Panasonic
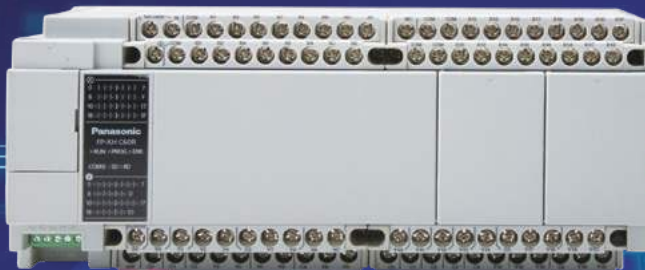## INDUSTRY

Programmable Controller
FP-XH SERIES

CE | c US

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

PNP type has been added to the lineup!

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
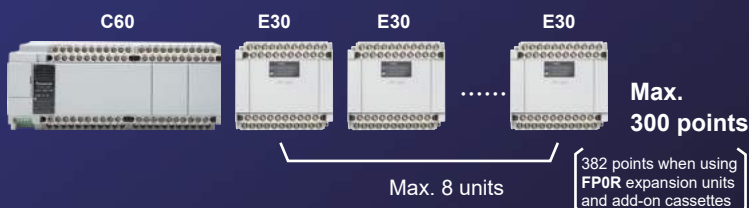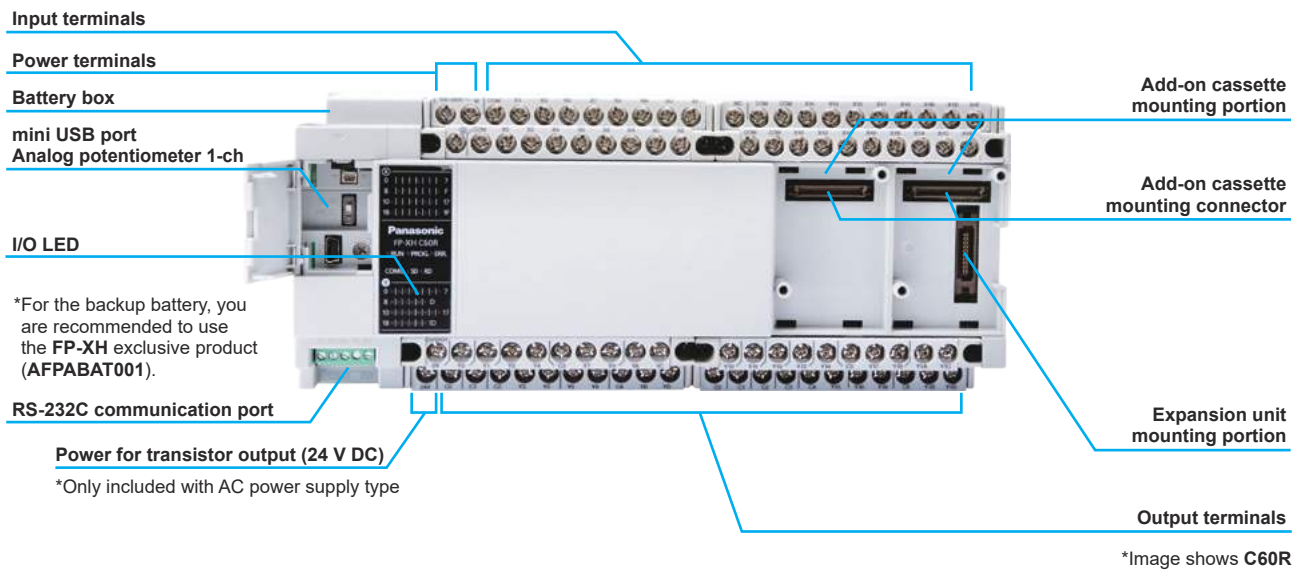
High-speed operation

• 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 (for **C30**, **C60**)

C60 | E30 | E30 | E30

Max. **300 points**

Max. 8 units

382 points when using **FP0R** expansion units and add-on cassettes

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

Input terminals

Power terminals

Battery box

mini USB port
Analog potentiometer 1-ch

I/O LED

*For the backup battery, you are recommended to use the **FP-XH** exclusive product (AFPABAT001).

