



(Excluding some models)



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# Compact terminal block type controller Superior basic performance and wealth of functions

PNP type is added to the lineup!



### High-speed operation

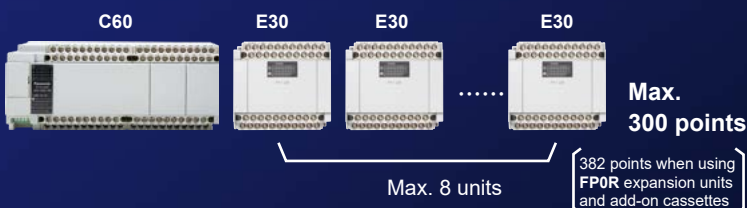
- Basic instruction (ST instruction): 0.04  $\mu$ s/step  
Up to 7 k steps (ratio to convention: 8 times)

### Large capacity program memory

- Program capacity: Max. 40 k steps (For C14: 16 k steps)  
24 k / 32 k / 40 k steps selectable

### Expandability

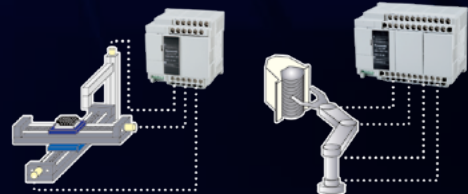
- Max. I/O points: 300 points  
One control unit connectable to up to 8 expansion units  
(382 points when using FP0R expansion units and add-on cassettes)
- Up to 4 add-on cassettes can be added (C14: up to 2 add-on cassettes)



### Multi-axis positioning control

- On up to 6 axes, built-in 100 kHz high-speed pulse output function  
(Transistor output type has a built-in pulse output function for 3 axes for C14, 4 axes for C30 and 6 axes for C60)

X-Y table + Machining head      Semiconductor wafer take-out blade



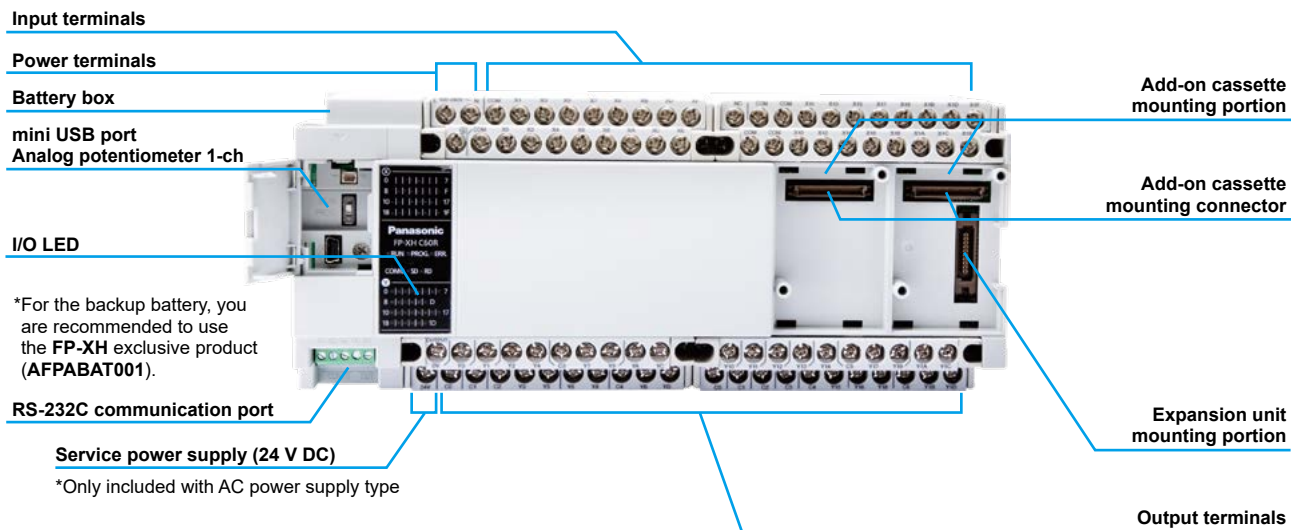
C14: 3-axis control

C30 / C60: 4-axis control

### Network

- Communication port: Max. 5 channels  
Support for up to 5 channels including 2 communication cassettes (2 channels type) and tool port.
- Compatible with Modbus-RTU  
Compatible with master / slave of Modbus-RTU, industry standard
- PLC link  
Bit data and word data can be shared (linked) via connection with FP-XH (up to 16 units).

