

NEW

## Programmable Controller

### FP-XH SERIES



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

PNP type has been 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

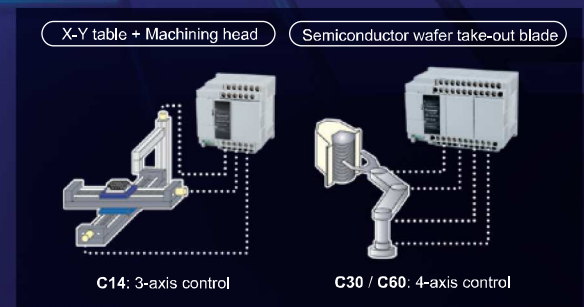
### Expandability

- 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 (for C30, C60)



### Multi-axis positioning control

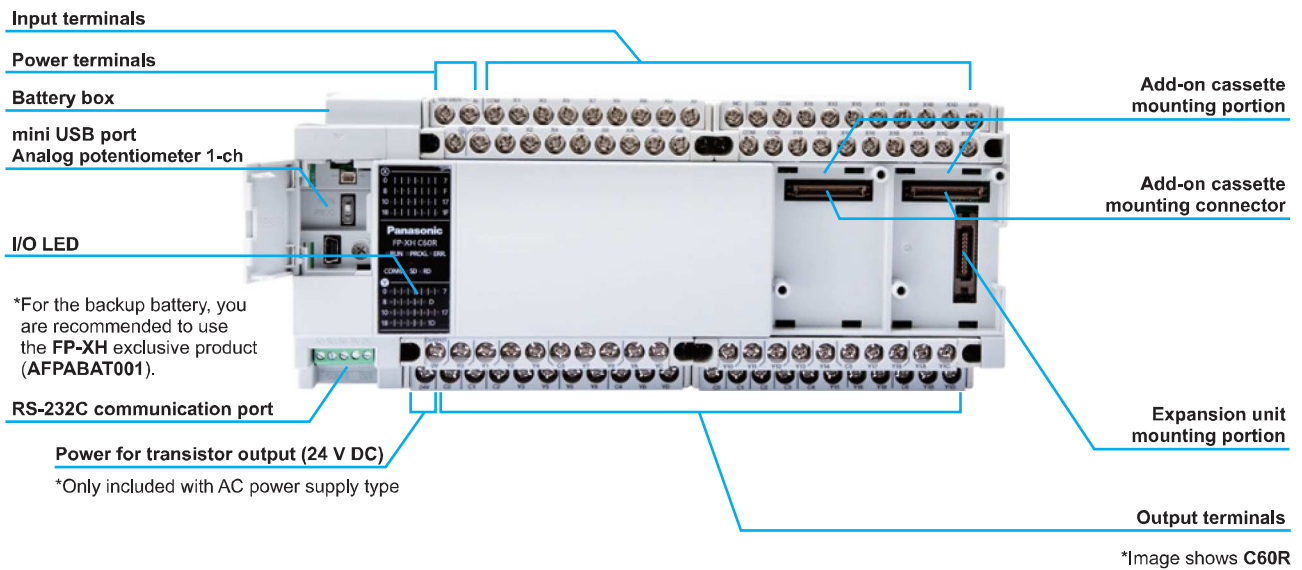
- On up to 6 axes, built-in 100 kHz high-speed pulse output function  
(Transistor output type has a built-in pulse output function for 3 axes for C14, 4 axes for C30 and 6 axes for C60)



### 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).

## FP-XH Name and function of each part



## 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 $\mu$ s/step (under 7 k steps)<br>0.7 $\mu$ s/step (7 k steps or more)   | 0.32 $\mu$ s/step   |
|                                | High-level instruction            | 0.22 $\mu$ s/step (under 7 k steps)<br>1.73 $\mu$ s/step (7 k steps or more)  | 7.5 $\mu$ s/step  |
| Program capacity               | <b>C14</b>                        | 16 k steps  | 16 k steps  |
|                                | <b>C30 / C60</b>                  | 24 k / 32 k / 40 k steps (Variable according to setting)<br>*DT capacity varies according to the program capacity                               | 32 k steps  |
| Pulse output performance       | Transistor output type            | 100 kHz $\times$ 3 channels / 4 channels / 6 channels   | 100 kHz $\times$ 2 channels + 20 kHz $\times$ 2 channels  |
|                                | Relay output type                 | 100 kHz $\times$ 2 channels<br>*When pulse output cassette is used  | 100 kHz $\times$ 1 channel or 80 kHz $\times$ 2 channels<br>*When pulse output cassette is used |
| High-speed counter performance | Transistor output type            | 100 kHz $\times$ 4 channels / 6 channels + 10 kHz $\times$ 4 channels<br>*6-ch pulse output available only with 60-point transistor output type | 50 kHz $\times$ 4 channels + 10 kHz $\times$ 4 channels   |
|                                | Relay output type                 | (Built-in) 10 kHz $\times$ 8 channels<br>(Pulse output cassette) 100 kHz $\times$ 4 channels  | (Built-in) 10 kHz $\times$ 8 channels<br>(Pulse output cassette) 50 kHz $\times$ 4 channels     |
| Communication                  | Communication port (Control unit) | USB $\times$ 1 + RS-232C $\times$ 1<br>*USB 2.0 compatible<br>*RS-232C port has European terminal block   | USB $\times$ 1 + RS-232C $\times$ 1<br>*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   | <b>C14 / C30:</b> 2 channels, <b>C60:</b> 4 channels  |
|                                | Cassette combination restrictions | No  | Yes   |
|                                | Tool                              | Compatible with <b>FPWIN Pro7 / GR7</b>   | Compatible with <b>FPWIN Pro7 / GR7</b>   |
|                                | Backup battery                    | <b>AFPABAT001</b>   | <b>AFPX-BATT</b>  |

## Control FPCWIN 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 FPCWIN GR7" programming software is designed to eliminate these inefficiencies and minimize programming complexity.

