Panasonic
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FP-X Series

Programmable Controllers

01/2008

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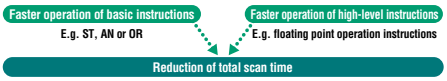
High performance

multiple functions and strengthened lineup

High-speed operation

The 32-bit RISC processor provides the top-level processing speed in compact PLCs. The scan time is 2ms or less for 5000 steps*1. A high-speed PLC is indispensable for enhancing the functionality of equipment.

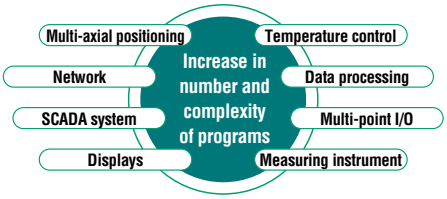
*1 Basic instructions: 40%, Data transfer and operation instructions: 60%



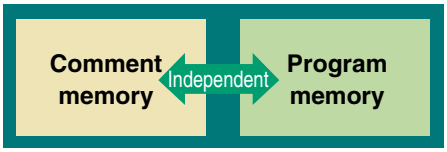
Large capacity program memory

FP-X, which is equipped with 32k steps*2 program memory, is ideal for fully covering the increasing functions, such as communications, positioning and analog control. The ample program capacity can also support future equipment modifications.

*2 C14: 16k steps



Inside of FP-X



Independent comment memory

The FP-X features an independent comment memory which facilitates program management and maintenance. Comments document a PLC project and help programmers understand the code long after the program was written.

Maximum number of I/O points

Since up to 8 expansion units can be connected to 1 control unit, the maximum number of I/O points is 300. Furthermore, with the add-on cassette and expansion FP0 adapter connected, the number of I/O points can be increased to 382.

Network

Up to 3 channels

3 channels are available with a combination of a communication cassette (2-channel type) and the tool port.

The combinations of a wide variety of communication functions can support diversified applications.

Ethernet

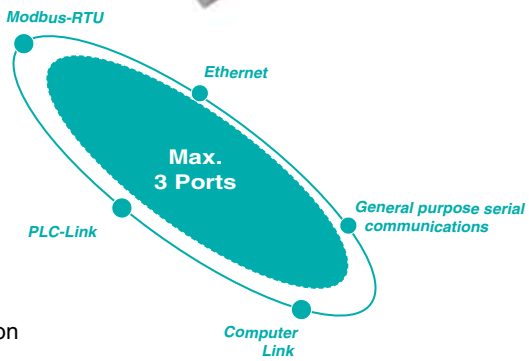
With a communication cassette (Ethernet type), inspection data, production data and error information can be easily collected.

Modbus-RTU

Communications with equipment compatible with Modbus-RTU (binary), a worldwide de-facto standard, are available without programming. E.g. temperature controllers and inverters.

PLC link

With a communication cassette (RS485 type), bit data/word data can be easily shared among up to 16 FP-X units.



MEWTOCOL-COM master/slave

Easy communications with equipment compatible with Matsushita's open protocol "MEWTOCOL" are available without programming. E.g. displays, machine vision systems, temperature controllers and power meters.

General purpose serial communications

Commands are generated/transmitted in accordance with the communication protocol of the target equipment.

Or, nonprocedural data receiving is available. E.g. measuring instruments, barcode readers and RF-ID.

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Product lineup

FP-X meets a variety of requirements

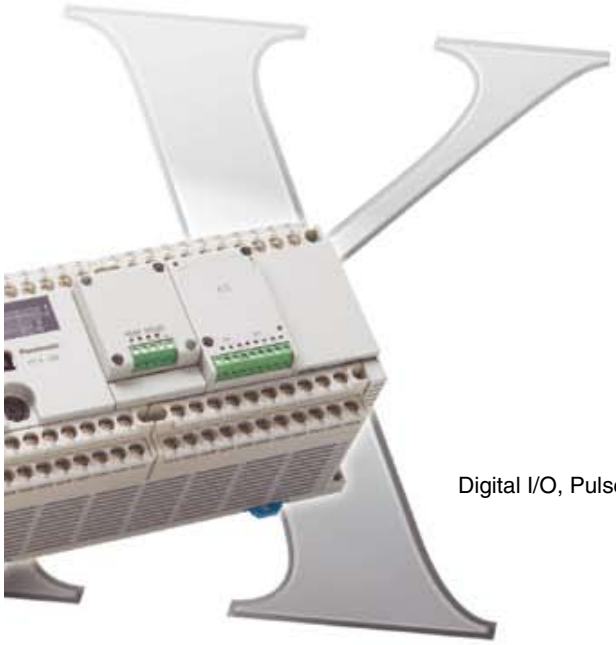
■ Control unit: 18 types

(14, 30 or 60 points) x (relay, NPN or PNP) x (AC or DC)

■ Expansion unit: 9 types

(16 points) x (relay, NPN or PNP)
(30 points) x (Relay, NPN or PNP) x (AC or DC)

		Relay output		NPN output		PNP output	
		AC	DC	AC	DC	AC	DC
Control unit	14 points	●	●	●	●	●	●
	30 points	●	●	●	●	●	●
	60 points	●	●	●	●	●	●
Expansion unit	16 points	(Without a power supply section)		(Without a power supply section)		(Without a power supply section)	
	30 points	●	●	●	●	●	●



■ 43 combinations (number of I/O points)

14 to 300 points

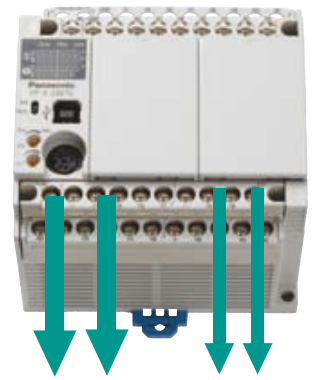
■ Add-on cassette: 16 types

Digital I/O, Pulse I/O, Analog I/O, Communication (RS485, RS232C, Ethernet), External memory

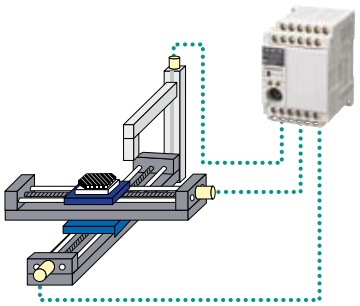
Positioning

■ Built-in 4-axis pulse output (transistor output type)

The transistor output type C14 comes with 3-axis while C30/60 comes with 4-axis pulse output built-in the control unit. The multi-axis control, which previously required a higher-level PLC or additional positioning unit, or 2 or more PLC units, can now be achieved with only 1 FP-X transistor output type unit in a small space at a low cost. In addition, as this type does not require a pulse I/O cassette needed for a relay output type, other function expansion cassettes such as communication or analog input can be attached for more diversified applications.

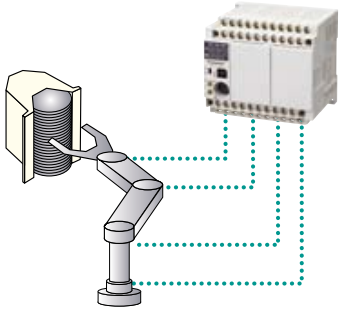


XY Table + Processing Head



3-axis Control with C14

Semiconductor Wafer Takeout Blade



4-axis Control with C30/C60

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Product lineup

The highly expandable lineup satisfies a wide range of demands.

■ Control unit

	Relay ouput		Transistor ouput	
	DC power supply	AC power supply	DC power supply	AC power supply
	AFPX-C14RD	AFPX-C14R	AFPX-C14TD (NPN) AFPX-C14PD (PNP)	AFPX-C14T (NPN) AFPX-C14P (PNP)
Program capacity: 16k steps 2-point potentiometer	8-point input of 24VDC 6-point output of 2A relay	8-point input of 24VDC 6-point output of 2A relay	8-point input of 24VDC 0.5A/5 to 24VDC 6-point output of transistor	8-point input of 24VDC 0.5A/5 to 24VDC 6-point output of transistor
	DC power supply	AC power supply	DC power supply	AC power supply
	AFPX-C30RD	AFPX-C30R	AFPX-C30TD (NPN) AFPX-C30PD (PNP)	AFPX-C30T (NPN) AFPX-C30P (PNP)
Program capacity: 32k steps 2-point potentiometer, equipped with a USB communication port	16-point input of 24VDC 14-point output of 2A relay	16-point input of 24VDC 14-point output of 2A relay	16-point input of 24VDC 0.5A/5 to 24VDC 14-point output of transistor	16-point input of 24VDC 0.5A/5 to 24VDC 14-point output of transistor
	DC power supply	AC power supply	DC power supply	AC power supply
	AFPX-C60RD	AFPX-C60R	AFPX-C60TD (NPN) AFPX-C60PD (PNP)	AFPX-C60T (NPN) AFPX-C60P (PNP)
Program capacity: 32k steps 4-point potentiometer, equipped with a USB communication port	32-point input of 24VDC 28-point output of 2A relay	32-point input of 24VDC 28-point output of 2A relay	32-point input of 24VDC 0.5A/5 to 24VDC 28-point output of transistor	32-point input of 24VDC 0.5A/5 to 24VDC 28-point output of transistor

■ Expansion unit

	Relay ouput	Transistor ouput
	AFPX-E16R	AFPX-E16T (NPN) AFPX-E16P (PNP)
Remarks: 2 or more E16's cannot be connected serially because they cannot supply the power to other units.	8-point input of 24VDC 8-point output of 2A relay	8-point input of 24VDC 0.5A/5 to 24VDC 8-point output of transistor

	DC power supply	AC power supply	DC power supply	AC power supply
	AFPX-E30RD	AFPX-E30R	AFPX-E30TD (NPN) AFPX-E30PD (PNP)	AFPX-E30T (NPN) AFPX-E30P (PNP)
Remarks: Addition of up to 8 units is possible including E16 and EFP0.	16-point input of 24VDC 14-point output of 2A relay	16-point input of 24VDC 14-point output of 2A relay	16-point input of 24VDC 0.5A/5 to 24VDC 14-point output of transistor	16-point input of 24VDC 0.5A/5 to 24VDC 14-point output of transistor

■ Add-on cassette

	Application cassette	
	AFPX-IN4T3	Input/Output cassette (4-point input of 24VDC, NPN 0.3A/3-point output of 24VDC)
	AFPX-IN8	Input cassette (8-point input of 24VDC)
	AFPX-TR8	Output cassette (NPN 0.3A/8-point output of 24VDC)
	AFPX-TR6P	Output cassette (PNP 0.5A/6-point output of 24VDC)
	AFPX-PLS	Pulse I/O cassette (High-speed counter input: single phase 80kHz 2ch., 2-phase 30kHz 1ch.) (Pulse output: 1 axis 100kHz < CW/CCW, pulse + sign >) *Cannot be built into a transistor output type.
	AFPX-AD2	Analog input cassette (2 points, 0 to 10 V/0 to 20mA 12-bit non-insulated)
NEW	AFPX-A21	Analog I/O cassette Input: 2ch. (0 to 5V/0 to 10V or 0 to 20mA 12-bit insulated) Output: 1ch. (0 to 10V or 0 to 20mA 12-bit insulated)
NEW	AFPX-DA2	Analog output cassette 2ch. (0 to 10V or 0 to 20mA 12-bit insulated 2ch.)
NEW	AFPX-TC2	Thermocouple input cassette, (K/J type, resolution: 0.2°C, insulated 2ch.)
	AFPX-MRTC	Master memory cassette with a real-time clock* (32k steps program memory + real-time clock in year/month/day/hour/minute) *Real-time clock requires an optional battery. (Real-time clock → Calendar timer)

	Communication cassette	
	AFPX-COM1	Communication cassette (RS232C 1ch.)
	AFPX-COM2	Communication cassette (RS232C 2ch.)
	AFPX-COM3	Communication cassette (RS485/422 selectable 1ch. insulated)
	AFPX-COM4	Communication cassette (RS485 1ch. insulated + RS232C 1ch.)
NEW	AFPX-COM5	Communication cassette (Ethernet 1ch. + RS232C 1ch.)
NEW	AFPX-COM6	Communication cassette (RS485 2ch. insulated)

■ Expansion FP0 adapter

	AFPX-EFP0	Up to 3 FP0 expansion units can be connected. Please refer to page 7 for details.

