

Programmable Controller  
**FP2/FP2SH**

Machine Cybernation  
High Speed & High Capacity



# Compact body loaded with functions equivalent to a medium-scale PLC Superior cost performance, and ideal for built-in use

FP2/FP2SH is a compact PLC series (W 140 x H 100 x D 110 mm W5.512 x H3.937 x D4.331 inch when using five modules) loaded with multiple functions, achieving superior cost performance. The CPU units have an RS232C port as standard equipment, which allows for communications with external equipment, such as a computer or a display panel, and advanced "communications" for remote monitoring and remote maintenance via a modem. Furthermore, the new intelligent units support wider applications, including full-scale "motor (positioning) control", "analog control", and "networking". This series is perfect as built-in controllers for a variety of systems and equipment.

## CPU units

Selectable from six types, including intelligent types, according to the application

There are six types of CPU units, including the standard type and the intelligent type with preinstalled commonly-used advanced functions. This selection allows for more economical system development according to the application. \* See page 10 for details.

FP2

Intelligent type is also available  
Superior cost performance



Standard type  
FP2-C1  
(AFP2211)



With 64 input points  
FP2-C1D  
(AFP2212)



With S-LINK  
FP2-C1SL  
(AFP2214)

FP2SH

Industry's highest class processing speed  
Adequate programming capacity



60-k step  
standard type  
FP2-C2  
(AFP2231)



60-k step type  
for small PC card  
FP2-C2P  
(AFP2235)

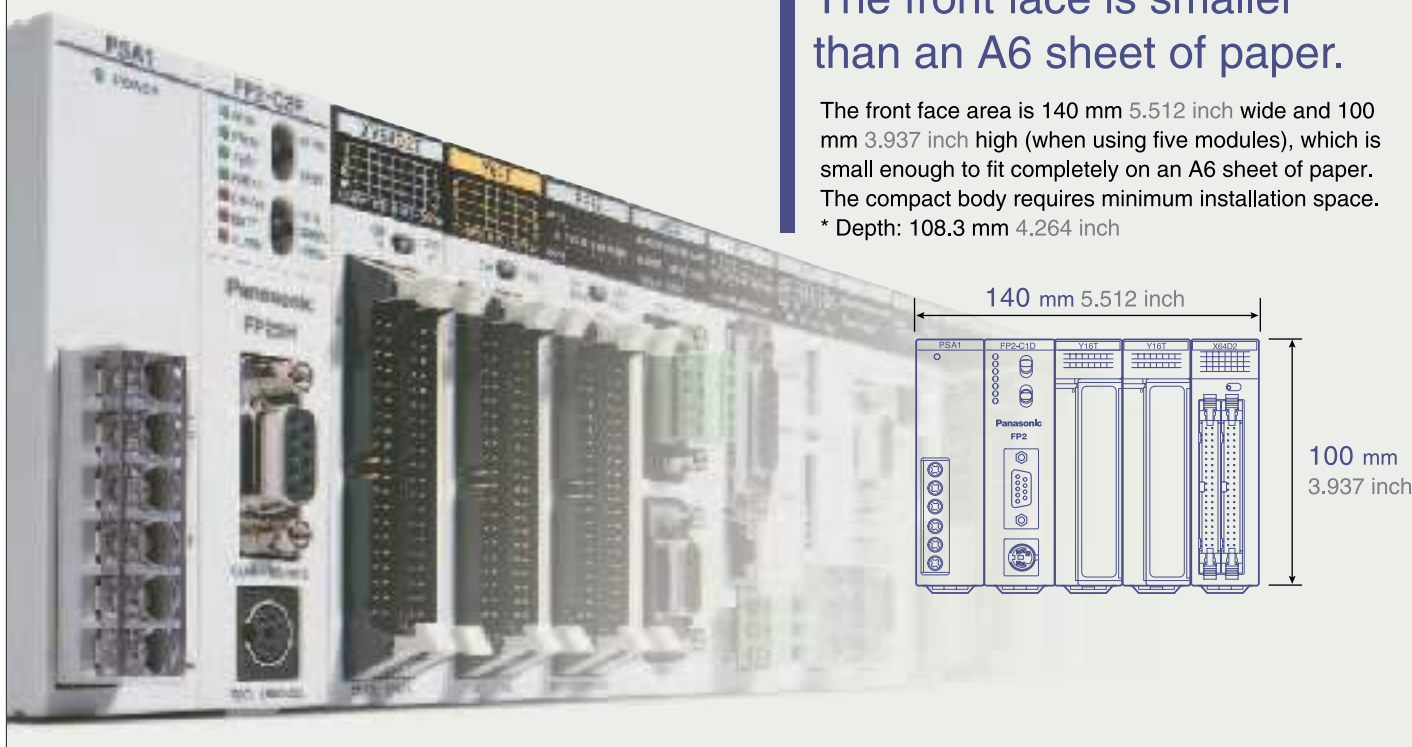


120-k step type  
for small PC card  
FP2-C3P  
(AFP2255)

## Body size

The front face is smaller  
than an A6 sheet of paper.

