Panasonic
INDUSTRY

Programmable Controller

FP-XH SERIES

CE (Excluding some models) | UKCA (Excluding some models) | cULus LISTED (Excluding some models)

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

PNP type is added to the lineup!

High-speed operation

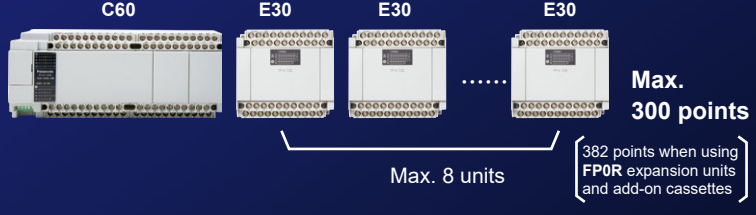
- Basic instruction (ST instruction): 0.04 μs/step
  Up to 7 k steps (ratio to convention: 8 times)

Large capacity program memory

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

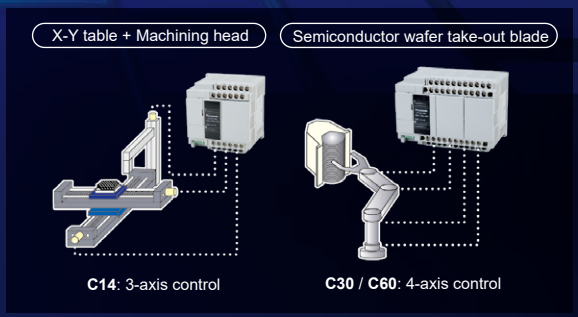
Expandability

- 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**)



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).

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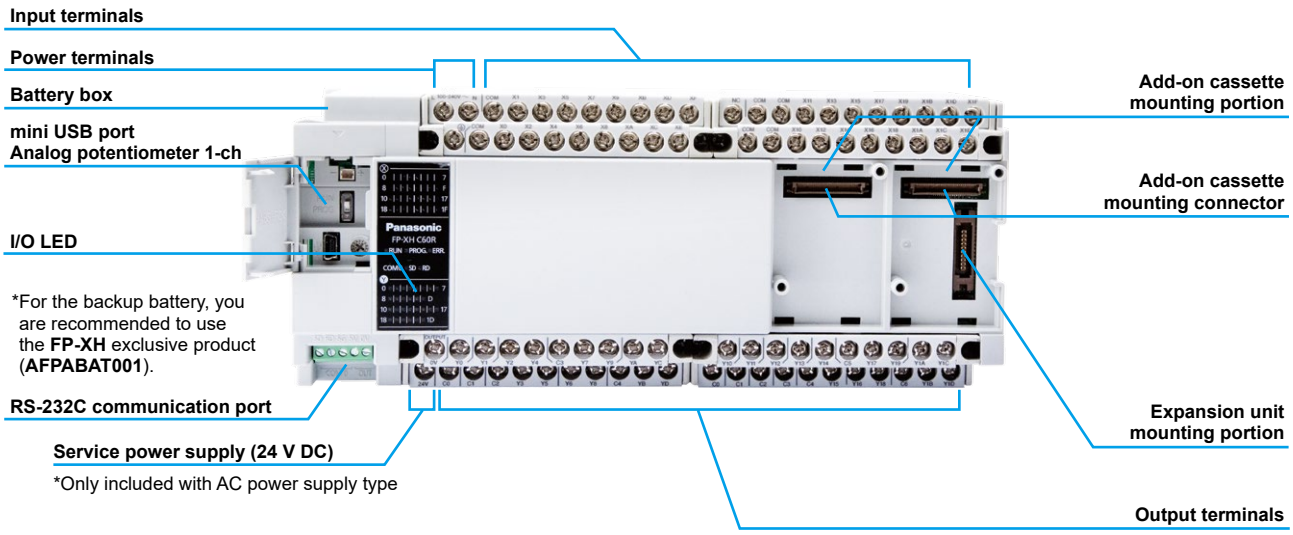
FP-XH Name and function of each part *Image shows **C60R**



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)	**AFPX-E30TD**
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 Pro7** 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	**FP7** series supports only CPU unit without encryption function	Windows® 11 / Windows® 10 (64-bit)	**AFPSGR7JP**
	Security enhanced type	**FP7** series supports both CPU unit with / without encryption function		**AFPSGR7JPS**
	English version	**FP7** series supports only CPU unit without encryption function		**AFPSGR7EN**
	Security enhanced type	**FP7** series supports both CPU unit with / without encryption function		**AFPSGR7ENS**
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)	Windows® 11 / Windows® 10 (64-bit)	**AFPSPR7A**
	Security enhanced type	**FP** series all models (for **FP7** series, supports both CPU unit with / without encryption function) *The encryption function is not supported.		**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 3.15 in *Standard accessories for expansion I/O units	**AFPX-EC08**
	Expansion unit connection cable, 30 cm 11.81 in	**AFPX-EC30**
	Expansion unit connection cable, 80 cm 31.50 in	**AFPX-EC80**
FP0 Power cable	Expansion **FP0** adapter cable, 1 m 39.37 in *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