RS-232C communication port

Power for transistor output (24 V DC)

*Only included with AC power supply type

Add-on cassette mounting portion

Add-on cassette mounting connector

Expansion unit mounting portion

Output terminals

*Image shows **C60R**

Compatibility

Inherits FP-X technology and improves functionality

Expandability
Enables building systems that can be configured with FP-X.

Program
Can use existing FP-X programs
Equipped with FP-X compatibility mode.

Size
Dimensions larger than equivalent FP-X.
C14: Ratio to convention Width 26 mm **1.024 in** wider, Depth 3 mm **0.118 in** deeper
C30 / C60: Ratio to convention Width 30 mm **1.181 in** wider, Depth 3 mm **0.118 in** deeper

Function comparison table

Comparison items		FP-XH	FP-X
Operation speed	Basic instruction	0.04 µs/step (under 7 k steps) 0.7 µs/step (7 k steps or more)	0.32 µs/step
	High-level instruction	0.22 µs/step (under 7 k steps) 1.73 µs/step (7 k steps or more)	7.5 µs/step
Program capacity	**C14**	16 k steps	16 k steps
	C30 / C60	24 k / 32 k / 40 k steps (Variable according to setting) *DT capacity varies according to the program capacity	32 k steps
Pulse output performance	Transistor output type	100 kHz × 3 channels / 4 channels / 6 channels	100 kHz × 2 channels + 20 kHz × 2 channels
	Relay output type	100 kHz × 2 channels *When pulse output cassette is used	100 kHz × 1 channel or 80 kHz × 2 channels *When pulse output cassette is used
High-speed counter performance	Transistor output type	100 kHz × 4 channels / 6 channels + 10 kHz × 4 channels *6-ch pulse output available only with 60-point transistor output type	50 kHz × 4 channels + 10 kHz × 4 channels
	Relay output type	(Built-in) 10 kHz × 8 channels (Pulse output cassette) 100 kHz × 4 channels	(Built-in) 10 kHz × 8 channels (Pulse output cassette) 50 kHz × 4 channels
Communication	Communication port (Control unit)	USB × 1 + RS-232C × 1 *USB 2.0 compatible *RS-232C port has European terminal block	USB × 1 + RS-232C × 1 *Round-pin RS-232C port
	Communication port (Cassette)	Max. 4 channels	Max. 2 channels
Others	Positioning control	Dedicated tool + Control by new instructions	Control by high-level instructions
	Analog volume	1 channel	**C14 / C30**: 2 channels, **C60**: 4 channels
	Cassette combination restrictions	No	Yes
	Tool	Compatible with **FPWIN Pro7 / GR7**	Compatible with **FPWIN Pro7 / GR7**
	Backup battery	**AFPABAT001**	**AFPX-BATT**

Programming software

Control FPWIN GR7

"Save" time on programming with user-friendly software

Configuration, editing programming, searching, monitoring, debugging, security, etc. PLC programming demands a lot of time and effort.
Many programmers get hung up on "trying out different configurations", "consulting the manual", and "re-writing repetitive code blocks".
The "**Control FPWIN GR7**" programming software is designed to eliminate these inefficiencies and minimize programming complexity.

Control FPWIN Pro7

Programming software of PLC open certification corresponds to FP7.

Control FPWIN Pro is the Panasonic programming software developed according to the international standard IEC 61131-3. **Control FPWIN Pro** is the universal software for all Panasonic PLC's and **ELC500** control unit.

- Programs written in **Control FPWIN Pro6** or earlier versions will run with **Control FPWIN Pro7**.
- Programs are compatible across **FP** series PLCs, e.g. **FP0R** will run with minor adjustments on **FPΣ** (Sigma) and **FP7** PLCs.
- **Control FPWIN Pro7** offer the same flexible choice of editors and allow you to select the programming language you are most familiar with.