The front face area is 140 mm 5.512 inch wide and 100 mm 3.937 inch high (when using five modules), which is small enough to fit completely on an A6 sheet of paper. The compact body requires minimum installation space.  
\* Depth: 108.3 mm 4.264 inch





## Memory and I/O control

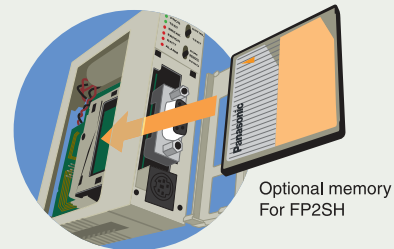
### Equipped with an adequate program memory and operating memory capacity

The body is compact; however, the capacity of the standard program memory of FP2/FP2SH is as large as 16 k/60 k steps, and, when optional memory is added, 32 k/120 k steps. A variety of operation memory types are also available. The maximum number of controlled I/O points is 2,048 (2,048/8,192 for FP2/FP2SH when using remote I/O units), which is sufficient for medium-scale control.

#### Addition of optional memory

FP2: Addition of optional memory to the CPU unit allows it to store up to 32 k program steps, provides it with the clock/calendar function, and makes comment writing possible.

FP2SH: An optional IC card can be used as program memory or expanded data memory.



Optional memory  
For FP2SH

#### I/O point expansion by adding backplanes

\* See page 12 for details.

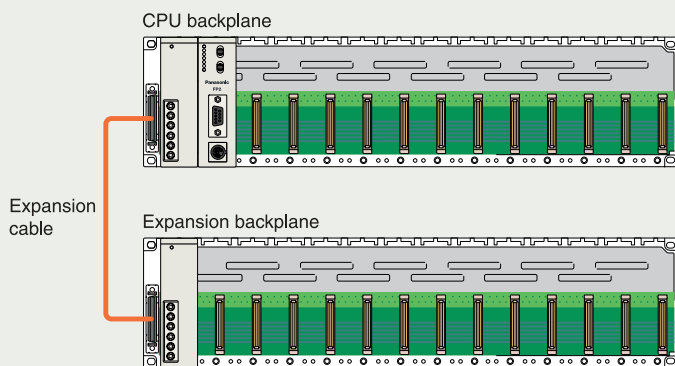
**NEW**

#### ● Conventional backplane

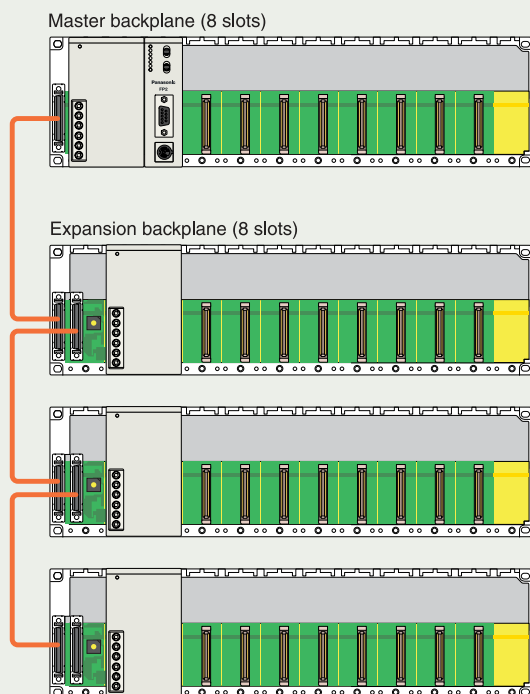
Only one backplane can be added to one master backplane. When both the master and expansion backplanes are of the 14-module type, up to 1,600 I/O points can be controlled.

#### ● H type backplane

Up to three backplanes can be added to one master backplane. A maximum of 32 units can be connected, and up to 2,048 I/O points can be controlled, values surpassing those of the conventional backplane expansion system (25 units/1,600 points).



(The backplane can be used as either a master or expansion backplane.)



	Conventional type	H type
Max. number of backplanes	1 + 1 = 2	1 for master + 3 for expansion = 4
Max. number of units	12 + 13 = 25	8 + 8 x 3 = 32
Max. number of I/O points	25 x 64 = 1,600	32 x 64 = 2,048
Max. cable length	1 cable, 2 m 6.562 ft	3 cables, 3.2m 10.499 ft

\* The H type and conventional type cannot be used in combination.

## Motor control

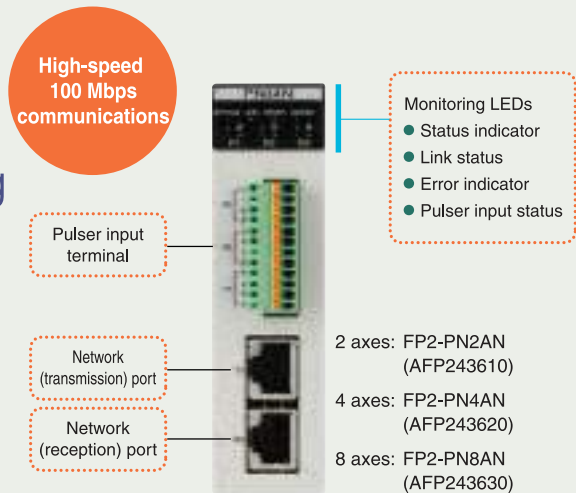


### "RTEX" positioning units

Compatible with Realtime Express MINAS A4N\*1 network servo systems  
 Facilitate multi-axis high precision positioning

