



(Excluding some models)



(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

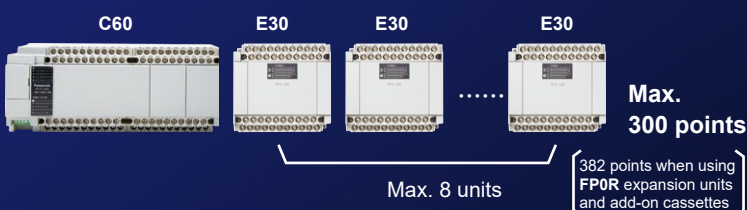
- Basic instruction (ST instruction): 0.04  $\mu$ s/step  
Up to 7 k steps (ratio to convention: 8 times)

### Large capacity program memory

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

### Expandability

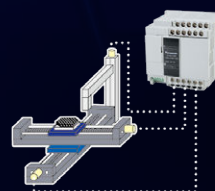
- Max. I/O points: 300 points  
One control unit connectable to up to 8 expansion units (382 points when using FP0R expansion units and add-on cassettes)
- Up to 4 add-on cassettes can be added (C14: up to 2 add-on cassettes)



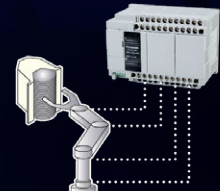
### Multi-axis positioning control

- 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



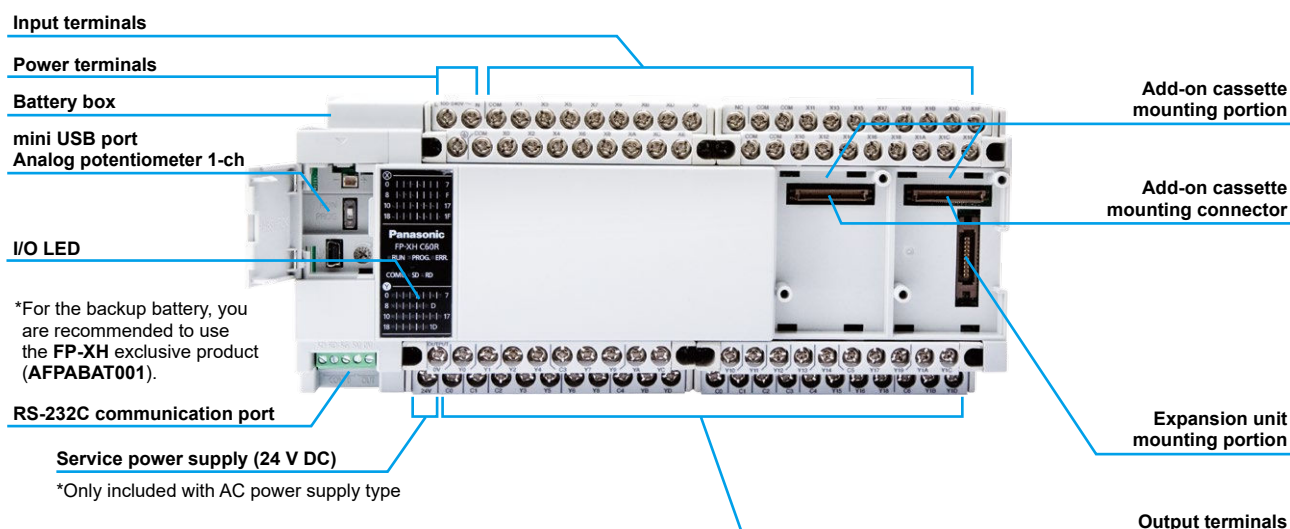
C30 / C60: 4-axis control

### 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)	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.
<b>FP-X</b> 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	<b>AFPX-IN4T3</b>
<b>FP-X</b> Input cassette	8-point input of 24 V DC, bi-directional (sink/source)	<b>AFPX-IN8</b>
<b>FP-X</b> Output cassette	8-point output of NPN transistor, 0.3 A / 24 V DC	<b>AFPX-TR8</b>
<b>FP-X</b> Output cassette	6-point output of PNP transistor, 0.5 A / 24 V DC	<b>AFPX-TR6P</b>
<b>FP-X</b> 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)	<b>AFPX-PLS</b>
<b>FP-X</b> Analog input cassette	2-point analog input, 0 to 10 V / 0 to 20 mA, 12-bit, 2 ms / 2 channels (non-insulated)	<b>AFPX-AD2</b>
<b>FP-X</b> Analog output cassette	2-point analog output, 0 to 10 V / 0 to 20 mA, 12-bit, 2 ms / 2 channels (insulated)	<b>AFPX-DA2</b>
<b>FP-X</b> 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)	<b>AFPX-A21</b>
<b>FP-X</b> Thermocouple input cassette	2-point thermocouple input, K / J type, Resolution: 0.2 °C, 200 ms / 2 channels (between channels: insulated)	<b>AFPX-TC2</b>
<b>FP-X</b> R.T.D. input cassette	2-points R.T.D. input, Pt100, Resolution: 0.1 °C, 200 ms (between channels: insulated)	<b>AFPX-RTD2</b>
<b>FP-X</b> Master memory cassette with a real-time clock (Note 2)	Master memory: Capable of storing all program steps and comments simultaneously. Storage of <b>FPWIN Pro7</b> source files Real time clock: Year, month, day, hour, minute, second, day of week (Buck-up battery <b>AFPABAT001</b> required)	<b>AFPX-MRTC</b>

