas No adhesion of organic solvents
	Usage altitude	Altitude of 2000 m or less (Air pressure of 70 kPa or more during transportation)
Mechanical resistance	Vibration resistance	One-way amplitude: 0.15 mm, constant acceleration: 19.6 m/s^2 2 hours in each direction, total of 6 hours Note 2) Note 3)
	Shock resistance	Peak acceleration: 98 m/s^2, 3 times in each direction
Electric working condition	Electrostatic discharge	±4 kV: Contact discharge method ±8 kV: Aerial discharge method
	Radiated radio Frequency electromagnetic field	80 to 1000 MHz, 10 V/m 1.4 to 2.0 GHz, 3 V/m; 2.0 to 2.7 GHz, 1 V/m
	EFT burst wave	Power line, I/O signal line (AC non-shielded line): ±2 kV Communication line, I/O signal line (excluding AC non-shielded line): ±1 kV
	Lightening surge	AC power supply: Common mode ±2 kV, Normal mode ±1 kV DC power supply: Common mode ±0.5 kV, Normal mode ±0.5 kV
	Radio-frequency electromagnetic field conduction interference	150 kHz to 80 MHz, 10 V
	Power frequency magnetic field	50 Hz, 30 A/m
	Square wave impulse noise	±1.5 kV, rise time 1 ns; pulse width 1 µs, 50 Hz
Structure		Open type equipment (panel built-in type)
Cooling system		Natural air cooling

Note 1) Pollution degree 2: Normally, this is the state in which non-conductive pollution occurs. However, there are circumstances stipulated in which condensation may produce a state of temporary conductivity.

Note 2) This is a mounted state in which the unit is fixed to the control panel with fixing screws. Make sure there is no vibration or shock during DIN rail mounting.

Note 3) Make sure to implement vibration countermeasures for environments in which there is repeated or continuous vibration.

Power supply specifications

Item	NA0P□-31C (AC power supply type)	NA0P□-34C (DC power supply type)
Rated voltage	100 to 240 V AC	24 V DC
Voltage tolerance	85 to 264 V AC	20.4 to 28.8 V DC
Rated frequency	50/60 Hz	-
Frequency tolerance	47 to 63 Hz	-
Time allowed for instantaneous power failure	1 cycle or less	< 20 ms
Waveform distortion rate	5% or less	-
Wave ripple rate	-	-
Rated output voltage 1 (internal 5 V)	5 V DC ±5%	
Rated output voltage 2 (internal 24 V)	24 V DC ±10%	
Rated output voltage 3 (service 24 V)	24 V DC ±10%	
Leak current	0.25 mA or less	0.25 mA or less
Inrush current	40 Ao-p or less, 10 ms or less	150 Ao-p or less, 10 ms or less
Dielectric strength	2300 Vrms AC, 1 minute Between power input terminals and ground	510 Vrms AC, 1 minute Between power input terminals and ground
Insulation type	Transformer insulation	
Insulation resistance	10 MΩ or more using 500 V DC megger	

SPECIFICATIONS

Performance specifications

Item				Specifications: Basic unit	
				14/24 points	32/40/60 points
Control system				Stored program and cyclic scanning system (default task), periodic task, event task	
I/O connection method				Direct I/O system: Local bus	
Direct I/O control method		Overall		Scan batch refresh method	
		Digital I/O		Task synchronization refresh method	
MPU				16-bit OS/Executing Processor (dual use)	
Memory type				Program memory, data memory, temporary memory	
Programming language <IEC61131-3 compliant>				LD language (Ladder Diagram)	
				ST language (Structured Text)	
Instruction word length				Variable length (depending on the instruction) 1 step = 32-bit length	
Instruction execution time				LD instruction 0.30 µs	
Program memory capacity				8 k steps (1 step = 32 bits)	20 k steps (1 step = 32 bits)
I/O memory (I/Q)		X, Y	Fixed	512 words	
System memory (SM)		SM	Fixed	512 words	
Data memory capacity				20 k words	40 k words
	High-speed standard memory (M)	M	Fixed	4 k words	
	Standard memory (M)	M	Variable	0 k word	4 k words
	Retained memory (RM)	L	Variable	2 k words	4 k words
	UserFB instance memory (FM)	V, F	Variable	4 k words	8 k words
	UserFB instance memory initial value setting area SystemFB instance memory (SFM)	-	Variable	4.5 k words	9 k words
	Timer	T	Variable	256 points (2 k words)	512 points (4 k words)
	Integrating timer	TR	Variable	0 point (0 k word)	0 point (0 k word)
	Counter	C	Variable	256 points (1 k words)	512 points (2 k words)
	Edge detection		Variable	1024 points (2 k words)	2048 points (4 k words)
	Other		Variable	0.5 k words	1 k words
FB instance information area (number of instances usable in UserFB)				1024 words (256 info.)	
ZIP file area				64 K bytes	
Data type				1-bit	
				16-bit	
				32-bit	
				Array	
				Structure	
Number of tasks	Default task			1	
	Periodic task			15	
	Event task			(Total number of periodic and event tasks)	
POU	UserPG			64 / default task 8 / Interrupt task	
	UserFB			128	
	UserFCT			128	
	Number of nested UserFB/FCT calls			Total of 64 steps (UserFB/FCT calls from PG are also included)	
Diagnostic function				Program check, watchdog timer, etc.	
Security function				Password	
Calendar function				Supported	
Backup	Program memory			Flash memory	
	System definition			Flash memory	
	Zip file			Flash memory	
	Data memory			Battery: SRAM	
	Calendar			Battery: RTC	
Memory pack	External: Detachable			Storage content: Program : System definition : ZIP file : Data	