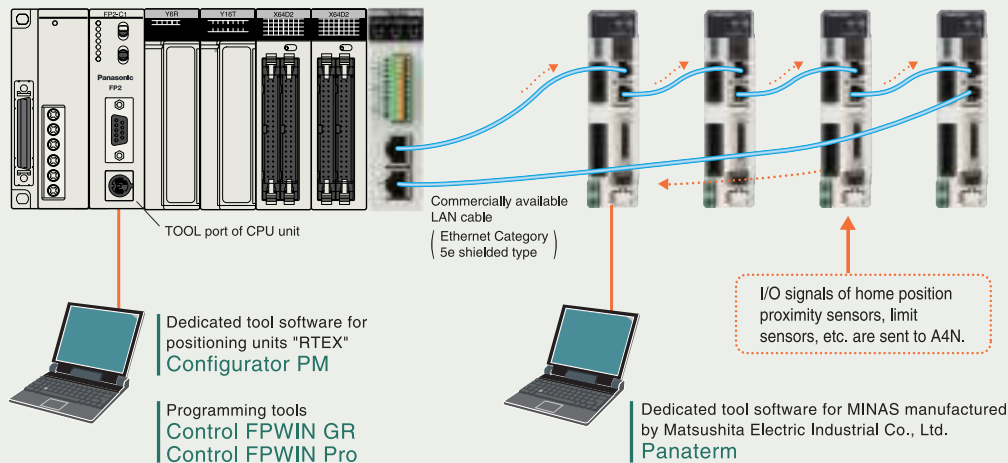
- High-accuracy multi-axis positioning control achieved by high-speed 100 Mbps communications
- Compatible with commercially-available LAN cables, significantly reducing wiring costs
- Two-axis unit available in addition to the four and eight-axis units
- Data from a maximum of 600 points can be registered for each axis.
- Three-axis helical interpolation supported in addition to two-axis linear and two-axis circular interpolation functions
- Dedicated tool software "Configurator PM" supports operations from setup through startup and monitoring.
- Equipped with a manual pulser input terminal, allowing for fine teaching

\*1: Realtime Express and MINAS A4N are a trademark and a product name of Matsushita Electric Industrial Co., Ltd.



## Controls up to 256 axes, adequately supporting large-scale equipment control

- Up to 32 eight-axis units can be connected, and up to 256 axes can be controlled. (when using FP2SH with H type backplane).
- Selectable among two, four, and eight-axis types to flexibly support control system configurations of a few or multiple axes
- Use in combination with the ultra-high speed and large capacity FP2SH CPU unit (20-k steps/1 ms (measured by our company), program capacity of 120-k steps) adequately supports the control of large-scale equipment.



Contact for inquiries about MINAS AC servomotor series:  
 Motor Company, Matsushita Electric Industrial Co., Ltd.  
 Telephone: +81-72-870-3057 Facsimile: +81-72-870-3120  
<http://panasonic.co.jp/motor/eng/>



## ■ Positioning units

### High-speed, high-accuracy pulse output type positioning unit Speed command: 4 Mpps, Startup time: 0.005 ms

Support pulse-input type stepping motors, and servomotors. The speed command range is up to 4 Mpps, allowing for high-speed and high-accuracy positioning. The startup time is as high as 0.005 ms, allowing for a reduction of the tact time.  
 (Startup time: Time between reception of a command from a CPU unit and pulse output from a positioning unit)

- The feedback pulse count function counts output pulses from encoders or other devices.
- The jog positioning function widens the supported application range.
- The four types of S-curve acceleration/deceleration control allow for smooth startup and stoppage.
- Program libraries for linear interpolation and other operations are available.  
 "Function Libraries for FPWIN Pro" can be downloaded from our website:  
<http://www.mew.co.jp/ac/e/fasys/plc>
- Motor Driver I/F Terminal II is available for connection with MINAS AC servo series.



For 1 axis (AFP8503)



For 2 axes (AFP8504)



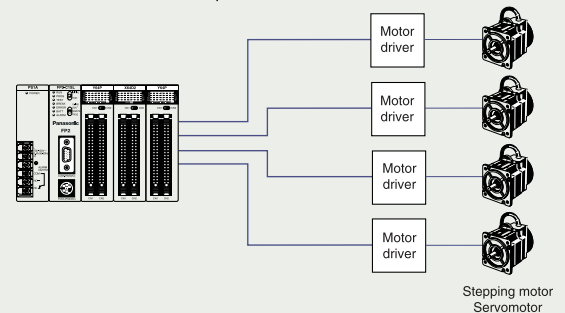
Positioning Unit (2 axes)  
 FP2-PP21 FP2-PP22  
 (AFP2432) (AFP2434)



Positioning Unit (4 axes)  
 FP2-PP41 FP2-PP42  
 (AFP2433) (AFP2435)

#### ■ Configuration

- One unit can control up to 4 axes.



## ■ High-speed counter units and Pulse I/O units

### Interrupt, counting, pulse output, and PWM output functions are integrated in a single unit.

- Equipped with four channels of a maximum of 200 kHz high-speed counter inputs, allowing for fine control.
- Equipped with eight user-allocatable outputs for the four high-speed counter channels. The number of counter stages can be changed.
- Have an interrupt function that allows the interrupt program to be started when the elapsed time reaches a set time or by timing it with an external input signal.
- Control up to 100 kpps pulse output and up to 30 kpps PWM output.
- A single module has high-speed counter, interrupt, general I/O, pulse output\*, PWM output\* functions, allowing for high-efficient system configuration. \* Only available with the pulse I/O units.