## FP-XH Name and function of each part \*Image shows C60R



## Product types

### Control units

Product name	Power supply	Specifications	Program capacity	Part No.
FP-XH C14R	100 to 240 V AC	8-point input of 24 V DC, 6-point relay output of 2 A	16 k steps	AFPXHC14R
FP-XH C14RD	24 V DC	8-point input of 24 V DC, 6-point relay output of 2 A	16 k steps	AFPXHC14RD
FP-XH C14T	100 to 240 V AC	8-point input of 24 V DC, 0.5 A / 5 to 24 V DC, 6-point output of transistor (NPN)	16 k steps	AFPXHC14T
FP-XH C14TD	24 V DC	8-point input of 24 V DC, 0.5 A / 5 to 24 V DC, 6-point output of transistor (NPN)	16 k steps	AFPXHC14TD
FP-XH C14P	100 to 240 V AC	8-point input of 24 V DC, 0.5 A / 24 V DC, 6-point output of transistor (PNP)	16 k steps	AFPXHC14P
FP-XH C14PD	24 V DC	8-point input of 24 V DC, 0.5 A / 24 V DC, 6-point output of transistor (PNP)	16 k steps	AFPXHC14PD
FP-XH C30R	100 to 240 V AC	16-point input of 24 V DC, 14-point relay output of 2 A	32 k steps	AFPXHC30R
FP-XH C30RD	24 V DC	16-point input of 24 V DC, 14-point relay output of 2 A	32 k steps	AFPXHC30RD
FP-XH C30T	100 to 240 V AC	16-point input of 24 V DC, 0.5 A / 5 to 24 V DC, 14-point output of transistor (NPN)	32 k steps	AFPXHC30T
FP-XH C30TD	24 V DC	16-point input of 24 V DC, 0.5 A / 5 to 24 V DC, 14-point output of transistor (NPN)	32 k steps	AFPXHC30TD
FP-XH C30P	100 to 240 V AC	16-point input of 24 V DC, 0.5 A / 24 V DC, 14-point output of transistor (PNP)	32 k steps	AFPXHC30P
FP-XH C30PD	24 V DC	16-point input of 24 V DC, 0.5 A / 24 V DC, 14-point output of transistor (PNP)	32 k steps	AFPXHC30PD
FP-XH C60R	100 to 240 V AC	32-point input of 24 V DC, 28-point relay output of 2 A	32 k steps	AFPXHC60R
FP-XH C60RD	24 V DC	32-point input of 24 V DC, 28-point relay output of 2 A	32 k steps	AFPXHC60RD
FP-XH C60T	100 to 240 V AC	32-point input of 24 V DC, 0.5 A / 5 to 24 V DC, 28-point output of transistor (NPN)	32 k steps	AFPXHC60T
FP-XH C60TD	24 V DC	32-point input of 24 V DC, 0.5 A / 5 to 24 V DC, 28-point output of transistor (NPN)	32 k steps	AFPXHC60TD
FP-XH C60P	100 to 240 V AC	32-point input of 24 V DC, 0.5 A / 24 V DC, 28-point output of transistor (PNP)	32 k steps	AFPXHC60P
FP-XH C60PD	24 V DC	32-point input of 24 V DC, 0.5 A / 24 V DC, 28-point output of transistor (PNP)	32 k steps	AFPXHC60PD