## Control FPCWIN Pro7



Programming software of PLC open certification corresponds to FP7.

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

- Programs written in **Control FPCWIN Pro6** or earlier versions will run with **Control FPCWIN Pro7**.
- Programs are compatible across **FP** series PLCs, e.g. **FP0R** will run with minor adjustments on **FPΣ** (Sigma) and **FP7** PLCs.
- **Control FPCWIN 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 FPCWIN GR7  | Japanese version                      | Supports only CPU unit without encryption function  | AFPSPGR7JP  |
|   | Security enhanced type                | Supports both CPU unit with / without encryption function   | AFPSPGR7JPS |
|   | English version                       | Supports only CPU unit without encryption function  | AFPSPGR7EN  |
|   | Security enhanced type                | Supports both CPU unit with / without encryption function   | AFPSPGR7ENS |
| Programming software for Windows® Control FPCWIN 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)<br>*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 | AFPBAT001 |

# Specifications

## General specifications

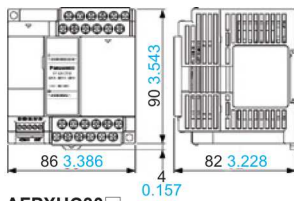
| Item                                  | Specifications   |   |                         |
|---------------------------------------|--|---|-------------------------|
| Operating ambient temperature         | 0 to +55 °C <b>+32 to +131 °F</b>  |   |                         |
| Storage ambient temperature           | -40 to +70 °C <b>-40 to +158 °F</b>  |   |                         |
| Operating ambient humidity            | 10 to 95 % RH (at +25 °C <b>+77 °F</b> , non-condensing)   |   |                         |
| Storage ambient humidity              | 10 to 95 % RH (at +25 °C <b>+77 °F</b> , non-condensing)   |   |                         |
| Breakdown voltage (Note)              | AC power supply  | DC power supply   |                         |
|                                       | 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 |
|                                       | 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   |
| Isolation resistance                  | Between power supply terminal and earth terminal   | 100 MΩ or more<br>(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 <b>0.138 in</b> single amplitude<br>8.4 to 150 Hz, Acceleration 9.8 m/s <sup>2</sup><br>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<br>(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<br>(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)

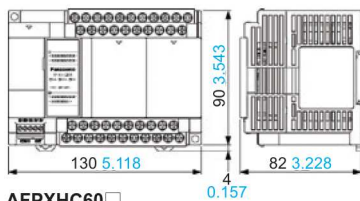
## Dimensions (Unit: mm in)

The CAD data can be downloaded from our website.

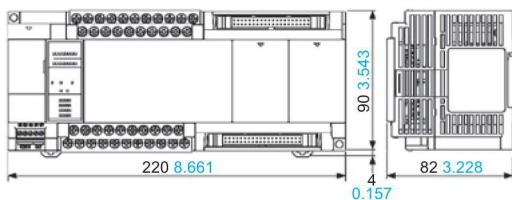
### AFPXHC14



### AFPXHC30



### AFPXHC60



- Notes: 1) When changing the 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                            | <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 (under 7 k steps)  |
|   | High-level instruction (FOMV):   | Approx. 0.22 μs/step (under 7 k steps)<br>Approx. 1.73 μs/step (7 k steps or more)  |
| Operation memory                            | 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)<br><b>FP-X</b> 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)  |
|   | Data register (DT)   | <b>C14</b> : 12 k words, <b>C30 / C60</b> : 64 k, 32 k, 12 k words<br>*For <b>C30 / C60</b> , 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 I1)  |   |
| 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<br>Relay output type: Input 11 (for <b>C30 / C60</b> : 14), Constant 1   |   |
| High-speed counter (Note 5) (Note 6)        | Control unit input   | Transistor output type:<br>Single-phase 8 channels (100 kHz × 4, 10 kHz × 4) or 2-phase 4 channels (50 kHz × 2, 10 kHz × 2)<br>Relay output type:<br>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<br>Relay output type:<br><b>C14</b> : Single-phase 2 channels (100 kHz × 2) or 2-phase 1 channel (50 kHz × 1)<br><b>C30 / C60</b> : Single-phase 4 channels (100 kHz × 4) or 2-phase 2 channels (50 kHz × 2)<br>*with two cassettes installed   |
| Pulse output / PWM output (Note 5) (Note 6) | Control unit output  | Transistor output type:<br><b>C14</b> : 3 channels, <b>C30</b> : 4 channels, <b>C60</b> : 6 channels<br>Pulse output: each 100 kHz<br>PWM output: 3 channels ( <b>C14</b> ), 4 channels (other than <b>C14</b> )<br>1 Hz to 70 kHz (Resolution of 1000)<br>70.001 kHz to 100 kHz (Resolution of 100)                                      |
|   | Pulse I/O with cassette installed  | Relay output type:<br><b>C14</b> : 1 channel, <b>C30 / C60</b> : 2 channels *with two cassettes installed<br>Pulse output: each 100 kHz<br>PWM output: 1 channel ( <b>C14</b> ), 2 channels (other than <b>C14</b> )<br>*with two cassettes installed<br>1 Hz to 70 kHz (Resolution of 1000)<br>70.001 kHz to 100 kHz (Resolution of 100) |
| Pulse catch input                           | Transistor output type: 8 points (Control unit input: 8 points)  |   |
| Interrupt input (Note 6)                    | 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 <b>AFPX-MRTC</b> 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)                                  |   |