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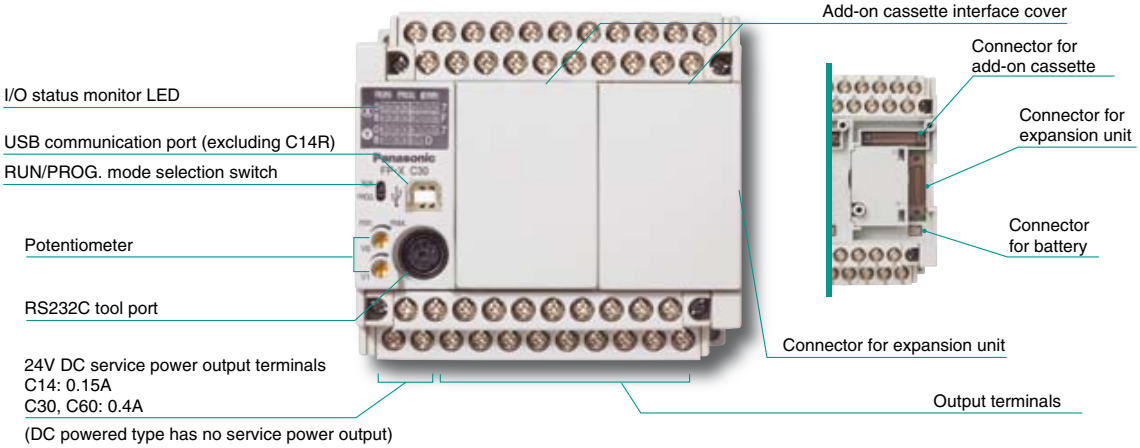
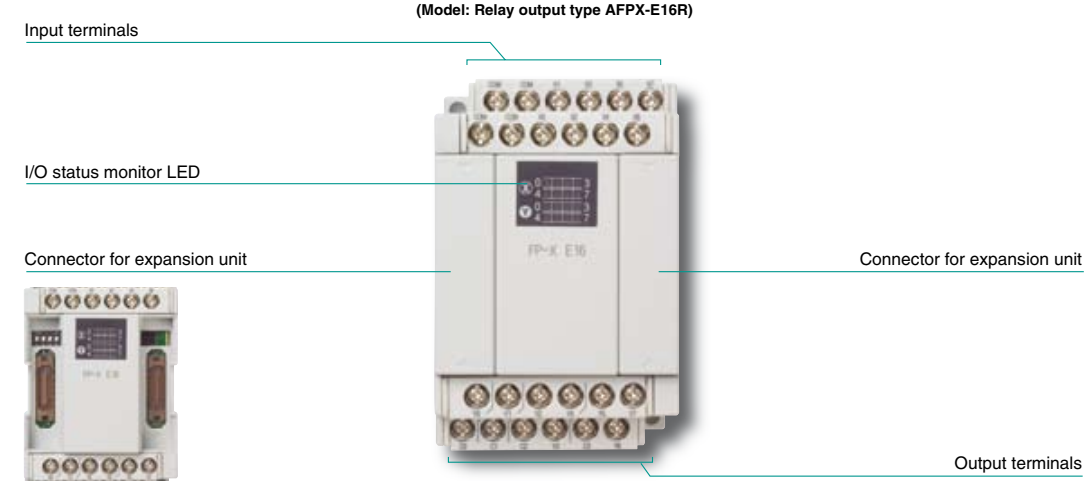
FP-X series

Name and function of each part

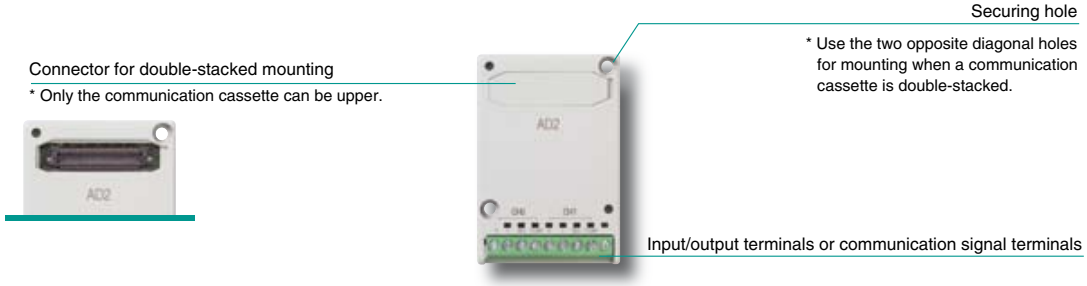
Control Unit
(Model: Relay output type AFPX-C30R)



Expansion Unit
(Model: Relay output type AFPX-E16R)



Add-on Cassette
(Model: Analog input cassette AFPX-AD2)



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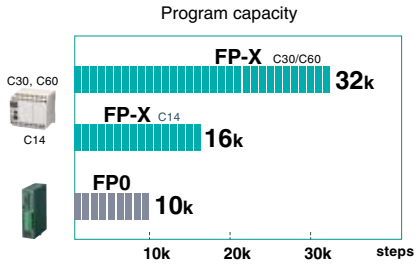
FP-X series

High capacity, ultra high-speed processing

The high-level basic performance provides sufficient room for future equipment expansion.

■ Abundant program capacity—32k steps (16k steps for C14)

The program capacity of 32k steps, exceeding the capacity of most compact PLCs, can flexibly handle a wide variety of applications requiring future equipment expansion. An adequate comment area has of course been reserved. Free comment entry makes the program easy to understand during verification.



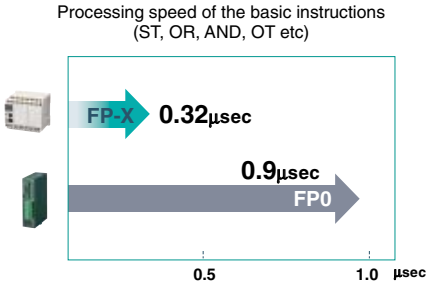
■ Equipped with an independent comment memory

Equipped with an independent comment memory separate from the program memory. All of the 100,000 I/O comments, 5000 lines of line-space comments and 5000 lines of remark comments are saved in the FP-X together with the programs.

Input comments do not decrease the program capacity.

■ High-speed scan at 0.32μsec for instruction processing

High-speed processing is often required for small-scale equipment control such as serial data communication, network construction or PID temperature control. High-speed scanning at 0.32μsec/step (basic instruction) easily meets such requirements.



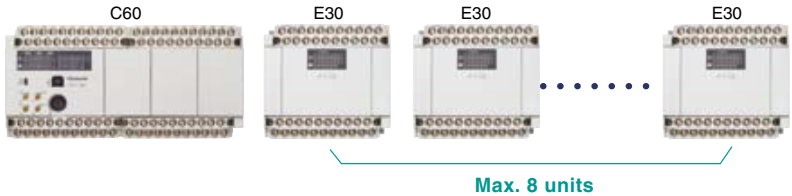
E.g. With a 5k step program consisting of 40% basic instructions and 60% applied instructions (data transfer and operation instructions)

→ Scan time: 1.9ms (measured time)

■ Abundant number of I/O points—Maximum 300 (up to 382 points possible by using FP0 expansion units and add-on cassettes)

When the user is unable to predict the number of I/O points required in the future for his machine or equipment, he may be unsure when selecting a PLC model. FP-X solves user concerns by providing a maximum of 300 I/O channels. This number can even be increased up to 382 points by using the add-on cassettes and FP0 expansion units.

Up to 8 expansion units (E16R, E30R, EFP0) can be connected.



Max. 300 channels

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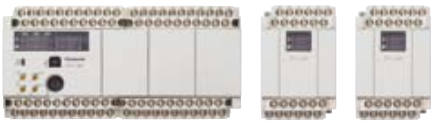
FP-X series

Great expandability

Only 1 E16 can be connected serially.



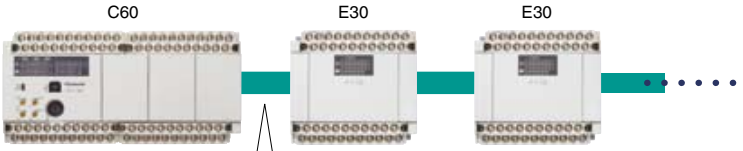
NG

E16 can be sandwiched with E30*

OK

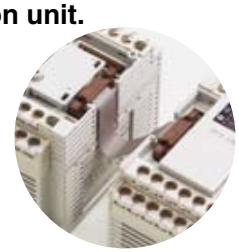
* E30 requires an external power supply

Connection by using the cable included with each expansion unit.



An 80-cm expansion cable is also available as an option.

Note: Total expansion cable length: 160cm max.



The units can be mounted very close to each other with the cable bent inside between the units in order to save space.

■ When further expansion or functions are required, use the existing FP0 expansion units

All control units can be expanded by up to 3 FP0 expansion units via an adapter. Applications can be expanded by using [Transistor outputs], [analog input/outputs], [thermocouple input] and [I/O link (network)].

* Only 1 expansion FP0 adapter unit can be attached to a control unit.
  Up to 7 FP-X expansion units can be used when the expansion FP0 adapter is attached.