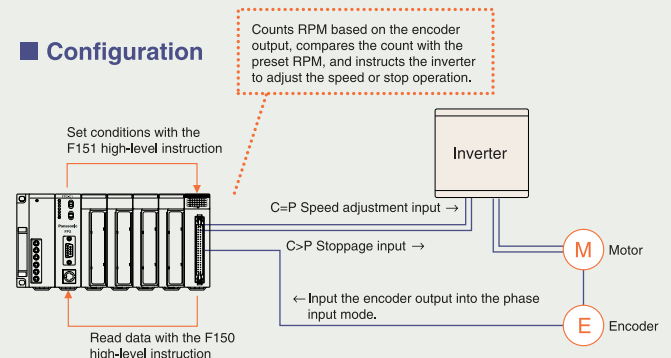


High-speed counter units  
 FP2-HSCT(NPN)  
 (AFP2441)  
 FP2-HSCP(PNP)  
 (AFP2451)



Pulse I/O units  
 FP2-PXYT(NPN)  
 (AFP2442)  
 FP2-PXYP(PNP)  
 (AFP2452)

#### ■ Configuration

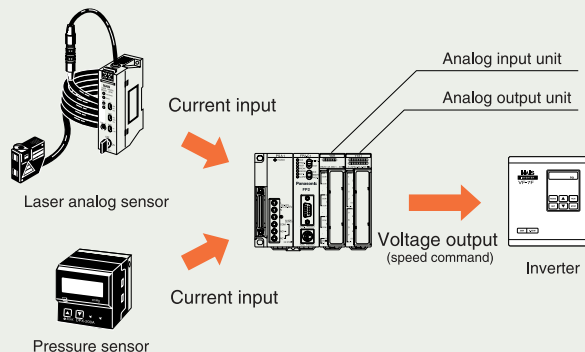


## Analog control units

Multi-range control of a variety of equipment is possible. The units can be directly connected with thermocouples and resistance temperature detectors.

- Support voltage/current/temperature sensor ranges.  
 The analog input unit supports voltage, current, and temperature sensors. The analog output unit supports voltage or current output. Different voltage/current ranges can be controlled concurrently.
- Equipped with multiple channels.  
 The input unit has eight channels, and the output unit has four. Space-saving multiple-channel control is possible.
- High-speed conversion at 500 μs by each channel  
 The speed of voltage and current input/output conversion can reach as high as 500 μs.
- I/O refresh system  
 Since input/output data is allocated to the I/O memory, complicated programming is not necessary.

### ■ Configuration



### ■ Analog input units

Three types of analog input units are available to meet a wide variety of customer needs.

#### High speed, high accuracy, multiple-input unit with isolated channels

Industry's fastest level

High speed achieved by highly reliable isolation among channels  
 Temperature conversion: 20 ms/ch  
 Voltage conversion: 5 ms/ch  
 (Without insulation setting: 500 μs/ch)

Industry's top level

High accuracy conversion  
 Voltage: ±0.1% (25°C)  
 Temperature: ±0.3% (0 to 55°C)

Multiple inputs

A single unit supports inputs of thermocouple, RTD, and voltage data\*1.



FP2-AD8X (AFP2401)

- For users who require faster and more accurate temperature control
- For users who require multiple isolated input channels or who want to reduce the cost per channel
- For users who want to input temperature and voltage (current) data through a single unit

\*1: Current inputs can be converted into voltage inputs by attaching the supplied external resistor to the input terminal section.

### ■ Analog output unit

Supports multiple channels. (Four channels per unit)

High speed, high accuracy

Conversion speed: 500 μs/ch  
 Overall accuracy: ±1.0% FS or less (0 to 55°C)



FP2-DA4 (AFP2410)

#### Input unit solely for RTDs (Pt100/Pt1000)

High speed, high accuracy

Conversion speed: 20 ms/ch  
 Conversion accuracy: ±0.3% (0 to 55°C)

- For users who input RTD data only and require more affordable type



FP2-RTD (AFP2402)

#### Low cost input unit solely for voltage/current data

- Low cost unit for input of voltage/current data that indicates measurements of pressure, flow rate, fluid volume, speed, etc.



FP2-AD8V1 (AFP2400L)

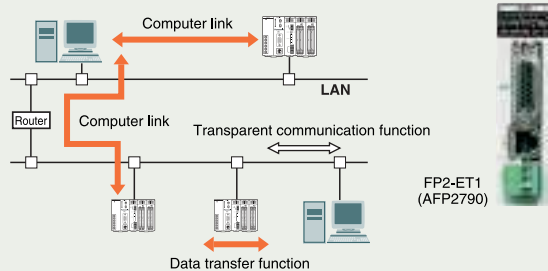
## Networking units

Support a wide variety of networks, such as open networks, PLC links, remote I/O systems, and S-LINK.

### Open networks

#### Ethernet

- (1) Supports three communications interfaces: 100BASE-TX, 10BASE-T, and 10BASE5
- (2) Supports TCP/IP and UDP/IP.
- (3) Communications among a maximum of eight connections are available.
- (4) Compatible with user-friendly MEWTOCOL.
- (5) Supports remote programming.



FP2-ET1  
(AFP2790)

#### FL-net



FL-net is a responsive high-performance network for factory automation based on Ethernet. The Japan Electrical Manufacturers' Association started FL-net certification in April 2000. FL-net is now rapidly spreading into various fields, including manufacturing, food, medical, packaging, printing industries and public/social systems.

[FL-net function of the VE link unit]

- (1) 10-Mbps high-speed link
- (2) Large link area of 8 k points/8 k words
- (3) 254 nodes max.



FP2-VE  
(AFP27960,  
only for FP2SH)

### PLC link

The PLC link is a system that allows our PLCs to share contact data and word data without programming.