**Expansion I/O units** Up to 8 units can be expanded, and an expansion cable of 8 cm 3.15 in is included.

Product name	Power supply	Specifications	Part No.
FP-X E14YR Expansion output unit	(Power is supplied from the left-side unit.)	14-point relay output of 2 A (Note 1)	AFPX-E14YR
FP-X E16R Expansion I/O unit	(Power is supplied from the left-side unit.)	8-point input of 24 V DC, 8-point relay output of 2 A (Note 1)	AFPX-E16R
FP-X E30R Expansion I/O unit	100 to 240 V AC	16-point input of 24 V DC, 14-point relay output of 2 A	AFPX-E30R
FP-X E30RD Expansion I/O unit	24 V DC	16-point input of 24 V DC, 14-point relay output of 2 A	AFPX-E30RD
FP-X E16X Expansion input unit	(Power is supplied from the left-side unit.)	16-point input of 24 V DC (Note 1)	AFPX-E16X
FP-X E16T Expansion I/O unit	(Power is supplied from the left-side unit.)	8-point input of 24 V DC, 0.5 A / 5 to 24 V DC, 8-point output of transistor (NPN) (Note 1)	AFPX-E16T
FP-X E30T Expansion I/O unit	100 to 240 V AC	16-point input of 24 V DC, 0.5 A / 5 to 24 V DC, 14-point output of transistor (NPN)	AFPX-E30T
FP-X E30TD Expansion I/O unit	24 V DC	16-point input of 24 V DC, 0.5 A / 5 to 24 V DC, 14-point output of transistor (NPN)	AFPXHC30TD
FP-X E16P Expansion I/O unit	(Power is supplied from the left-side unit.)	8-point input of 24 V DC, 0.5 A / 24 V DC, 8-point output of transistor (PNP) (Note 1)	AFPX-E16P
FP-X E30P Expansion I/O unit	100 to 240 V AC	16-point input of 24 V DC, 0.5 A / 24 V DC, 14-point output of transistor (PNP)	AFPX-E30P
FP-X E30PD Expansion I/O unit	24 V DC	16-point input of 24 V DC, 0.5 A / 24 V DC, 14-point output of transistor (PNP)	AFPX-E30PD
Expansion FP0 adapter	24 V DC	Up to three FP0R expansion units can be connected to the FP-X via this adapter. Power cable included (Note 2)	AFPX-EFP0

Notes: 1) Since no power supply circuit is built in, two units cannot be connected in succession.

2) Only one unit can be installed in the control unit, and it is installed at the end of the expansion unit.

## Product types

### Add-on cassettes (Application cassettes)

Product name	Specifications	Part No.
FP-X I/O cassette	4-point input of 24 V DC, bi-directional (sink/source), 3-point output of NPN transistor 0.3 A / 24 V DC	AFPX-IN4T3
FP-X Input cassette	8-point input of 24 V DC, bi-directional (sink/source)	AFPX-IN8
FP-X Output cassette	8-point output of NPN transistor, 0.3 A / 24 V DC	AFPX-TR8
FP-X Output cassette	6-point output of PNP transistor, 0.5 A / 24 V DC	AFPX-TR6P
FP-X Pulse I/O cassette (Note 1)	High-speed counter input: single-phase 2 channels, each 80 kHz or two-phase 1 channel, 30 kHz Pulse output: one axis 100 kHz / channel (Use restriction is applied for a two-unit installation)	AFPX-PLS
FP-X Analog input cassette	2-point analog input, 0 to 10 V / 0 to 20 mA, 12-bit, 2 ms / 2 channels (non-insulated)	AFPX-AD2
FP-X Analog output cassette	2-point analog output, 0 to 10 V / 0 to 20 mA, 12-bit, 2 ms / 2 channels (insulated)	AFPX-DA2
FP-X Analog I/O cassette	2-point analog input, 0 to 5 V / 0 to 10 V or 0 to 20 mA, 12-bit, 2 ms / 2 channels (insulated) 1 point analog output, 0 to 10 V / 0 to 20 mA, 12-bit, 1 ms / 1 channel (insulated)	AFPX-A21
FP-X Thermocouple input cassette	2-point thermocouple input, K / J type, Resolution: 0.2 °C, 200 ms / 2 channels (between channels: insulated)	AFPX-TC2
FP-X R.T.D. input cassette	2-points R.T.D. input, Pt100, Resolution: 0.1 °C, 200 ms (between channels: insulated)	AFPX-RTD2
FP-X Master memory cassette with a real-time clock (Note 2)	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 (Buck-up battery AFPABAT001 required)	AFPX-MRTC

Notes: 1) Cannot be used with a transistor output type control unit.  
2) Only one master memory with real-time clock can be installed.

### Add-on cassettes (Communication cassettes)

Product name	Specifications	Part No.
FP-X COM1 Communication cassette	RS-232C 1 channel, RS and CS control signal equipped (non-insulated)	AFPX-COM1
FP-X COM2 Communication cassette	RS-232C 2 channels (non-insulated)	AFPX-COM2
FP-X COM3 Communication cassette	RS-485 / RS-422 selectable 1 channel (insulated)	AFPX-COM3
FP-X COM4 Communication cassette	RS-485 1 channel (insulated) and RS-232C 1 channel (non-insulated)	AFPX-COM4
FP-X COM5 Communication cassette	Ethernet 1 channel (10BASE-T, 100BASE-TX) and RS-232C 1 channel (non-insulated)	AFPX-COM5
FP-X COM6 Communication cassette	RS-485 2 channels (insulated)	AFPX-COM6

Note: If the application cassette is installed, it should be installed on the application cassette.