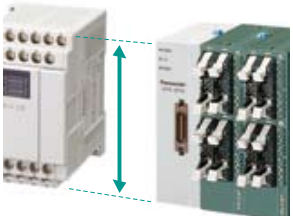
Expansion FP0 adapter (AFPX-EFP0)*

In addition to the supplied 8cm expansion cable, 30cm and 80cm tpyes are available as options, allowing the units to be arranged more freely. (Total expansion cable length: 160cm max.)

Product number	Specifications
FP0-E8X	8ch. DC input, MIL connector
FP0-E16X	16ch. DC input, MIL connector
FP0-E8YT/-E8YP	8ch. transistor output, MIL connector
FP0-E8YRS	8ch. relay output, screw terminal block
FP0-E16YT/-E16YP	16ch. transistor output, MIL connector
FP0-E32T/-E32P	16ch. DC input, 16ch. transistor output, MIL connector
FP0-E8RS	4ch. DC input, 4ch. relay output, screw terminal block
FP0-E16RS	8ch. DC input, 8ch. relay output, screw terminal block
FP0-E32RS	16ch DC input, 16ch relay output screw terminal block

Product number	Specifications
FP0-A21	Analog 2ch. input, 1ch. output
FP0-A80	Analog 8ch. input
FP0-A04V	Analog (voltage) 4ch. output
FP0-A04I	Analog (current) 4ch. output
FP0-TC4	Thermocouple 4ch. input
FP0-TC8	Thermocouple 8ch. input
FP0-RTD6	6ch RTD input
FP0-IOL	I/O link unit
FP0-CCL	CC-link unit
FP0-DPS2	PROFIBUS remote I/O unit

We also have other units.
Please refer to the part number list at the end of this catalog.



The panel surface look clean due to the uniform unit height of 90mm.

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FP-X series

Add-on cassette (lineup)

"Require slightly more functions", "Want to add functions to the existing equipment"
—The rich variety of add-on cassettes helps solve these requirements.

■ The add-on cassette easily adds small quantities of functions and I/O points.

A: Available, N/A: Not available

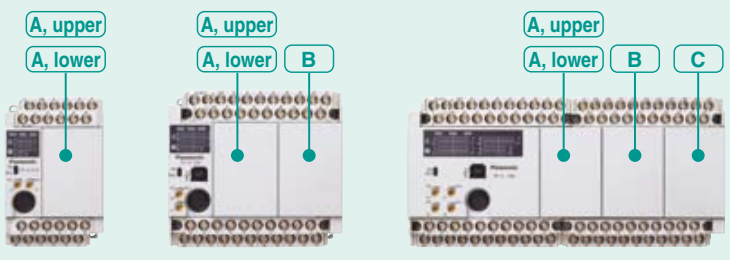
Add-on Cassette		Part number	Specifications	Attachable position (see the figure below)			
				A, lower	A, upper	B	C
Application Cassette	I/O cassette	AFPX-IN4T3 NEW	4-point input of 24VDC, Bi-direction (Sink/Source) 3-point output of 24VDC, NPN transistor 0.3A	A	N/A	A	Only a backup battery can be attached.
	Input cassette	AFPX-IN8	8-point input of 24VDC, Bi-direction (Sink/Source)	A	N/A	A	
	Output cassette	AFPX-TR8	8-point output of 24VDC, NPN transistor 0.3A	A	N/A	A	
		AFPX-TR6P	6-point output of 24VDC, PNP transistor 0.5A	A	N/A	A	
	Pulse I/O cassette (Cannot be used with a transistor output type control unit.)	AFPX-PLS	High-speed counter input: single phase 80kHz 2ch or 2-phase 30kHz 1ch Pulse output: 1 axis 100kHz (CW/CCW, Pulse + Sign)	A	N/A	A	
	Analog input cassette	AFPX-AD2	2-point analog input, 0 to 10V or 0 to 20mA, 12-bit, 2ms/2ch	A	N/A	A	
	Analog output cassette	AFPX-DA2 NEW	2-point analog output, 0 to 10V or 0 to 20mA, 12-bit, 2ms/2ch	A	N/A	A	
	Analog I/O cassette	AFPX-A21 NEW	2-point analog input, 0 to 5V, 0 to 10V or 0 to 20mA, 12-bit, 2ms/2ch 1-point analog output, 0 to 10V or 0 to 20mA, 12-bit, 1ms/1ch	A	N/A	A	
	Thermocouple input cassette	AFPX-TC2 NEW	2-point thermocouple input, K/J type, Resolution: 0.2°C, 200ms/2ch, channels insulated	A	N/A	A	
	Master memory cassette (Only one cassette can be attached.)	AFPX-MRTC	32k steps program memory + all comment saving/transfer, calendar timer (real-time clock)	A	N/A	A	
Communication Cassette (Only one of these cassettes can be attached.)		AFPX-COM1	RS232C 1ch	A	A	N/A	
		AFPX-COM2	RS232C 2ch	A	A	N/A	
		AFPX-COM3	RS485/RS422 selectable 1ch	A	A	N/A	
		AFPX-COM4	RS485 1ch + RS232C 1ch	A	A	N/A	
		AFPX-COM5 NEW	Ethernet 1ch + RS232C 1ch	A	A	N/A	
		AFPX-COM6 NEW	RS485 2ch	A	A	N/A	

Max. number of attachable cassettes

C14	2 cassettes
C30, C60	3 cassettes

Easily removable (2 screws to secure the unit)

Attachment position (see the table above)



- Only section A has an upper side available to attach the cassette.
- No add-on cassettes can be attached to section C. Only a back-up battery can be attached.

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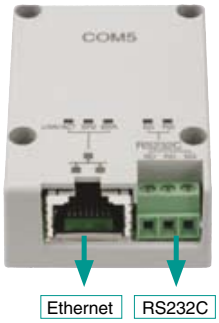
FP-X series

Add-on cassette (Ethernet)

This Ethernet cassette fulfills user requiremens such as the “easy collection of inspection/ production data” or “remote changing of ladder programs”, using LAN (Ethernet).

■ The industry’s first*1 add-on to equip a compact PLC with an Ethernet port

AFPX-COM5



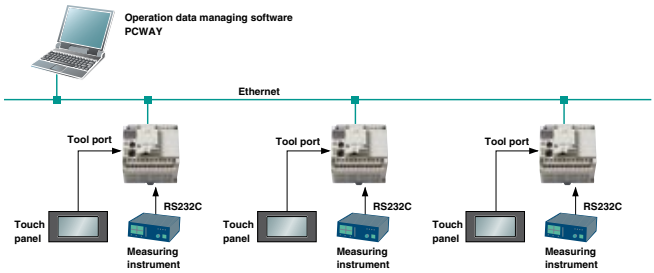
*1: In Japan, as of May 1, 2007

- Enables easy Ethernet connections with a compact PLC, which were previously not possible.
- Also equipped with an RS232C port. Together with the tool port (programming port), a total of 3 communication ports are available, which is remarkable for a compact PLC.
- For example, the following operations are simultaneously available with this cassette attached:

1. **I/O control**
2. **Reading data from a tester (measuring instrument) of inspection equipment (RS232C)**
3. **Collecting the read data from the host computer (Ethernet)**
4. **Setting/monitoring via a touch panel (Tool port)**

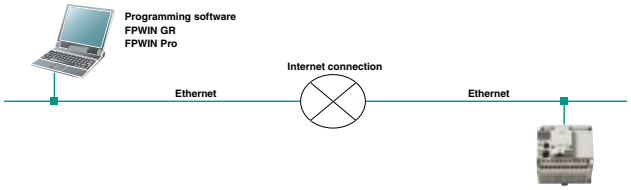
■ Application

Data collection



Remote maintenance

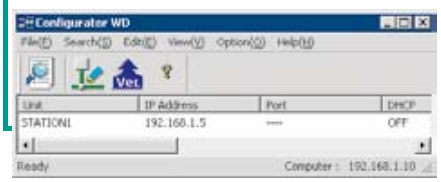
Program/monitoring



Interface	Specifications and functions
Ethernet (COM1)	10BASE-T, 100BASE-TX, TCP/IP, Baud rate: 9600bps/115200bps • MEWTOCOL-COM master/slave (3 connections max.) • General- purpose serial communications (1 connection max.) Server function, client function
RS232C (COM2)	• 3-wire (RD, SD, SG), Asynchronous, Baud rate: 300bps to 115200bps • MEWTOCOL-COM master/slave • General-purpose serial communications • Modbus-RTU master/slave

Ethernet port functions		Specifications
MEWTOCOL-COM master/slave		• Automatically sends responses without communication programs to commands of Matsushita’s open protocol “MEWTOCOL”. • Contact/word data writing/reading, program editing • PCWAY, FPWIN GR and FPWIN Pro are supported.
General purpose serial communications	Server function	• Waits for a connection from a client PC (personal computer), and after the connection has been established, receives data from the PC.
	Client function	• After the power has been turned on, establishes a connection to a preset IP address and sends data.

Use our free software “Configurator WD” for setting up the Ethernet port (e.g. IP address and operation mode).



Download the software free of charge from:
http://www.panasonic-electric-works.com

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FP-X series

Positioning

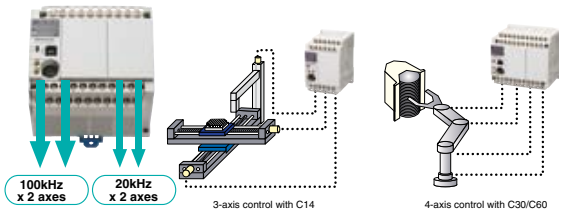
FP-X perfectly fits the need for low cost “multi-axis positioning control in small-scale equipment”.

■ Built-in 4-axis pulse output (Transistor output type)

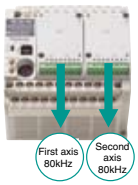
The transistor output type C14 comes with 3-axis while C30/C60 comes with 4-axis pulse output inside the control unit. The multi-axis control, which previously required a higher-level PLC or additional positioning unit, or 2 or more PLC units, can now be achieved with only 1 FP-X transistor output type unit in a small space at a low cost. In addition, as this type does not require a pulse I/O cassette as needed for a relay output type, other function expansion cassettes such as communication or analog input can be attached for more diversified applications.

Item	Specification
Pulse Output Max Frequency	C14: 100kHz(CH0,1), 20kHz(CH2) C30,C60: 100kHz(CH0,1), 20kHz(CH2,3)
Output Type	CW/CCW, Pulse + Direction Output
Function	Trapezoidal control, table shaped control, jog operation, home return, 2-axis linear interpolation

XY table + processing head **Semiconductor wafer takeout blade**



■ The relay output type can control 2 axes by using the expansion cassettes.