#### VE mode



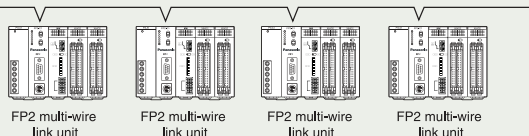
High-speed, large-capacity PLC link using the VE link unit based on Ethernet

- (1) 10-Mbps high-speed link
- (2) Large link area of 8,192 points/8,192 words
- (3) Up to 99 units can be connected.
- (4) Extendable to 2,500 m 8,202 ft. \* When using a repeater

#### MEWNET-W2 mode

Large capacity PLC links can be established by using twisted-pair cables and multi-wire link units.

- (1) 500-kbps transmission speed
- (2) Transfer of data of 4,096 points/4,096 words is possible.
- (3) Up to 32 units can be connected.
- (4) Extendable to 1,200 m 3,937 ft.



FP2 multi-wire  
link unit

FP2 multi-wire  
link unit

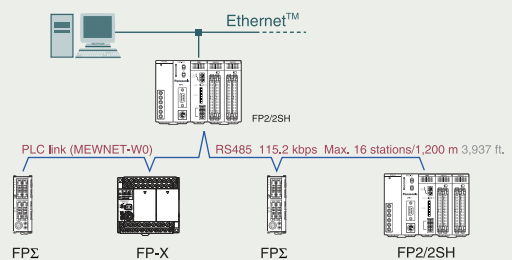
FP2 multi-wire  
link unit

FP2 multi-wire  
link unit

#### MEWNET-W0 mode

A PLC link of the compact high-performance PLC "FPΣ" and FP-X can be established by using a combination of the multi-communication unit and an RS485 communication block. This mode enables the efficient connection of FP2/FP2SH, FPΣ, and FP-X units on a single network and contributes to significant cost reduction.

- (1) 115.2 kbps transmission speed
- (2) Transfer of data of 64 points/128 words is possible.
- (3) Up to 16 units can be connected.
- (4) Extendable to 1,200 m 3,937 ft.



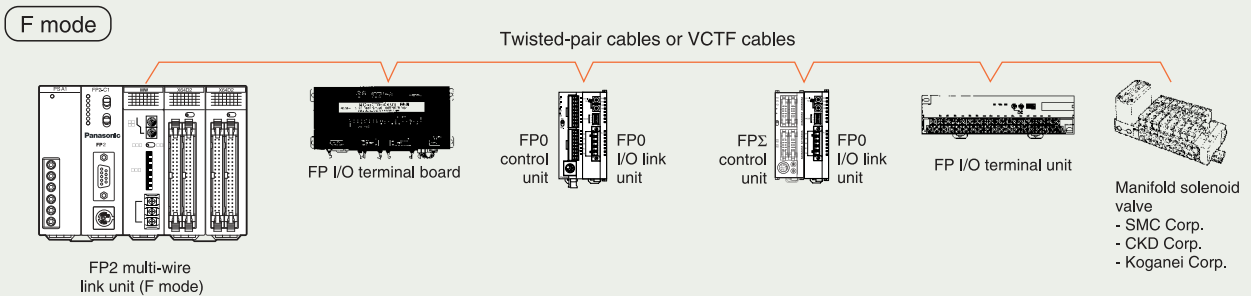
\* Each FPΣ unit also requires that an RS485 cassette (AFPG803 or AFPG806) be attached.  
\* Each FP-X unit requires that an AFPX-COM3 or AFPX-COM4 communication cassette be attached.

## Remote I/O systems

### MEWNET-F mode

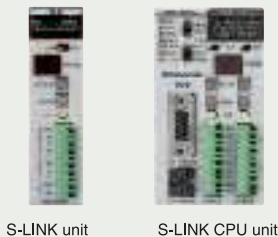
The number of I/O points can be increased up to 8,192, and the transmission distance can be extended up to 700 m 2,297 ft. by using the multi-wire link units.

- MEWNET-F is a remote I/O system that connects I/O units in separate locations with twisted-pair cables.
- The remote I/O master unit serves as a master station. Slave stations can be selected from the units shown on the next page.
- Up to four wiring routes are available, allowing for a complicated layout of slave stations.
- This network system is ideal for cases where I/O units need to be installed in separate locations or in a location away from the control box.

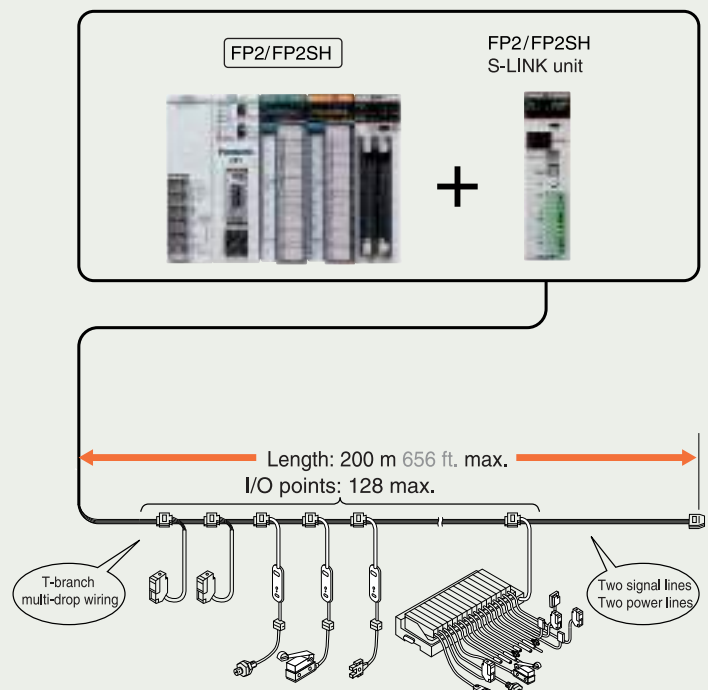


### S-LINK

- S-LINK is a link system that allows the free layout of I/O devices, such as sensors, by T-branch connections with a four-wire flat cable.
- The number of I/O points can be increased up to 2,048 in increments of one channel having 128 points.
- A CPU unit with S-LINK ports and a single S-LINK unit are available. FP2-C1SL has two S-LINK ports and can control 256 I/O points.