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.
<b>FP-X</b> COM1 Communication cassette	RS-232C 1 channel, RS and CS control signal equipped (non-insulated)	<b>AFPX-COM1</b>
<b>FP-X</b> COM2 Communication cassette	RS-232C 2 channels (non-insulated)	<b>AFPX-COM2</b>
<b>FP-X</b> COM3 Communication cassette	RS-485 / RS-422 selectable 1 channel (insulated)	<b>AFPX-COM3</b>
<b>FP-X</b> COM4 Communication cassette	RS-485 1 channel (insulated) and RS-232C 1 channel (non-insulated)	<b>AFPX-COM4</b>
<b>FP-X</b> COM5 Communication cassette	Ethernet 1 channel (10BASE-T, 100BASE-TX) and RS-232C 1 channel (non-insulated)	<b>AFPX-COM5</b>
<b>FP-X</b> COM6 Communication cassette	RS-485 2 channels (insulated)	<b>AFPX-COM6</b>

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® <b>Control FPWIN GR7</b>	Japanese version	<b>FP7</b> series supports only CPU unit without encryption function	<b>AFPSPGR7JP</b>
	Security enhanced type	<b>FP7</b> series supports both CPU unit with / without encryption function	<b>AFPSPGR7JPS</b>
	English version	<b>FP7</b> series supports only CPU unit without encryption function	<b>AFPSPGR7EN</b>
	Security enhanced type	<b>FP7</b> series supports both CPU unit with / without encryption function	<b>AFPSPGR7ENS</b>
Programming software for Windows® <b>Control FPWIN Pro7</b>	English, Japanese, Korean and Chinese	<b>FP</b> series all models (for <b>FP7</b> series, supports only CPU unit without encryption function)	<b>AFPSPR7A</b>
	Security enhanced type	<b>FP</b> series all models (for <b>FP7</b> series, supports both CPU unit with / without encryption function) *The encryption function is not supported.	<b>AFPSPR7AS</b>

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

### Option

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

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

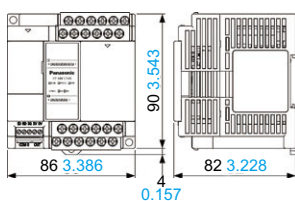
### General specifications

Item		Specifications		
Operating ambient temperature		0 to +55 °C <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)	Relay output		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
	Transistor output	Between output terminal and earth terminal	1,500 V AC for 1 minute	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
		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 <b>0.138 in</b> 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		

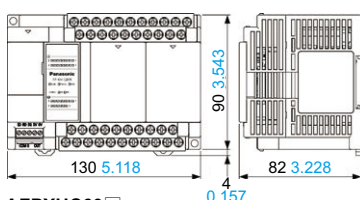
Note: Cut-off current 5 mA (Initial value at shipment)

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

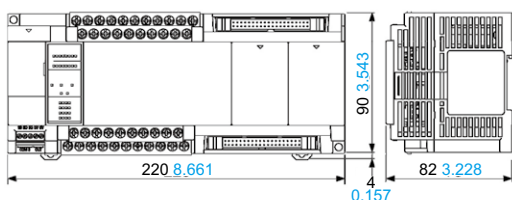
AFPXHC14



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		<b>C14</b> : 16 k steps, <b>C30</b> / <b>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 (FOMV): 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)	<b>C14</b> : 12 k words, <b>C30</b> / <b>C60</b> : 64 k, 32 k, 12 k words *For <b>C30</b> / <b>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)
		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)	<b>C14</b> : Single-phase 2 channels (100 kHz × 2) or 2-phase 1 channel (50 kHz × 1) <b>C30</b> / <b>C60</b> : 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)	<b>C14</b> : 3 channels, <b>C30</b> : 4 channels, <b>C60</b> : 6 channels Pulse output: each 100 kHz PWM output: 3 channels ( <b>C14</b> ), 4 channels (other than <b>C14</b> ) 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)	<b>C14</b> : 1 channel, <b>C30</b> / <b>C60</b> : 2 channels *with two cassettes installed Pulse output: each 100 kHz PWM output: 1 channel ( <b>C14</b> ), 2 channels (other than <b>C14</b> ) *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 <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 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	

Panasonic Industry Co., Ltd.

Industrial Device Business Division

7-1-1, Morofuku, Daito-shi, Osaka 574-0044, Japan