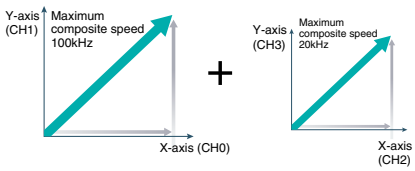
Pulse output up to 2-axis 80kHz is possible by loading 2 pulse I/O cassettes (AFPX-PLS). Also capable of performing 2-axis linear interpolation.

Remark:
Pulse I/O cassette does not work with control unit transistor output type.

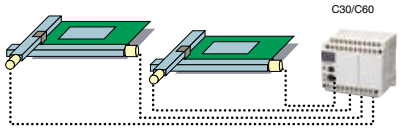
■ 2-axis linear interpolation simultaneously in 2 sets (Transistor output type)

2-axis linear interpolation refers to moving a robot arm or equipment head diagonally on a straight line by simultaneously controlling 2 motor shafts. It is used for palletizing, component pick and place, XY table control, contour cutting of a PC board etc. The FP-X transistor output type is capable of simultaneously controlling 2-axis linear interpolation, for the first time in the industry with a compact pulse-output PLC. This unit dramatically expands the range of applications along with the added convenience of programming by using the linear interpolation commands F175 (SPSH).

Simultaneous control of 2 mechanisms



Controls 2 units of 2-axis XY table



■ The relay output type is also capable of 2-axis linear interpolation.

By adding 2 pulse I/O cassettes (AFPX-PLS), linear interpolation is possible at the maximum composite speed of 80kHz. The command used for this unit is F175 (SPSH), same as that for the transistor output types.

■ High-speed counters—8 built-in sets

8 single-phase or 4 dual-phase sets (X0~X7)

Model type	Input mode	1 channel in use	All channels in use
Transistor output type	Single phase	100kHz	50kHz x 4ch + 10kHz x 4ch
	Dual Phase	35kHz	20kHz x 2ch + 5kHz x 2ch
Relay output type	Single phase	10kHz	10kHz x 8ch
	Dual phase	5kHz	5kHz x 4ch

When adding a pulse I/O cassette to the relay output type, 2 high-speed counter sets can be added to every cassette. Please refer to the user manual for counter specification.

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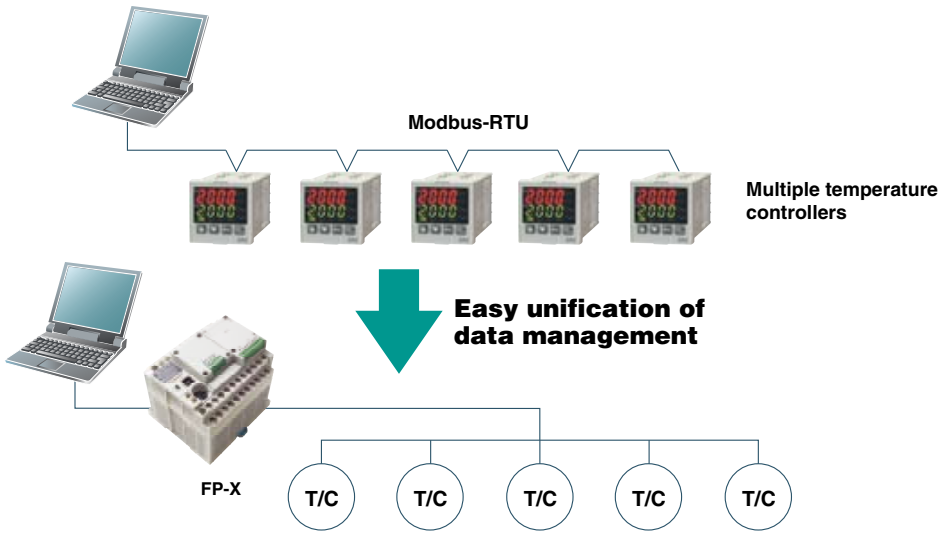
FP-X series

Multi-point PID control

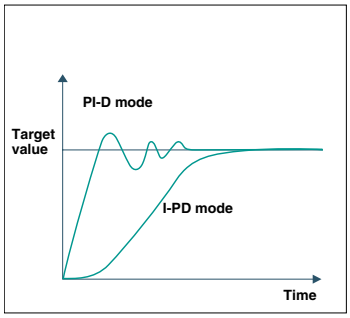
- High-accuracy PID control is possible by adopting a sophisticated algorithm and floating-point operations.
- Higher accuracy is obtained by ultra high-speed computations in a 32μs/loop. For example, a 16-loop control only adds a scan time of 0.5ms by ensuring minimum impact on the tact time.
- The simultaneous multi-point auto-tuning simplifies complex parameter setting.
- The high-speed control PI-D*1 mode and overshoot suppression I-PD*2 mode are available for selection according to the intended application.
- By combining with a sequence control, the parameters (Kp, Ti, Td, etc.) can be changed during a PID control execution, thereby enabling optimum temperature control in each stage including start up, mid-range and convergence. The ability to change the target value easily enables multi-step temperature control, which was difficult with only temperature controllers. In addition, the multi-point temperature control enables centralized control of multiple temperature controllers with a single FP-X for unified data management.

*1 Derivative type
*2 Proportional-derivative type

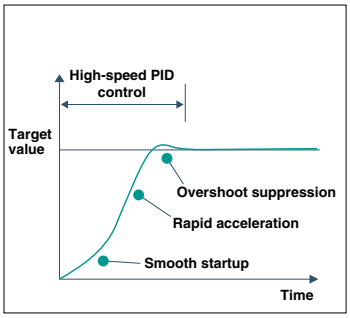


The number can even be increased up to 28 channels by using the thermocouple input cassette and FP0 thermocouple unit.

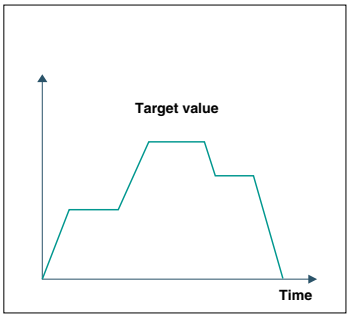
2 modes are selectable



Partial optimum control by changing parameters



Multi-step control by changing the target value



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FP-X series

Reassuring data security

Protects your important programs by preventing illegal copies.

■ Program upload is easily prohibited by tool software FPWIN.

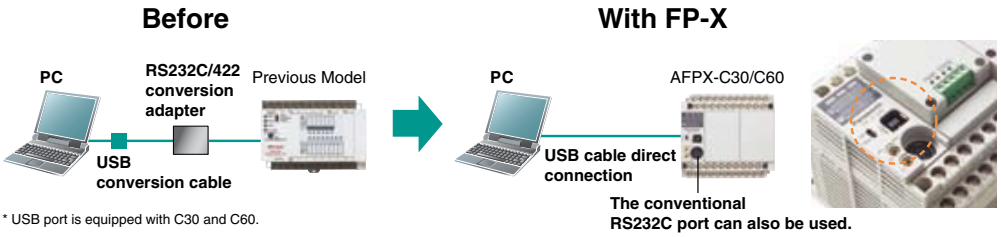
- Reading a program from the PLC main unit is virtually impossible.
- In the upload-prohibited condition, program transfers to the master memory are also prohibited.
- Release of an upload-prohibited condition is possible with a forced release accompanied by a program deletion.
- Program updates are easily carried out by transferring the program in the master memory to FP-X even during an upload-prohibited condition. The transferred program in FP-X is set up with the same upload prohibition and permission conditions used in the master memory.

Items possible during an upload-prohibited condition	Items impossible during an upload- prohibited condition
Program download from a PC Data transfer from the master memory Change of data monitor/resistor value Contact monitor Time chart monitor	Forced input/output (original program is required) Ladder monitor (original program is required) Rewrite during RUN mode (original program is required)
Program upload to a PC Data transfer to the master memory	Password protection

■ More secure 8-character password can be used along with the previous 4-character password.

- The combination of upper and lower case alphanumeric characters produces 218 trillion combinations. In addition, after 3 consecutive entry failures, a power reset is required for password release.

■ Using a standard USB port makes it unnecessary to use an an expensive USB conversion adapter/ cable for connecting a PC to the PLC.*



* USB port is equipped with C30 and C60.

C30 and C60 control units have a USB port as standard equipment. They can be easily connected to a PC with a commercially available USB cable (AB type), making program editing/monitoring available. It is no longer necessary to bring a dedicated cable to remote locations.

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FP-X series

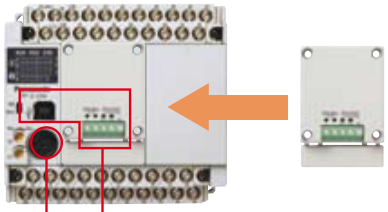
Network

Different types of equipment need to be linked – FP-X flexibly meet such requirements.

■ Up to 3 serial communication ports can be used simultaneously

Usable interfaces include RS232C, RS485, RS422 and USB.

* The RS232C tool port can be used as a general-purpose serial communication port.



Communication cassette (two-channel type)

AFPX-COM2 (RS232C + RS232C)
AFPX-COM4 (RS485 + RS232C)
AFPX-COM5 (Ethernet + RS232C)
AFPX-COM6 (RS485 + RS485)

- COM1: RS232C, RS485, Ethernet
- COM2: RS232C, RS485, USB (The cassette port and the USB port cannot be used simultaneously.)
- Tool port: RS232C

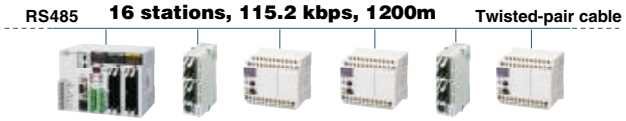
■ PLC link (MEWNET-W0)

Bit data/word data can be shared (linked) among up to 16 FP-X units. This is ideal for linking adjacent equipment in a distributed control system.

- Links with our other PLCs (FPΣ (Sigma), FP2/FP2SH) are possible.
- Simple setting of the number of linked units, linked relays and starting area address of the own station by using FPWINPro allows contact information and data to be shared without programming.
- Baud rate of 115.2kbps, the highest rate for a compact model.
- A transfer distance of 1200m, the longest distance for a compact model.
- FP-X and FPΣ (Sigma) allow a change of the station number by programming (SYS instruction).