- Sensors to be connected by S-LINK must be chosen from S-LINK-compatible sensors manufactured by SUNX Limited.



Note: The number of I/O points may be less than 128 depending on the connected device model and connection location.  
 For details, refer to the S-LINK instruction manual of SUNX Limited.



# Programmable Controller FP2/FP2SH

## Serial communication control

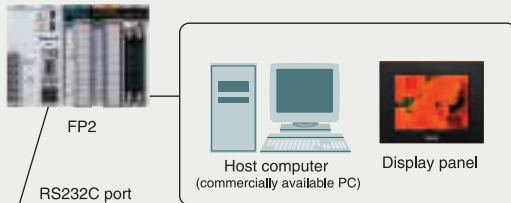
The CPU units have an RS232C port as standard equipment. The communication unit enables connections with RS232C/RS485/RS422-compatible devices.

### CPU units

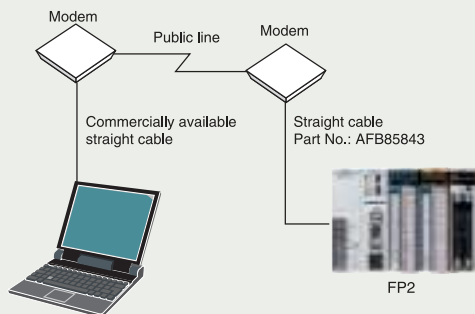
All CPU units have an RS232C port as standard equipment. They can be directly connected to a host computer or a display panel, and can also be connected to a modem to collect data from and change programs in devices in a remote location.



- Direct connection to a control panel or a computer



- Remote monitoring via a modem



- "PCWAY" for easy data collection



The operation data managing software "PCWAY" allows FP2/FP2SH operation data to be imported into Excel without programming.

\* Excel is a registered trademark of the Microsoft Corporation.

### Multi-communication unit (MCU)

The communication blocks are detachable.

Up to two blocks to be attached can be selected among RS485, RS232C, and RS422 blocks.



FP2-MCU (AFP2465)

Industry's fastest level

The 230 kbps communication speed (simultaneous two-channel communication) facilitates fast large-volume data communications.

[Selectable from three communication blocks]  
The use of only one channel is also possible.

#### RS232C



FP2-CB232 (AFP2803)

#### RS422



FP2-CB422 (AFP2804)

#### RS485



FP2-CB485 (AFP2805)

The combination is selectable.



Multi-communication unit FP2-MCU (AFP2465)

COM2 (the lower channel) is sealed before shipping so that it can be protected from damage even when only COM1 is used.

\* This unit cannot operate without a communication block attached. Purchase the above communication block(s) together with this unit.

# FP2

The functions for a medium-scale PLC are squeezed into a compact body. Perfect when combining various devices.



## ■ Features

### 1. Compact body W140 x H100 mm\* W 5.512 x H 3.937 inch.

The functions for a medium-scale PLC are squeezed into a compact body which requires minimal installation area for an overall reduction in the device size.

\* The five-module type. (H: 100, W: 140, D: 108.3 mm) High design flexibility for number of modules.

### 2. Module specifications that allow you to design as you desire.

Backplanes for 5, 7, 9, 12, and 14 modules are available, and since the units have the same width, you can choose the most economical design for your application.

### 3. Standard equipped with RS232C port.

RS232C port allows connection with operation display panels and host computers, as well as remote surveillance using modems.

### 4. Different memory options are available to meet your application.

Memory units for comment, calendar timer, expansion RAM, and ROM operation are available so you can add just the options you need.

### 5. Dedicated instructions for high level data processing.

Real number data operation is supported too. So you can simplify programs for data processing more.

## ■ Power supply / I/O specifications

Item	Description
Power supply	100 V to 120 V AC / 200 V to 240 V AC / 100 V to 240 V AC, 24 V DC (varies with different models)
Input	12 V to 24 V DC, 24 V DC $\pm$ common
Output	Relay 2 A to 5 A / Transistor 0.1 A to 0.5 A (varies with different models)

## ■ Performance specifications

Item	Description	
Number of I/O points	Up to 768 points	
Expansion	Standard Units: 25max. I/O points: 1,600 max. Remote I/O points: 2,048 max.	
	H type Units: 32 max. I/O points: 2,048 max. Remote I/O points: 2,048 max.	
Operation speed	0.35 $\mu$ s/step (Basic instruction)	
Built-in memory	RAM (ROM is optional)	
Memory capacity	Approx. 16k steps	
Operation Memory	Internal relay	4048 points
	Timer/Counter(T/C)	1024 points in total
	Data register	6000 words

## ■ Special functions

Item	Description
Analog I/O	Available by adding analog input and analog output units.
High speed counter	Available by adding high-speed counter unit. (Max. 200 kHz)
Pulse output	Positioning unit 2-axis Positioning unit 4-axis
Serial	RS232C port Standard equipped with CPU unit. Expandable by adding C.C.U., M.C.U. and serial data unit.
	RS422 RS485 Expandable by adding M.C.U.
Interrupt input	Available by adding high-speed counter unit or pulse I/O unit.