Model List

Product name		Model	Specifications
Basic unit			
High-functionality type: Basic unit <NA0PA>		NA0PA14T-34C	24 V DC DI 8 points; Tr DO 6 points; RS-232C port; 24 V DC power supply
		NA0PA24T-34C	24 V DC DI 14 points; Tr DO 10 points; RS-232C port; 24 V DC power supply
		NA0PA32T-34C	24 V DC DI 20 points; Tr DO 12 points; RS-232C port; 24 V DC power supply
		NA0PA40T-34C	24 V DC DI 24 points; Tr DO 16 points; RS-232C port; 24 V DC power supply
		NA0PA60T-34C	24 V DC DI 36 points; Tr DO 24 points; RS-232C port; 24 V DC power supply
		NA0PA24T-31C	24 V DC DI 14 points; Tr DO 10 points; RS-232C port; 100 to 240 V AC power supply
		NA0PA32T-31C	24 V DC DI 20 points; Tr DO 12 points; RS-232C port; 100 to 240 V AC power supply
		NA0PA40T-31C	24 V DC DI 24 points; Tr DO 16 points; RS-232C port; 100 to 240 V AC power supply
		NA0PA60T-31C	24 V DC DI 36 points; Tr DO 24 points; RS-232C port; 100 to 240 V AC power supply
Standard type: Basic unit <NA0PB>		NA0PB14R-34C	24 V DC DI 8 points; Ry DO 6 points; RS-232C port; 24 V DC power supply
		NA0PB24R-34C	24 V DC DI 14 points; Ry DO 10 points; RS-232C port; 24 V DC power supply
		NA0PB32R-34C	24 V DC DI 20 points; Ry DO 12 points; RS-232C port; 24 V DC power supply
		NA0PB60R-34C	24 V DC DI 36 points; Ry DO 24 points; RS-232C port; 24 V DC power supply
Extension unit			
Power supply unit	Right	NA0S-2	5 V DC, 24 V DC output; 100 to 240 V AC input power supply
		NA0S-4	5 V DC, 24 V DC output; 24 V DC input power supply
DIO unit	Right	NA0E24R-34	24 V DC DI 14 points; Ry DO 10 points; 24 V DC power supply
		NA0E24T-31	24 V DC DI 14 points; Tr DO 10 points; 100 to 240 V AC power supply
		NA0E08R-3	24 V DC DI 4 points; Ry DO 4 points
		NA0E08T-3 *	24 V DC DI 4 points; Tr DO 4 points
		NA0E08T-0 *	Tr DO 8 points
		NA0E08X-3	24 V DC DI 8 points
		NA0E16R-0 *	Ry DO 16 points
		NA0E16T-0	Tr DO 16 points
AIO unit	Right	NA0AY02-MR	Analog Output 2ch (-10～10V, 0～10V or -20～20mA, 0～20mA)
		NA0AW06-MR	Analog Input 4ch (-10～10V, 0～10V or -20～20mA, 0～20mA) + Analog Output 2ch (-10～10V, 0～10V or -20～20mA, 0～20mA)
		NA0AX06-MR	Analog Input 6ch (-10～10V, 0～10V or -20～20mA, 0～20mA)
AIO board	Front	NA3AY02-MR	Analog Output 2ch (0～10V or 0～20mA)
		NA3AW03-MR	Analog Input 2ch (0～10V or 0～20mA) + Analog Output 1ch (0～10V or 0～20mA)
Temperature measuring unit	Right	NA0AX02-TC *	Thermocouple input 2ch, resolution 0.1˚C
		NA0AX06-TC	Thermocouple input 6ch, resolution 0.1˚C
		NA0AX16-TC *	Thermocouple input 16ch, resolution 0.1˚C
		NA0AX06-PT *	Resistance temperature sensor input 6ch, resolution 0.1˚C
AI + temperature measuring combo unit	Right	NA0AX06-MRTC *	Input 2ch + thermocouple input 4ch
Load cell unit	Right	NA0F-LC1	1ch, resolution 16 bits
High-precision load cell unit	Left	NA0FA-LC1 *	1ch, resolution 24 bits
Communication unit	Left	NA0LA-RS3 *	2 ports RS-232C (Port 3 + Port 4)
		NA0LA-RS5	2 ports RS-485 (Port 3 + Port 4)
		NA0LA-ETI *	1 port 10BASE-T/100BASE-TX Ethernet
Communication board	Front	NA3LA-RS1	1 port RS-232C (Port 1) + 1 port RS-485 (Port 2)
		NA3LA-ET1	1 port 10BASE-T/100BASE-TX Ethernet
		NA3LA-CA1 *	1 port CANopen
Related equipment			
PC loader		NP4H-SWN	Programming support tool Standard (Japanese/English)
Loader connection cable		NA0H-CUV	USB (AM connector) /RS-232C (MD4M connector), 180 cm
Memory pack		NA8PMF-20	Program memory pack
Terminal connector		NA8P-HE	Extension unit falling-off detection

* Under development

⚠ Safety Considerations

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

Fuji Electric Co., Ltd.

Gate City Ohsaki, East Tower,
11-2, Osaki 1-chome, Shinagawa-ku, Tokyo 141-0032, Japan

Phone : +81-3-5435-7057
Fax : +81-3-5435-7420
URL : http://www.fujielectric.com/

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