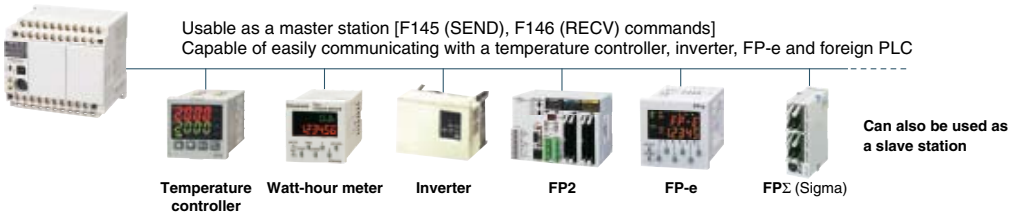
Item	Specifications
Number of stations	16 stations
Transmission speed	115.2kbps
Transmission distance	1200m
Shared data	128 words (data register), 64 words (contacts)
Communication method	Floating master

FP-X requires a communication cassette (AFPX-COM3, AFPX-COM4 or AFPX-COM6)
FP2/FP2SH requires a multi-communication unit (FP2-MCU, FP2-CB485)
FPΣ (Sigma) requires a communication cassette (FPG-COM3-A, FPG-COM4-A)



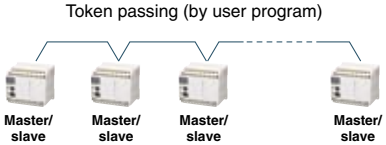
■ Modbus-RTU compatibility

Compatible with both the master and slave of the Modbus RTU, the world's de-facto standard. Great performance is expected for air-conditioning, temperature control, etc.



■ Another available application

When 17 or more FP-X units need to be linked, the use of Modbus instead of MEWNET-W0 (see above) can accommodate up to 99 FP-X units. Because each FP-X can be a master or a slave, a multi-master link can be constructed by passing a token from a user program.



Multi-master link of up to 99 units is possible.

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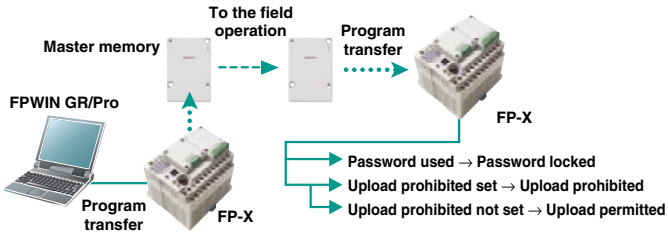
FP-X series

Other useful functions

■ The master memory makes program transfer easy, and a real-time clock is also included

- The built-in 512kb flash-ROM can store a 32-k step program as well as the comments and FPWIN Pro source file.
- Program update in a remote location is easy by simply sending master memory for local installation.
- As the master memory stores the password information, password protection can be applied for program transmission. Similarly, upload prohibition/permission can be set up.
- The built-in real-time clock enables periodical repeated control and periodical data logging.

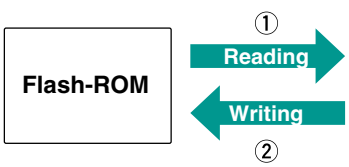


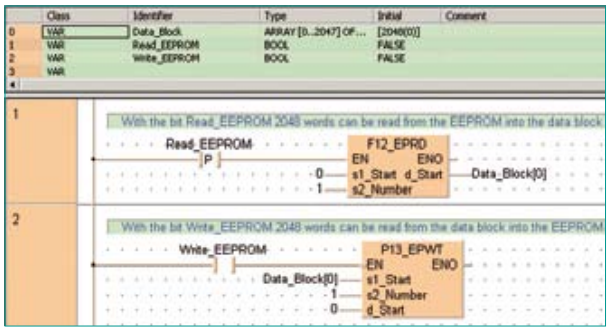
■ Programs can be saved without a backup battery, making maintenance easier

- The programs and comments are stored in flash-ROM requiring no backup batteries.
- A backup battery (AFPX-BATT) is provided for data and the real-time clock. 1 battery for C14, 2 for C30 and 3 for C60 can be attached. A 2-battery installation can operate for a long time (10 years or more) without maintenance. (The real-time clock does not work without a battery.)

■ F-ROM data saving (data can be saved without a battery)

- FP-X can store a program, comments, a total of 55 words of data and bit setting values in a flash memory without a battery. All of the data and bits can be stored by adding optional batteries, but writing into a flash-ROM is possible without a battery by using applied instructions (F12, P13). Perfectly suited for data storage of the setup values and recipes modified several times a day.*





* The limitation in a flash-ROM designates the number of rewrites to be 10,000, or the feasible number to be approx 30,000. However, rewriting every second will generate a memory failure within a few hours.

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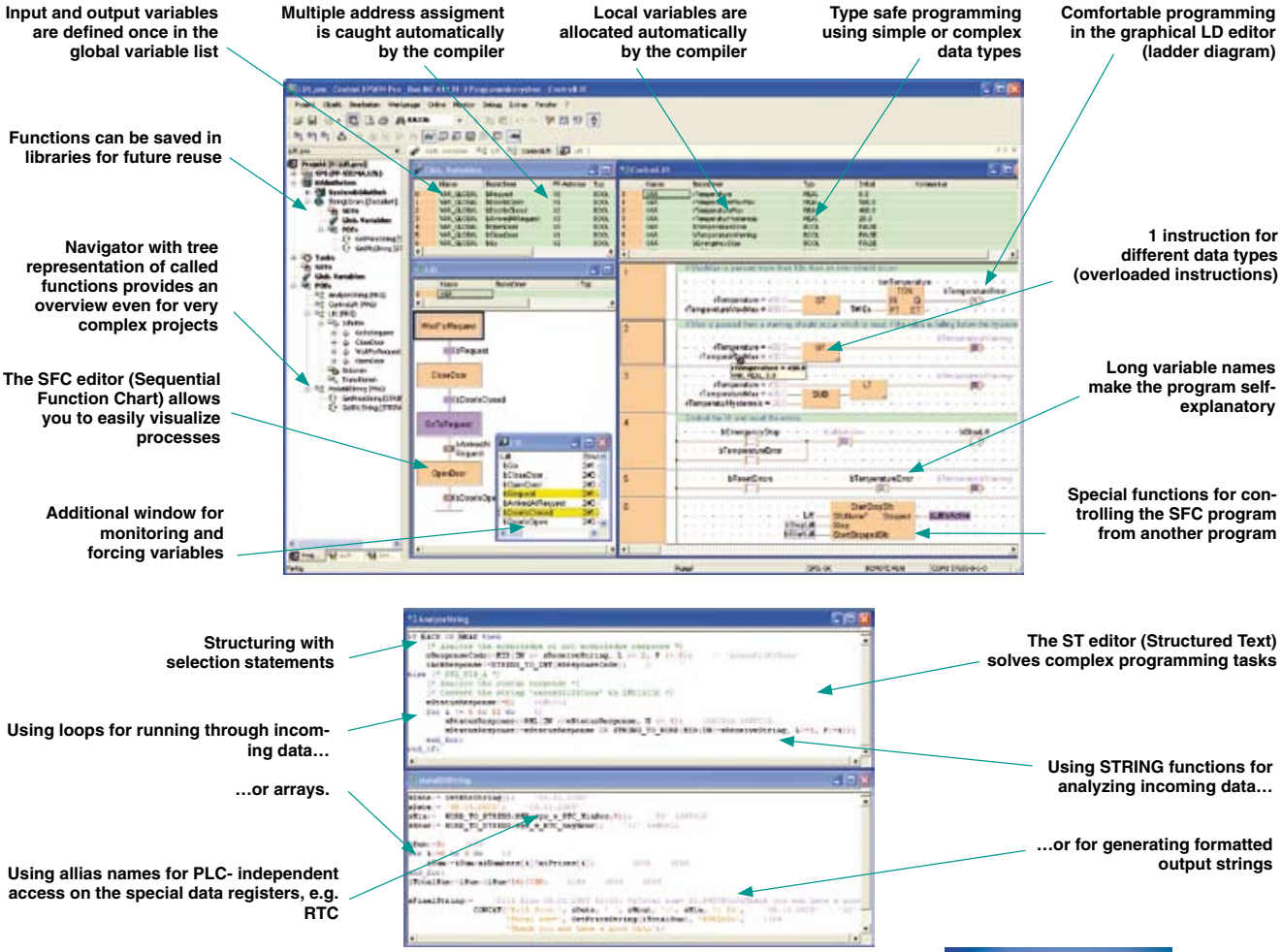
FP-X series

Programming according to the international standard IEC 61131-3

FPWIN Pro is the Panasonic programming software developed according to the international standard IEC 61131-3 (for Windows 98, NT V4.0, 2000, ME, XP or Vista). This new version is a result of experience gained over many years. We were one of the first PLC manufacturers to offer IEC 61131-3 programming software, and we are a leading member of the international organization PLCopen.



The most important highlights at a glance:

- 1 software for all FP Series PLCs.
- 5 programming languages (instruction list, ladder diagram, function block diagram, sequential function chart, structured text) available for all PLCs.
- Program organization units, task and project management provide clear structure.
- Reuse of ready-made functions and function blocks saves time for programming and debugging.
- Online monitoring and diagnostics.
- Forcing—turning off input and output contacts via the PC.
- Extensive comments—online documentation created hand in hand with the program.
- Modem communication for remote programming, service and diagnostics.
- Extensive comments—online documentation created hand in hand with the program.
- 6 languages are supported: English, German, French, Italian, Spanish and Japanese.

Part numbers:

FPWINPROF: Full version supports all FP Series PLCs
FPWINPROS: Small version, supports FP-e, FP0, FP-X and FPΣ(Sigma)