## ■ Special network functions

Item	Description
Remote I/O	S-LINK, MEWNET-F
PLC Link	MEWNET-W2 (Wire) MEWNET-W0
Computer Link	Linkable by using tool port or COM. port on CPU unit. Also available by adding M.C.U. and C.C.U.
Modem connection	Available

## ■ Other built-in functions

Item	Description
Program block-edit during RUN	Available
Constant scan	Available
Adjustable input time ltering	Not available
Clock/Calendar function	Can be used with the addition of the calendar function option.

# FP2SH

Scanning time of 1 ms for 20k steps.

A high-performance model for high-speed operation.



## ■ Features

### 1. Scanning time of 1 ms for 20k steps.

With an operating speed at the top of its class, super high-speed processing is made possible. The result is a dramatically decreased tact time and high-speed device.

### 2. Large programming capacity of up to 120k steps.

Both the large programming capacities of 60k and 120k are available depending on the model.

### 3. Optional small PC card is also available.

The small PC card is available for programming backup or data memory expansion. This allows data processing of great amounts of data.

### 4. Built-in comment and calendar timer functions.

These functions, options with the FP2, are built right into the FP2SH.

\* The I/O unit and intelligent unit are the same for the FP2 series.

## ■ Power supply / I/O specifications

Item	Description
Power supply	100 V to 120 V AC / 200 V to 240 V AC / 100 V to 240 V AC, 24 V DC (varies with different models)
Input	12 V to 24 V DC, 24 V DC $\pm$ common
Output	Relay 2 A to 5 A / Transistor 0.1 A to 0.5 A (varies with different models)

## ■ Performance specifications

Item	Description	
Number of I/O points	Up to 768 points	
Expansion	Standard Up to 1 backplane Units: 25max. I/O points: 1,600 max. Remote I/O points: 8,192 max.	
	H type Up to 3 backplanes Units: 32 max. I/O points: 2,048 max. Remote I/O points: 8,192 max.	
Operation speed	0.03 $\mu$ s/step (Basic instruction)	
Built-in memory	RAM (ROM/Small PC card is optional)	
Memory capacity	Approx. 60 k steps/Approx. 120 k steps (varies with different models)	
Operation Memory	Internal relay	14,192 points
	Timer/Counter(T/C)	3,072 points in total
	Data register	10,240 words
	File register	32,765 words x 3 banks

## ■ Special functions

Item	Description
Analog I/O	Available by adding analog input and analog output units.
High speed counter	Available by adding high-speed counter unit. (Max. 200 kHz)
Pulse output	Positioning unit 2-axis Positioning unit 4-axis
Serial	RS232C port Standard equipped with CPU unit. Expandable by adding C.C.U., M.C.U. and serial data unit.
	RS422 RS485 Expandable by adding M.C.U.
Interrupt input	Available by adding high-speed counter unit or pulse I/O unit.

## ■ Special network functions

Item	Description
Remote I/O	S-LINK, MEWNET-F
PLC Link	MEWNET-W2 (Wire) MEWNET-W0 MEWNET-VE FL-NET
Computer Link	Linkable by using tool port or COM. port on CPU unit. Also available by adding M.C.U and C.C.U.
Modem connection	Available

## ■ Other built-in functions

Item	Description
Program block-edit during RUN	Available
Constant scan	Available
Adjustable input time ltering	Not available
Clock/Calendar function	Built-in type

# FP2/FP2SH system configurations and unit lineup

## Unit combinations

- Each unit is counted in the number of modules occupied. Most of the units occupy one module each. Some units occupy two modules each.
- Each unit is mounted on a backplane chosen depending on the total number of modules occupied by the all units used.  
The power supply unit and CPU unit must be mounted on the CPU backplane.
- Only one backplane other than the five-module type can be added by using an expansion cable. A power supply must be mounted on the expansion backplane.
- If the backplane is of the H type, up to three backplanes can be added.
- Most of the units can be used in any combination; however, some combinations are subject to constraints due to the unit type, current consumption, and other factors besides the above requirements.  
Please contact us for details.



## Power Supply Units



100 V AC,  
2.5 A type  
FP2-PSA1  
(AFP2631)



200 V AC,  
2.5 A type  
FP2-PSA2  
(AFP2632)



100 to 240 V AC,  
5 A type  
FP2-PSA3  
(AFP2633)



24 V DC,  
5 A type  
FP2-PSD2  
(AFP2634)

## Backplanes

(For use with both master and expansion backplanes. Only the 5-module type can not be used with expansion backplane.)



5-module type  
FP2-BP05 (AFP25005)



7-module type  
FP2-BP07 (AFP25007)



9-module type  
FP2-BP09 (AFP25009)



12-module type  
FP2-BP12 (AFP25012)



14-module type  
FP2-BP14 (AFP25014)

## H type Backplanes



H type master backplane  
(11 modules): 8 slots  
FP2-BP11MH (AFP25011MH)



H type expansion backplane  
(10 modules): 8 slots  
FP2-BP10EH (AFP25010EH)

■ Units that occupy two modules each  
There is a two-module type in the power supply and CPU units.