### Programming tools

Product name	Type	Specifications	Part No.
Programming software for Windows® Control FPWIN GR7	Japanese version	Supports only CPU unit without encryption function	AFPSPR7JP
	Security enhanced type	Supports both CPU unit with / without encryption function	AFPSPR7JPS
	English version	Supports only CPU without encryption function	AFPSPR7EN
	Security enhanced type	Supports both CPU unit with / without encryption function	AFPSPR7ENS
Programming software for Windows® Control FPWIN Pro7	English, Japanese, Korean and Chinese	FP series all models (for FP7 series, supports only CPU unit without encryption function)	AFPSPR7A
	Security enhanced type	FP series all models (for FP7 series, supports both CPU unit with / without encryption function) *The encryption function will be offered in the future.	AFPSPR7AS

Note: Windows is trademarks or registered trademarks of Microsoft Corporation in the United States and other countries.

### Option

Product name	Specifications	Part No.
FP-XH Backup battery	Required when expanding the hold area of the operation memory or when using the clock / calendar function	AFPABAT001
FP-X Expansion cable (Note 1, 2)	Expansion unit connection cable, 8 cm <a href="#">3.15 in</a> *Standard accessories for expansion I/O units	AFPX-EC08
	Expansion unit connection cable, 30 cm <a href="#">11.81 in</a>	AFPX-EC30
	Expansion unit connection cable, 80 cm <a href="#">31.50 in</a>	AFPX-EC80
FP0 Power cable	Expansion FP0 adapter cable, 1 m <a href="#">39.37 in</a> *Standard accessories for expansion FP0 adapter	AFP0581
FP-X Terminal block (Note 3)	Terminal block for C30, C60 and E30, 21 pins, cover with no marking, four units included	AFPX-TAN1

Notes: 1) The total length of the expansion cable should not exceed 160 cm [62.99 in](#).  
2) When using a long expansion cable, I/O checking errors may occur due to noise. In such a case, we recommend that you use a ferrite core.  
3) The terminal block is installed as standard. This is an option for wiring switching.

# Specifications

## General specifications

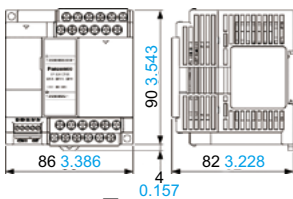
Item	Specifications
Operating ambient temperature	0 to +55 °C +32 to +131 °F
Storage ambient temperature	-40 to +70 °C -40 to +158 °F
Operating ambient humidity	10 to 95 % RH (at +25 °C +77 °F, non-condensing)
Storage ambient humidity	10 to 95 % RH (at +25 °C +77 °F, non-condensing)
Breakdown voltage (Note)	AC power supply
	DC power supply
	Relay output
	Transistor output
	Between power supply terminal and earth terminal
	Between power supply terminal and service power supply terminal
Isolation resistance	Between input terminal and earth terminal
	Between output terminal and earth terminal
	Between power supply terminal and earth terminal
	Between power supply terminal and service power supply terminal
Vibration resistance	5 to 8.4 Hz, 3.5 mm 0.138 in single amplitude 8.4 to 150 Hz, Acceleration 9.8 m/s <sup>2</sup> 10 min. each in the X, Y and Z directions (1 octave/min)
Shock resistance	147 m/s <sup>2</sup> , 4 times each in the X, Y and Z directions
Noise resistance	1,000 V [P-P] with pulse widths of 50 ns and 1 μs (using a noise simulator) (Power supply terminal)
Operating condition	No corrosive gas and no excessive dust
Applicable standard for EC directives	EMC directive: EN 61131-2 (directive concerning emission, immunity and low voltage)
Over-voltage category	Category II
Level of contamination	2

Note: Cut-off current 5 mA (Initial value at shipment)

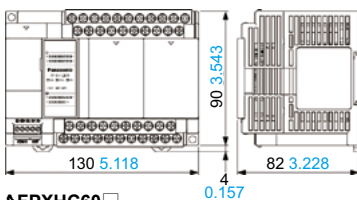
## Dimensions (Unit: mm in)

The CAD data can be downloaded from our website.