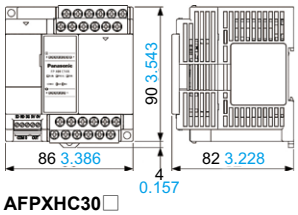
Item			Specifications	
Operating ambient temperature			0 to +55 °C +32 to +131 °F	
Storage ambient temperature			-40 to +70 °C -40 to +158 °F	
Operating ambient humidity			10 to 95 % RH (at +25 °C +77 °F, non-condensing)	
Storage ambient humidity			10 to 95 % RH (at +25 °C +77 °F, non-condensing)	
			AC power supply	DC power supply
Breakdown voltage (Note)	Relay output	Between power supply terminal and earth terminal	1,500 V AC for 1 minute	500 V AC for 1 minute
		Between power supply terminal and service power supply terminal	1,500 V AC for 1 minute	–
		Between input terminal and earth terminal	1,500 V AC for 1 minute	500 V AC for 1 minute
		Between output terminal and earth terminal	1,500 V AC for 1 minute	500 V AC for 1 minute
	Transistor output	Between power supply terminal and earth terminal	1,500 V AC for 1 minute	500 V AC for 1 minute
		Between power supply terminal and service power supply terminal	1,500 V AC for 1 minute	–
		Between input terminal and earth terminal	1,500 V AC for 1 minute	500 V AC for 1 minute
		Between output terminal and earth terminal	500 V AC for 1 minute	500 V AC for 1 minute
Isolation resistance		Between power supply terminal and earth terminal	100 MΩ or more (500 V DC using an insulation resistance meter)	
		Between power supply terminal and service power supply terminal		
		Between input terminal and earth terminal		
		Between output terminal and earth 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/s² 10 min. each in the X, Y and Z directions (1 octave/min)	
Shock resistance			147 m/s², 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)

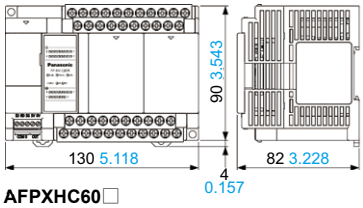
Dimensions (Unit: mm in)

The CAD data can be downloaded from our website.

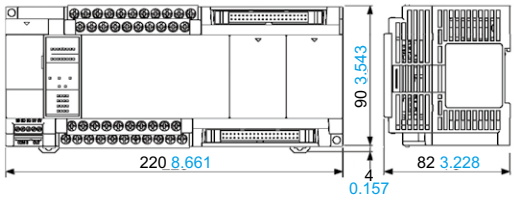
AFPXHC14□



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			**C14**: 16 k steps, **C30** / **C60**: 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	Relay	External input (X) (Note 2)	1,760 points (X0 to X109F)
		External output (Y) (Note 2)	1,760 points (Y0 to Y109F)
		Internal relay (R)	Default: 8,192 points (R0 to R511F)
		Special internal relay (R)	240 points
		Timer / Counter (T / C) (Note 3)	1,024 points (Initial settings Timer: 1,008 points, Counter: 16 points)
		Link relay (L)	2,048 points (L0 to L127F)
	Memory area	Data register (DT)	**C14**: 12 k words, **C30** / **C60**: 64 k, 32 k, 12 k words *For **C30** / **C60**, DT capacity varies according to the program capacity
		Special data register (DT)	500 words
		Link data register (LD)	256 words (LD0 to LD255)
		Index register (I)	14 words (I0 to ID)
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	Transistor output type: Single-phase 8 channels (100 kHz × 4, 10 kHz × 4) or 2-phase 4 channels (50 kHz × 2, 10 kHz × 2) Relay output type: Single-phase 8 channels (10 kHz × 8) or 2-phase 4 channels (5 kHz × 4)
		Pulse I/O with cassette installed (Transistor output type cannot be installed)	**C14**: Single-phase 2 channels (100 kHz × 2) or 2-phase 1 channel (50 kHz × 1) **C30** / **C60**: Single-phase 4 channels (100 kHz × 4) or 2-phase 2 channels (50 kHz × 2) *with two cassettes installed
Pulse output / PWM output (Note 4, 5)		Control unit output (Transistor output type only)	**C14**: 3 channels, **C30**: 4 channels, **C60**: 6 channels Pulse output: each 100 kHz PWM output: 3 channels (**C14**), 4 channels (other than **C14**) 1 Hz to 70 kHz (Resolution of 1000) 70.001 kHz to 100 kHz (Resolution of 100)
		Pulse I/O with cassette installed (Transistor output type cannot be installed)	**C14**: 1 channel, **C30** / **C60**: 2 channels *with two cassettes installed Pulse output: each 100 kHz PWM output: 1 channel (**C14**), 2 channels (other than **C14**) *with two cassettes installed 1 Hz to 70 kHz (Resolution of 1000) 70.001 kHz to 100 kHz (Resolution of 100)
Pulse catch input Interrupt input (Note 5)			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)
Periodical interrupt			1 point, 0.1 ms to 30 sec.
Potentiometer input			1 channel (0 to 4,000)
Input time constant processing			Available
Clock / calendar			Available (only when the master memory cassette **AFPX-MRTC** and battery are installed)
Flash ROM backup		Backup by F12 / P13 instructions	All area of Data register
		Automatic backup when power is off	Counter: 16 points, Internal relay: 128 points, Data register: 315 words
Battery backup			Memory set in hold area of system register (only when battery is installed)
Battery lifetime			5 years or more in the actual use condition (operating 8 hours a day) (Note 6)
Password			Yes (Can be selected from 4 digits, 8 digits or 32 digits)
PLC link function			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

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Specifications are subject to change without notice.
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