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FP-X series

Product number list

■ FP-X control unit

N/A: Not available
A: Available

	Product name	Power supply	Specifications	Program capacity	Potentiometer	USB port	Product number
Relay output	FP-X C14R	100 to 240VAC	8-point input of 24VDC, 6-point output of 2A relay	16k steps	2-point	N/A	AFPX-C14R
	FP-X C14RD	24VDC	8-point input of 24VDC, 6-point output of 2A relay	16k steps	2-point	N/A	AFPX-C14RD
	FP-X C30R	100 to 240VAC	16-point input of 24VDC, 14-point output of 2A relay	32k steps	2-point	A	AFPX-C30R
	FP-X C30RD	24VDC	16-point input of 24VDC, 14-point output of 2A relay	32k steps	2-point	A	AFPX-C30RD
	FP-X C60R	100 to 240VAC	32-point input of 24VDC, 28-point output of 2A relay	32k steps	4-point	A	AFPX-C60R
	FP-X C60RD	24VDC	32-point input of 24VDC, 28-point output of 2A relay	32k steps	4-point	A	AFPX-C60RD
Transistor output	FP-X C14T	100 to 240VAC	8-point input of 24VDC, 0.5 A/5 to 24VDC, 6-point output of transistor (NPN)	16k steps	2-point	N/A	AFPX-C14T
	FP-X C14TD	24VDC	8-point input of 24VDC, 0.5 A/5 to 24VDC, 6-point output of transistor (NPN)	16k steps	2-point	N/A	AFPX-C14TD
	FP-X C14P	100 to 240VAC	8-point input of 24VDC, 0.5 A/24VDC, 6-point output of transistor (PNP)	16k steps	2-point	N/A	AFPX-C14P
	FP-X C14PD	24VDC	8-point input of 24VDC, 0.5 A/24VDC, 6-point output of transistor (PNP)	16k steps	2-point	N/A	AFPX-C14PD
	FP-X C30T	100 to 240VAC	16-point input of 24VDC, 0.5 A/5 to 24VDC, 14-point output of transistor (NPN)	32k steps	2-point	A	AFPX-C30T
	FP-X C30TD	24VDC	16-point input of 24VDC, 0.5 A/5 to 24VDC, 14-point output of transistor (NPN)	32k steps	2-point	A	AFPX-C30TD
	FP-X C30P	100 to 240VAC	16-point input of 24VDC, 0.5 A/24VDC, 14-point output of transistor (PNP)	32k steps	2-point	A	AFPX-C30P
	FP-X C30PD	24VDC	16-point input of 24VDC, 0.5 A/24VDC, 14-point output of transistor (PNP)	32k steps	2-point	A	AFPX-C30PD
	FP-X C60T	100 to 240VAC	32-point input of 24VDC, 0.5 A/5 to 24VDC, 28-point output of transistor (NPN)	32k steps	4-point	A	AFPX-C60T
	FP-X C60TD	24VDC	32-point input of 24VDC, 0.5 A/5 to 24VDC, 28-point output of transistor (NPN)	32k steps	4-point	A	AFPX-C60TD
	FP-X C60P	100 to 240VAC	32-point input of 24VDC, 0.5 A/24VDC, 28-point output of transistor (PNP)	32k steps	4-point	A	AFPX-C60P
	FP-X C60PD	24VDC	32-point input of 24VDC, 0.5 A/24VDC, 28-point output of transistor (PNP)	32k steps	4-point	A	AFPX-C60PD

Note: The 24VDC inputs of all units are bi-directional (sink/source) inputs.

■ FP-X expansion unit

	Product name	Power supply	Specifications	Product number
Relay output	FP-X E16R Expansion I/O unit	— (Power is supplied from the left-side unit.)	8-point input of 24VDC, 8-point relay output of 2A Remarks; Two or more E16R can't be connected serially because it can't supply the power to other units. With an 8cm extension cable	AFPX-E16R
	FP-X E30R Expansion I/O unit	100 to 240VAC	16-point input of 24VDC, 14-point relay output of 2A Remarks; Possible to connect up to 8 units including E16R, EFP0. With an 8cm extension cable	AFPX-E30R
	FP-X E30RD Expansion I/O unit	24VDC	16-point input of 24VDC, 14-point relay output of 2A Remarks; Possible to connect up to 8 units including E16R, EFP0. With an 8cm extension cable	AFPX-E30RD
Transistor output	FP-X E16T Expansion I/O unit	— (Power is supplied from the left-side unit.)	8-point input of 24VDC, 8-point transistor (NPN) output of 0.5A Remarks; Two or more E16T cannot be connected serially because it cannot supply the power to other units. With an 8cm extension cable	AFPX-E16T
	FP-X E16P Expansion I/O unit	— (Power is supplied from the left-side unit.)	8-point input of 24VDC, 8-point transistor (PNP) output of 0.5A Remarks; Two or more E16T cannot be connected serially because it cannot supply the power to other units. With an 8cm extension cable	AFPX-E16P
	FP-X E30TD Expansion I/O unit	24VDC	16-point input of 24VDC, 14-point transistor (NPN) output of 0.5A Remarks; Possible to connect up to 8 units including E16, EFP0. With an 8cm extension cable	AFPX-E30TD
	FP-X E30T Expansion I/O unit	100 to 240VAC	16-point input of 24VDC, 14-point transistor (NPN) output of 0.5A Remarks; Possible to connect up to 8 units including E16, EFP0. With an 8cm extension cable	AFPX-E30T
	FP-X E30PD Expansion I/O unit	24VDC	16-point input of 24VDC, 14-point transistor (PNP) output of 0.5A Remarks; Possible to connect up to 8 units including E16, EFP0. With an 8cm extension cable	AFPX-E30PD
	FP-X E30P Expansion I/O unit	100 to 240VAC	16-point input of 24VDC, 14-point transistor (PNP) output of 0.5A Remarks; Possible to connect up to 8 units including E16, EFP0. With an 8cm extension cable	AFPX-E30P
Expansion FP0 Adapter		24VDC	Up to 3 FP0 expansion units can be connected via an adapter. With an 8cm extension cable and power cable	AFPX-EFP0

Note: The 24V DC inputs of all units are bi-directional (sink/source) inputs.

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FP-X series

Product number list

FP-X add-on cassette

Product name	Specifications	Product number
FP-X Input /Output cassette	4-point input of 24VDC, bi-directional (sink/source), 3-point output of NPN transistor 0.3 A/24VDC	AFPX-IN4T3
FP-X Input cassette	8-point input of 24VDC, bi-directional (sink/source)	AFPX-IN8
FP-X Output cassette	8-point output of NPN transistor, 0.3A/24VDC	AFPX-TR8
	6-point output of PNP transistor, 0.5A/24VDC	AFPX-TR6P
FP-X Pulse I/O cassette	High-speed counter input: single-phase 2ch., each 80kHz or two-phase 1ch., 30kHz, Pulse output: one axis 100kHz/ch. (Use restriction is applied for a two-unit installation) Cannot be used with a transistor output type control unit.	AFPX-PLS
FP-X Analog input cassette	2-point analog input, 0 to 10V/0 to 20mA, 12-bit, 2ms/2ch. (non-insulated)	AFPX-AD2
FP-X Analog output cassette	2-point analog output, 0 to 10V/0 to 20mA, 12-bit, 2ms/2ch. (insulated)	AFPX-DA2
FP-X Analog I/O cassette	2-point analog input, 0 to 5V/0 to 10V or 0 to 20m, 12-bit, 2ms/2ch., 1 point analog output, 0 to 10V or 0 to 20m, 12-bit, 1ms/1ch. (insulated)	AFPX-A21
FP-X Thermocouple input cassette	2-point thermocouple input, K/J type, Resolution: 0.2°C, 200ms/2ch. Channels insulated	AFPX-TC2
FP-X Master memory cassette with a real-time clock	Master memory: Capable of storing all program steps and comments simultaneously. Storage of FPWIN Pro source files Real-time clock: Year, month, day, hour, minute, second, day of week (optional battery required)	AFPX-MRTC
FP-X COM1 Communication cassette	RS232C 1ch. RS and CS control signal equipped (non-insulated)	AFPX-COM1
FP-X COM2 Communication cassette	RS232C 2ch. (non-insulated)	AFPX-COM2
FP-X COM3 Communication cassette	RS485/RS422 selectable 1ch (insulated)	AFPX-COM3
FP-X COM4 Communication cassette	RS485 1ch. (insulated) + RS232C 1ch. (non-insulated)	AFPX-COM4
FP-X COM5 Communication cassette	Ethernet 1ch. (10BASE-T, 100BASE-TX) + RS232C 1ch. (non-insulated)	AFPX-COM5
FP-X COM6 Communication cassette	RS485 2ch. (insulated)	AFPX-COM6

FP-X options and service parts

Product name	Specifications	Product number
FP-X Backup battery	Battery for backing up the operation memory and real-time clock	AFPX-BATT
FP-X Expansion cable	Expansion unit connection cable, 8cm	AFPX-EC08
	Expansion unit connection cable, 30cm	AFPX-EC30
	Expansion unit connection cable, 80cm	AFPX-EC80
FP-X Terminal block	Terminal block for C30, C60 and E30, 21 pins, cover with no marking, four units included	AFPX-TAN1
RS232C Programming cable	Programming cable for FP series PLCs, Mini DIN 5-pin male to sub-D 9-pin, 3m	AFC8513
USB Programming cable	FPX programming cable, USBA to USBB, 2m	AFPXCABUSB2

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FP-X series

Product number list

■ FP0 expansion units

Product name	Specifications						Product number
	Number of I/O points		Power supply voltage	Input	Output	Connection type	
FP0 E8 Expansion Unit	8	Input: 8	–	24VDC Sink/Source (±common)	–	MIL connector	FP0-E8X
	8	Input: 4 Output: 4	24VDC	24VDC Sink/Source (±common)	Relay output: 2A	Terminal block	FP0-E8RS
	8	Output: 8	24VDC	–	Relay output: 2A	Terminal block	FP0-E8YRS
	8	Output: 8	–	–	Transistor output: NPN 0.1A	MIL connector	FP0-E8YT
	8	Output: 8	–	–	Transistor output: PNP 0.1A	MIL connector	FP0-E8YP
FP0 E16 Expansion Unit	16	Input: 16	–	24VDC Sink/Source (±common)	–	MIL connector	FP0-E16X
	16	Input: 8 Output: 8	24VDC	24VDC Sink/Source (±common)	Relay output: 2A	Terminal block	FP0-E16RS
	16	Input: 8 Output: 8	–	24VDC Sink/Source (±common)	Transistor output: NPN 0.1A	MIL connector	FP0-E16T
	16	Input: 8 Output: 8	–	24VDC Sink/Source (±common)	Transistor output: PNP 0.1A	MIL connector	FP0-E16P
	16	Output: 16	–	–	Transistor output: NPN 0.1A	MIL connector	FP0-E16YT
	16	Output: 16	–	–	Transistor output: PNP 0.1A	MIL connector	FP0-E16YP
FP0 E32 Expansion Unit	32	Input: 16 Output: 16	–	24VDC Sink/Source (±common)	Transistor output: NPN 0.1A	MIL connector	FP0-E32T
	32	Input: 16 Output: 16	–	24VDC Sink/Source (±common)	Transistor output: PNP 0.1A	MIL connector	FP0-E32P
	32	Input: 16 Output: 16	24VDC	24VDC Sink/Source (±common)	Relay output: 2A	Terminal block	FP0-E32RS

Notes: 1) The relay output type expansion units come with a power cable (part number AFP0581). (The transistor output type needs no power cable.)
2) The terminal block type relay output units have 2 terminal blocks (9 pins) made by Phoenix. Use a 2.5mm wide screwdriver.
3) The transistor output units have a press-fit socket for wire-pressed terminal c able and contacts. Use the press-fit tool (part number AXY52000) for wire-pressed terminal cable.