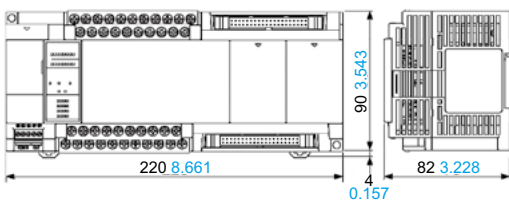
### AFPXHC14



### AFPXHC30



### AFPXHC60



- Notes: 1) When changing the program capacity (system register No.0), the data register (DT) capacity will also change.  
2) The number of points in the table is the number of points of operation memory. The number of points actually available to be used is determined by the hardware configuration.  
3) The number of timer points can be changed by the setting of the system register No.5.  
4) The maximum counting speed and maximum output frequency for the high-speed counter, pulse output and PWM output indicate the specifications for the voltage of 24 V DC and ambient temperature of +25 °C +77 °F. The frequency may decrease depending on voltage, temperature or combination of functions used.  
5) The inputs and outputs used for each function of the high-speed counter, pulse output, PWM output, pulse catch input or interrupt input cannot be allocated in duplication.  
6) Battery lifetime values is calculated when the power is not completely turned on. Since the actual value depends on conditions of use, in practice, the lifetime may be shorter.

## Functional specifications

Item	Specifications
Programming method	Relay symbol
Control method	Cyclic operation
Program memory	Built-in Flash ROM
Program capacity	<b>C14:</b> 16 k steps, <b>C30 / C60:</b> 24 k / 32 k / 40 k steps (switch-over) (Note 1)
Basic instructions	Approx. 110
High-level instructions	Approx. 220
Operation speed	Basic instruction (ST): Approx. 0.04 μs/step (up to 7 k steps) Approx. 0.7 μs/step (7 k steps or more)
	High-level instruction (F0MV): Approx. 0.22 μs/step (up to 7 k steps) Approx. 1.73 μs/step (7 k steps or more)
Operation memory	External input (X) (Note 2)
	External output (Y) (Note 2)
	Internal relay (R)
	Special internal relay (R)
	Timer / Counter (T / C) (Note 3)
	Link relay (L)
	Data register (DT)
	Special data register (DT)
	Link data register (LD)
	Index register (I)
Differential points	Points for program capacity
Master control relay points (MCR)	256 points
Number of labels (JMP + LOOP)	256 points
Number of step ladders	1,000 steps
Number of subroutines	500 subroutines
High-speed counter (Note 4, 5)	Control unit input
	Pulse I/O with cassette installed (Transistor output type cannot be installed)
Pulse output / PWM output (Note 4, 5)	Control unit output (Transistor output type only)
	Pulse I/O with cassette installed (Transistor output type cannot be installed)
Pulse catch input	Transistor output type: 8 points (Control unit input: 8 points) Relay output type: 14 points (Control unit input: 8 points, Pulse I/O cassette: 3 points × 2)
Interrupt input (Note 5)	1 point, 0.1 ms to 30 sec.
Periodical interrupt	1 channel (0 to 4,000)
Potentiometer input	Available
Input time constant processing	Available (only when the master memory cassette <b>AFPX-MRTC</b> and battery are installed)
Clock / calendar	All area of Data register
Flash ROM backup	Backup by F12 / P13 instructions Automatic backup when power is off
Battery backup	Counter: 16 points, Internal relay: 128 points, Data register: 315 words
Battery lifetime	Memory set in hold area of system register (only when battery is installed)
Password	5 years or more in the actual use condition (operating 8 hours a day) (Note 6)
PLC link function	Yes (Can be selected from 4 digits, 8 digits or 32 digits)
Communication function and supported communication protocol	Max. 16 units, link relay: 1,024 points, link register: 128 words (Data transfer, remote programming: Not available)
Communication function and supported communication protocol	Up to 5 ports with built-in 1-port communication cassette installed
	COM0 to 4: MEWTOCOL COM (computer link) Master/Slave
	COM0 to 3: General communication
	COM0 to 1: PLC link COM0 to 3: MODBUS RTU Master/Slave