■ Product types

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

■ Programming tools

Product name		Type	Specifications	Part No.
Programming software for Windows® **Control FPWIN GR7**	Japanese version	Supports only CPU unit without encryption function	Windows® 10 (32-bit / 64-bit) / Windows® 8.1 (32-bit / 64-bit) / Windows® 8 (32-bit / 64-bit) / Windows® 7 SP1 or later (32-bit / 64-bit)	AFPSGR7JP
	Security enhanced type	Supports both CPU unit with / without encryption function		AFPSGR7JPS
	English version	Supports only CPU without encryption function		AFPSGR7EN
	Security enhanced type	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® 10 (32-bit / 64-bit) / Windows® 8.1 (32-bit / 64-bit) / Windows® 8 (32-bit / 64-bit) / Windows® 7 SP1 or later (32-bit / 64-bit)	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

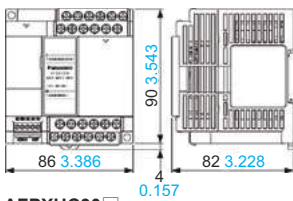| Product name	Specifications	Part No.
FP-XH backup battery	Required when expanding the hold area of the operation memory or when using the clock / calendar function	AFPABAT001

■ Specifications

General specifications

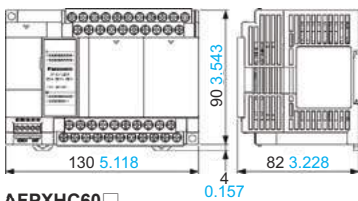| Item	Specifications		
Operating ambient temperature	0 to +55 °C +32 to +131 °F		
Storage ambient temperature	-40 to +70 °C -40 to +158 °F		
Operating ambient humidity	10 to 95 % RH (at 25 °C +77 °F, non-condensing)		
Storage ambient humidity	10 to 95 % RH (at 25 °C +77 °F, non-condensing)		
		AC power 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	1,500 V AC for 1 minute
Breakdown voltage (Note) — 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)

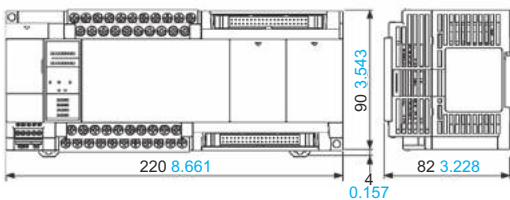## ■ Dimensions (Unit: mm in) The CAD data can be downloaded from our website.

AFPXHC14□

90 3.543
86 3.386
82 3.228
4 0.157

AFPXHC30□

90 3.543
130 5.118
82 3.228
4 0.157

AFPXHC60□

90 3.543
220 8.661
82 3.228
4 0.157

Notes: 1) When changing the system register No.0 (sequence program capacity), 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) Can be selected by the setting of the system register No. 1 (internal relay capacity). To provide compatibility with the conventional FP-X series control unit, select 4,096 points.
4) The number of timer points can be changed by the setting of the system register No.5.
5) 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.
6) 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.
7) 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 (under 7 k steps) Approx. 0.7 μs/step (7 k steps or more) High-level instruction (F0MV): Approx. 0.22 μs/step (under 7 k steps) Approx. 1.73 μs/step (7 k steps or more)	
Operation memory — Link 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) (Note 3)	Default: 8,192 points (R0 to R511F) **FP-X** compatible specifications: 4,096 points	
Special internal relay (R)	240 points	
Timer / Counter (T / C) (Note 4)	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)	
File register (FL)	None	
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	
Number of interrupt program	Transistor output type: Input 8, Constant 1 Relay output type: Input 11 (for **C30** / **C60**: 14), Constant 1	
High-speed counter (Note 5) (Note 6)	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 (10 kHz × 4)
	Pulse I/O with cassette installed	Transistor output type: installation not possible Relay output type: **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 5) (Note 6)	Control unit output	Transistor output type: **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	Relay output type: **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 6)	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 (Note 6)	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 7)	
Password	Yes (Can be selected from 4 digits, 8 digits or 32 digits)	
Self-diagnostic function	Watchdog timer, program syntax check, etc.	
PLC link function	Max. 16 units, link relay: 1,024 points, link register: 128 words (Data transfer, remote programming: Not available)	
Rewriting in RUN mode	Available (downloading in RUN mode, program rewriting in RUN mode) (Max. 512 steps)	

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Industrial Device Business Division
Specifications are subject to change without notice.