■ FP0 intelligent units

Product name	Specifications			Product number
FP0 Thermocouple unit	4 channels, K, J, T, R thermocouple, Resolution: 0.1°C			FP0-TC4
	8 channels, K, J, T, R thermocouple, Resolution: 0.1°C			FP0-TC8
FP0 Analog I/O unit	<Input specifications>	Number of channels: Input range:	2 channels 0 to 5V, –10 to +10V (Resolution: 1/4000) 0 to 20mA (Resolution: 1/4000)	FP0−A21
	<Output specifications>	Number of channels: Output range:	1 channel –10 to +10V (Resolution: 1/4000) 0 to 20mA (Resolution: 1/4000)	
FP0 A/D Converter Unit	<Input specifications>	Number of channels: Input range:	8 channels 0 to 5, –10 to +10V (Resolution: 1/4000) 0 to 20mA (Resolution: 1/4000)	FP0-A80
FP0 D/A Converter Unit	<Output specifications>	Number of channels: Output range:	4 channels –10 to +10V (Resolution: 1/4000) 4 to 20mA (Resolution: 1/4000)	FP0-A04V FP0-A04I
FP0 RTD Unit	6 channels, Pt100, Pt1000, Ni1000, Resolution: 0.1K			FP0-RTD6

■ FP0 link units

Product name	Specifications	Power supply voltage	Product number
FP0 CC-Link Slave unit*	This unit is for making the FP0 function as a slave station of the CC-Link. Only one unit can be connected to the furthest right edge of the FP0 expansion bus.	24VDC	FP0-CCLS
FP0 I/O Link unit	This is a link unit designed to make the FP0 function as a station to MEWNET-F (remote I/O system).	24VDC	FP0-IOL
FP0 PROFIBUS Unit	PROFIBUS DP slave or remote I/O unit	24VDC	FP0-DPS2
FP Web-Server Unit	Connect all FP-Series PLCs to the Ethernet	24VDC	FPWEB2

*Note: Accuracy will change if an FP0 thermocouple unit is used at the same time.
For details, please refer to the CC-Link Unit manual.

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FP-X series

Specifications

■ Programmable display GT series

Product name	Description					Product number
GT01 Main Unit		STN monochrome LCD	5VDC	RS232C type	Black	AIGT0030B1
					Ash gray	AIGT0030H1
			24VDC	RS232C type	Black	AIGT0030B
					Ash gray	AIGT0030H
				RS422/RS485 type	Black	AIGT0032B
					Ash gray	AIGT0032H
GT01R Main Unit		STN monochrome LCD	5VDC	RS232C type	Pure black	AIGT0230B1
					Silver	AIGT0230H1
			24VDC	RS232C type	Pure black	AIGT0230B
					Silver	AIGT0230H
				RS422/RS485 type	Pure black	AIGT0232B
					Silver	AIGT0232H
GT11 Main Unit		STN monochrome LCD	24VDC	RS232C type	Black	AIGT2030B
					Ash gray	AIGT2030H
				RS422/RS485 type	Black	AIGT2032B
					Ash gray	AIGT2032H
GT21C Main Unit		STN color LCD	24VDC	RS232C type	Black	AIGT2230B
					Silver	AIGT2230H
				RS422/RS485 type	Black	AIGT2232B
					Silver	AIGT2232H
GT32M Main Unit		TFT monochrome LCD	24VDC	RS232C type	Pure black	AIG32MQ02D
					Silver	AIG32MQ03D
				RS422/RS485 type	Pure black	AIG32MQ04D
					Silver	AIG32MQ05D
GT32T0 Main Unit		TFT color LCD	24VDC	RS232C type	Pure black	AIG32TQ02D
					Silver	AIG32TQ03D
				RS422/RS485 type	Pure black	AIG32TQ04D
					Silver	AIG32TQ05D
GT32T1 Main Unit (Ethernet and sound output function supported)		TFT color LCD	24VDC	RS232C type	Pure black	AIG32TQ12D
					Silver	AIG32TQ13D
				RS422/RS485 type	Pure black	AIG32TQ14D
					Silver	AIG32TQ15D

■ FP memory loader

Product name	Product number
Data clear type	AFP8670
Data hold type	AFP8671

■ FPWIN pro PLC programming software according to IEC 61131-3

Product name	Type	Product number
FPWIN PRO	Small version with English manual	FPWINPROSEN5
	Small version with German manual	FPWINPROSDE5
	Small version with French manual	FPWINPROSFR5

■ Other software tools

Product name	Description	Product number
FP OPC Server	Standardized connectivity to FP Series PLCs (software with one license)	AFPS03510D
FP Data Analyzer	Software tool to read and display PLC data	AFPS04510D
PCWAY	Data monitoring, logging and setting software based on Excel	AFW10031
Control CommX	Connects your Visual Basic application to Panasonic PLCs	AFW20031
Key unit	USB port dongle for PCWAY and CommX	AFW1033

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FP-X series

Specifications

■ General specifications

Item	Description
Rated voltage	100 to 240VAC (AC power), 24VDC (DC power)
Operating voltage range	85 to 264VAC (AC power), 20.4 to 28.8VDC (DC power)
Service power output	C14: 24VDC/0.15A, C30 and C60: 24VDC/0.4A
Rush current	40A or less (C14), 45A or less (C30, C60) at 25°C (AC power) 12A or less at 25°C (DC power)
Allowed momentary power off time	110ms or more
Ambient temperature	0 to +55°C
Storage temperature	-40 to +70°C
Ambient humidity	10 to 95% RH (at 25°C, non-condensing)
Storage humidity	10 to 95% RH (at 25°C, non-condensing)
Breakdown voltage	Combined input/output terminals - Combined power and ground terminals, 2300VAC*1 1 minute (AC power), 500VAC*1 1 minute (DC power)
	Input terminals - Relay output terminals, 2300VAC*1 1 minute
	Input terminals - Transistor output terminals, 500VAC*1 1 minute
	Power terminals - Ground terminals, 1500VAC*1 1 minute (AC power), 500VAC*1 1 minute (DC power)
Insulation resistance	Combined input/output terminals - Combined power and ground terminals, 100MΩ or higher (500VDC using an insulation resistance meter)
	Input terminals - Output terminals, 100MΩ or higher (500VDC using an insulation resistance meter)
	Power terminals - Ground terminals, 100MΩ or higher (500VDC using an insulation resistance meter)
Vibration resistance	5 to 9Hz, single amplitude 3.5mm/9 to 150Hz, constant acceleration 9.8m/s^2, 1 sweep/min, 10 sweeps in each XYZ direction
Shock resistance	147m/s^2, 4 times on 3 axes
Noise immunity	1500V [P-P] pulse width 50ns, 1μs (AC power), 500V [P-P] pulse width 50ns, 1μs (DC power) (per noise simulator method) (power terminals)
Operating condition	No corrosive gas and no excessive dust
EC Directive Compliance Standard	Conforming to EN61131-2
Level of contamination	2
Over-voltage category	II

Note:
*1 Cutoff current 5mA

■ Power consumption, weight

Product name	Part number	Current consumption	Weight
Control Unit	AFPX-C14□□	26W or less*2	Approx. 280g or less
	AFPX-C30□□	52W or less*2	Approx. 490g or less
	AFPX-C60□□	64W or less*2	Approx. 780g or less
Expansion I/O Unit	AFPX-E16□□	8W or less*2	Approx. 195g or less
	AFPX-E30□□	45W or less*2	Approx. 470g or less
Expansion FP0 adapter	AFPX-EFP0	0.24W or less*3	Approx. 65g
Input cassette	AFPX-IN8	1W or less*2	Approx. 25g
Output cassette	AFPX-TR8	1W or less*2	Approx. 25g
	AFPX-TR6P	1W or less*2	Approx. 25g
Pulse I/O cassette	AFPX-PLS	2W or less*2	Approx. 25g
Master memory cassette	AFPX-MRTC	2W or less*2	Approx. 20g
Analog input cassette	AFPX-AD2	2W or less*2	Approx. 25g
Analog I/O cassette	AFPX-A21	3W or less*2	Approx. 25g
Analog output cassette	AFPX-DA2	5W or less*2	Approx. 25g
Thermocouple input cassette	AFPX-TC2	1W or less*2	Approx. 25g
Communication cassettes	AFPX-COM1	2W or less*2	Approx. 20g
	AFPX-COM2		
	AFPX-COM3		
	AFPX-COM4		
	AFPX-COM5	3W or less*2	Approx. 25g
	AFPX-COM6	2W or less*2	Approx. 20g

Notes:
*2 Power consumption by the AC power supply connected to the control unit
*3 Power consumption by the DC power supply connected to the expansion FP0 adapter

Please refer to the user manual and specifications for further details.

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FP-X series

Specifications

■ Control specifications

Item		Specifications
Program method		Relay symbol method
Control method		Cyclic operation method
Program memory		Flash ROM built-in (no battery backup required)
Program capacity		16k steps (C14), 32k steps (C30, C60)
Operation processing speed		Basic instruction 0.32μs/step
Basic instructions		111
Applied instructions		216
External inputs (X)		1760 points *1
External outputs (Y)		1760 points *1
Internal relay (R)		4096 points
Special internal relay (R)		192 points
Link relay (L)		2048 points
Timer/counter (T/C)		Total 1024 points: timer capable of counting (1ms, 10ms, 100ms, 1s) x 32767 Counter capable of counting 1 to 32767
Data register (DT)		12285 words (C14), 32765 words (C30, C60)
Link data register (LD)		256 words
Special data register (DT)		374 words
Index register (I0 to ID)		14 words
Master control relay (MCR)		256 points
Number of labels (LOOP)		256 labels
Number of differentiations		Up to program capacity
Number of stepladders		1000 stages
Number of subroutines		500 subroutines
Number of interruption programs		Relay output type: 15 programs (14 external, 1 constant) Transistor output type: 9 programs (8 external, 1 constant)
High-speed counter *2		Built-in (Transistor output): single-phase 8ch (50kHz x 4ch + 10kHz x 4ch) Built-in (Relay output): single-phase 8ch (10kHz x 8ch) Pulse I/O cassette: single-phase 2ch (80kHz x 2ch)
Pulse output *3		Built-in (Transistor output): 100kHz x 2ch + 20kHz x 2ch Pulse I/O cassette: One unit (one axis) 100kHz, or two units (two axes) 80kHz
Pulse catch input / interrupt input		Relay output type: Total 14 points (including the high-speed counter) Transistor output type: Total 8 points (including the high-speed counter)
Periodical interrupt		0.5ms to 30s
Potentiometer		2 points (0 to 1000) (C14, C30) 4 points (0 to 1000) (C60)
Constant scan		Possible
Real-time clock		Equipped (usable only when AFPX-MRTC is installed) *4
Flash ROM backup *6	Backup by F12, P13 commands	Data register (32,765 words)
	Auto-backup at power failure	Counter 16 points (1008 to 1023), Internal relay 128 points (R2470 to R255F), Data register 55 words
Battery backup		The memory allocated in the storage area by the system register (only when a battery is installed) *5
Battery life (when no power is supplied)	Before installing AFPX-MRTC	C14: 1230 days (actual operation 10 years at 25°C) C30, C60: 990 days (actual operation 10 years at 25°C)
	After installing AFPX-MRTC	C14: 780 days (actual operation 10 years at 25°C) C30, C60: 680 days (actual operation 10 years at 25°C)
		(More than two batteries can be installed in C30 and C60. In this case, the battery life is extended several times)
Password		Capable (4 or 8 characters selectable)
Self-diagnosis function		Watch dog timer, program syntaxcheck
Comment storage		Capable (328KB) (backup battery not required)
PLC link function		Max. 16 units, link relay 1024 points, link register 128 words (No data transfer or remote programming)
Rewriting in RUN mode		Capable

Notes:
*1 The actual usable number of points is restricted by the hardware.
*2 Specification at the rated input voltage of 24V DC, 25°C. Frequency may be lower due to the voltage and temperature.
*3 Max frequency may vary by the method of operation. Please refer to the manual for details.
*4 Calendar accuracy at 0°C: 119sec/month or less, 25°C: 51 sec/month or less, 55°C: 148 sec/month or less (Real-time clock requires a battery.)
*5 When data is stored in the storage area while the battery is not installed, the data is not cleared and the data value may be indefinite. The same condition occurs when the battery is exhausted.
*6 The number of possible rewrites is 10,000 or less.

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FP-X series

Specifications

■ Input specifications (control unit, expansion unit and add-on cassette)

Item		Description		
		Relay output (control unit and expansion unit)	Transistor output (control unit and expansion unit)	Add-on cassette (AFPX-IN8, AFPX-IN4T3)
Insulation method		Photocoupler		
Rated input voltage		24VDC		
Operating voltage range		21.6 to 26.4VDC		
Rated input current		Approx. 4.7mA (Control unit X0 to X7)	Approx. 8mA (Control unit X0 to X3) Approx. 4.7mA (Control unit X4 to X7)	Approx. 3.5mA
		Approx 4.3mA (Control unit X8 and after, Expansion unit)	Approx. 4.3mA (Control unit X8 and after, Expansion unit)	
Input points per common		8 points/common (C14, E16) 16 points/common (C30, C60, E30)		8 points/common (AFPX-IN8), 4 points/common (AFPX-IN4T3)
		(Input power polarity either positive or negative)		
Min. ON voltage/ON current		19.2V/3 mA	19.2V/6mA (Control unit X0 to X3) 19.2V/3mA (Control unit X4 and after, Expansion unit)	19.2V/3mA
Max. OFF voltage/OFF current		2.4V/1 mA	2.4V/1.3mA (Control unit X0 to X3) 2.4V/1mA (Control unit X4 and after, Expansion unit)	2.4V/1mA
Input impedance		Approx. 5.1kΩ (Control unit X0 to X7) Approx. 5.6kΩ (Control unit X8 and after, Expansion unit)	Approx. 3kΩ (Control unit X0 to X3) Approx. 5.1kΩ (Control unit X4 to X7) Approx. 5.6kΩ (Control unit X8 and after, Expansion unit)	Approx. 6.8kΩ
Response time	OFF → ON	Control unit X0 to X7 0.6ms or less: Normal input 50µs or less: High-speed counter, pulse catch, interruption input setting *1 Control unit X8 and after, Expansion unit 0.6ms or less	Control unit X0 to X3 135µs or less: Nominal input 5µs or less: High-speed counter, pulse catch, interruption input setting*1 Control unit X4 to X7 135µs or less: Nominal input 50µs or less: High-speed counter, pulse catch, interruption input setting*1 Control unit X8 and after, Expansion unit 0.6ms or less	1.0ms or less
	OFF → ON	Same as above		1.0ms or less
Operating indicator		LED display		

Note: *1 Specification at the rated input voltage of 24VDC, 25°C.

■ Relay output specifications (control units, expansion units)

Item		Description
Output type		1a contact
Rated control capacity (Resistive load)		2A 250VAC, 2A 30VDC (8A or less/common)
Output points per common		C14, E16: 1 point or 3 points/common, C30, E30: 1 point or 4 points/common, C60: 1, 2 or 4 points/common
Response time	OFF→ON	Approx. 10ms
	ON→OFF	Approx. 8ms
Life time	Mechanical	20 million operations or more (Operation frequency 180 times/min)
	Electrical	100,000 operations or more (Operation frequency 20 times/min at the rated control capacity)
Surge absorber		None
Operating indicator		LED display

■ Transistor output specifications (Control unit, expansion unit and add-on cassette)

Item		Description	
		Control unit, Expansion unit	Add-on cassette (AFPX-TR8, AFPX-TR6P, AFPX-IN4T3)
Insulation method		Photocoupler	
Output type		Open collector	
Rated load voltage		NPN type: 5 to 24VDC, PNP type: 24VDC	24VDC
Load voltage allowable range		NPN type: 4.75 to 26.4VDC, PNP type: 21.6 to 26.4VDC	21.6 to 26.4VDC
Max. load current		0.5A	NPN type: 0.3A, PNP type: 0.5A
Max. inrush current		1.5A	
Output points per common		C14: 6 points/common, E16: 8 points/common, C30, C60, E30: 8 or 6 points/common	TR8: 8 points/common, TR6P: 6 points/common, IN4T3: 3 points/common
OFF state leakage current		1µA or less	
ON state voltage drop		0.3VDC or less	1.5VDC or less
Response time	OFF → ON	1ms or less*2	0.1ms or less
	OFF → ON	1ms or less*2	0.8ms or less
Voltage range for external power supply		21.6 to 26.4VDC	—
Surge absorber		Zener diode	
Operating indicator		LED display	

Note: *2 Please refer to the user manual for Y0 to Y7 of the transistor output type.

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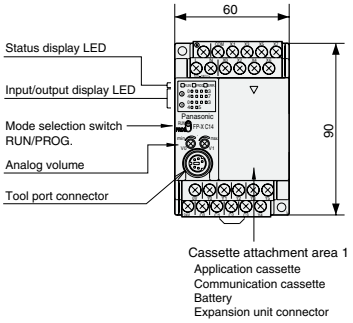
FP-X series

Dimensions

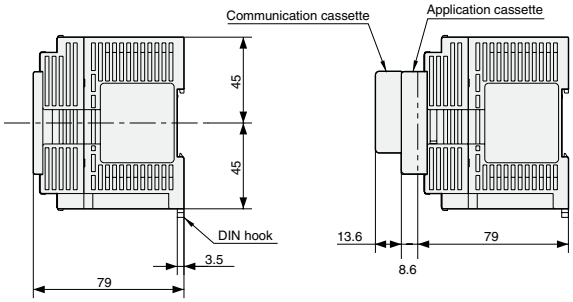
■ FP-X control unit dimensions (unit: mm)

■ AFPX-C14□□

(The same dimensions apply to the expansion I/O unit AFPX-E16*)

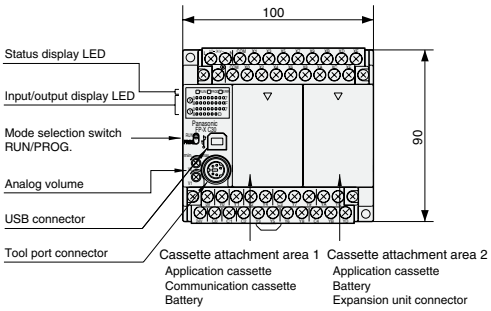


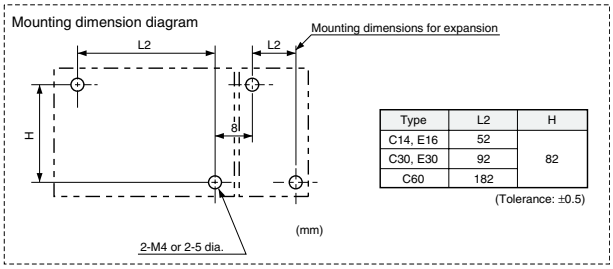
Dimensions when add-on cassettes (function and communication) are installed



*AFPX-COM5 Communication Cassette (Ethernet type): 5 mm higher

■ AFPX-C30□□ (The same dimensions apply to the expansion I/O unit AFPX-E30□□)

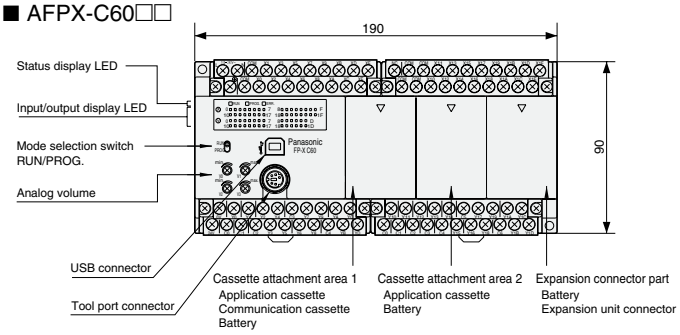




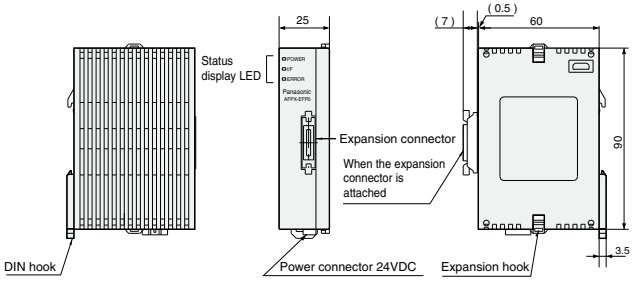
Type	L2	H
C14, E16	52	82
C30, E30	92	
C60	182	

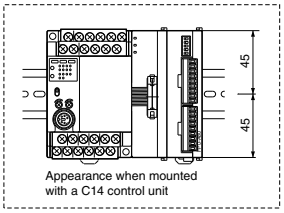
(Tolerance: ±0.5)

■ AFPX-C60□□



■ FP-X expansion FP0 adapter dimensions (unit: mm)





Appearance when mounted with a C14 control unit

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▸ **Switzerland**	**Panasonic Electric Works Schweiz AG**	Grundstrasse 8, 6343 Rotkreuz, Tel. (041) 7997050, Fax (041) 7997055, www.panasonic-electric-works.ch
▸ **United Kingdom**	**Panasonic Electric Works UK Ltd.**	Sunrise Parkway, Linford Wood, Milton Keynes, MK14 6 LF, Tel. (01908) 231555, Fax (01908) 231599, www.panasonic-electric-works.co.uk
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▸ **Singapore**	**Panasonic Electric Works Asia Pacific Pte. Ltd.**	101 Thomson Road, #25-03/05, United Square, Singapore 307591, Tel. (06255) 5473, Fax (06253) 5689

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