Type	Model No.
Power supply unit, 5 A type	FP2-PSA3
	FP2-PSD2
CPU unit with 64 input points	FP2-C1D
CPU unit with S-LINK ports	FP2-C1SL



Expansion cable  
(60cm/23.62 in.)  
FP2-EC (AFP2510)



Expansion cable  
(2m/78.74 in.)  
FP2-EC2 (AFP2512)



Dummy unit  
FP2-DM  
(AFP2300)

## CPU Units

### FP2



Standard type  
FP2-C1  
(AFP2211)



With 64-point input  
FP2-C1D  
(AFP2212)



With S-LINK  
FP2-C1SL  
(AFP2214)

### FP2SH



Standard type  
(60k steps)  
FP2-C2  
(AFP2231)



For small PC card  
(60k steps)  
FP2-C2P  
(AFP2235)



For small PC card  
(120k steps)  
FP2-C3P  
(AFP2255)

## Input and Output Units



16-point DC input  
FP2-X16D2 (AFP23023)  
16-point NPN transistor output  
FP2-Y16T (AFP23403)  
16-point PNP transistor output  
FP2-Y16P (AFP23503)  
6-point Relay output (5A)  
FP2-Y6R (AFP23101)  
16-point Relay output (2A)  
FP2-Y16R (AFP23103)



32-point DC input  
FP2-X32D2 (AFP23064)  
32-point NPN transistor output  
FP2-Y32T (AFP23404)  
32-point PNP transistor output  
FP2-Y32P (AFP23504)



64-point DC input  
FP2-X64D2 (AFP23067)  
64-point NPN transistor output  
FP2-Y64T (AFP23407)  
64-point PNP transistor output  
FP2-Y64P (AFP23507)  
32-point input/32-point NPN output mixed  
FP2-XY64D2T (AFP23467)  
FP2-XY64D7T (AFP23477)  
32-point input/32-point PNP output mixed  
FP2-XY64D2P (AFP23567)  
FP2-XY64D7P (AFP23577)

## Optional Memories

### For FP2



FP2-EM1  
FP2-EM2



FP2-EM3  
FP2-EM6  
FP2-EM7

### Type of memory unit

Product number	Part number	Comment input function	Clock/calendar function	With 16k expansion RAM	ROM socket
FP2-EM1	AFP2201	A	A	N/A	N/A
FP2-EM2	AFP2202	A	A	A	N/A
FP2-EM3	AFP2203	A	A	A	A
FP2-EM6	AFP2206	N/A	N/A	A	A
FP2-EM7	AFP2207	N/A	N/A	N/A	A

A: Available  
N/A: Not available



F-ROM  
FP2-EM4 (AFP2204)



EP-ROM  
FP2-EM5 (AFP2205)

FP Memory Loader



### For FP2SH



Memory unit with ROM socket  
FP2-EM7 (AFP2207)



F-ROM  
(AFP5208)

Data clear/  
Data hold type  
AFP8670/  
AFP8671



Small PC card (2MB)  
F-ROM  
(AIC50020)



Small PC card (2MB)  
SRAM  
(AIC52000)



EP-ROM  
(AFP5209)

## Analog Input/Output Units



Voltage/current input unit  
FP2-AD8VI (AFP2400L)



Multiple analog input unit  
FP2-AD8X (AFP2401)



Resistance thermometer device input unit  
FP2-RTD (AFP2402)



Analog output unit  
FP2-DA4 (AFP2410)

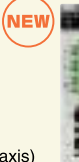
## Positioning Units

NEW



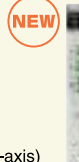
(2-axis)

Positioning units  
RTX  
FP2-PN2AN (AFP243610)



(4-axis)

Positioning units  
RTX  
FP2-PN4AN (AFP243620)



(8-axis)

Positioning units  
RTX  
FP2-PN8AN (AFP243630)



(2-axis)

Positioning units  
FP2-PP21 FP2-PP22 (AFP2432) (AFP2434)



(4-axis)

Positioning units  
FP2-PP41 FP2-PP42 (AFP2433) (AFP2435)

## Pulse Input/Output Units



High-speed counter unit  
FP2-HSCT FP2-HSCP (AFP2441) (AFP2451)



Pulse I/O unit  
FP2-PXYT FP2-PXYP (AFP2442) (AFP2452)



Multi-communication unit  
FP2-MCU (AFP2465)  
\* The communication blocks are available separately.



Serial data unit  
FP2-SDU (AFP2460)



Computer communication unit  
FP2-CCU (AFP2462)

## Multi-Communication Unit

## Serial Data Control Unit

## Operation Display Panel and Computer Interface Unit

## Link-related Units

NEW



VE-LINK  
FP2-VE (AFP27960)



ET-LAN  
FP2-ET1 (AFP2790)



Multi-wire link unit  
FP2-MW (AFP2720)



S-LINK  
FP2-SL2 (AFP2780)

## Panasonic Servo MINAS All/S Series



## Motor Driver I/F Terminal II



1-axis type

AFP8503



2-axis type

AFP8504



# Specifications ①

## ■ CPU units

Item		FP2 CPU unit		FP2SH CPU unit		
		FP2-C1 (AFP2211) FP2-C1D (AFP2212) FP2-C1SL (AFP2214)		FP2-C2 (AFP2231)	FP2-C2P (AFP2235)	FP2-C3P (AFP2255)
Operation speed	Basic	0.35 μs or more		0.03 μs or more		
	High-level	0.93 μs or more		0.06 μs or more		
Program capacity	Built-in RAM	16 k steps		60 k steps		120 k steps
	w/expansion	32 k steps		Not available		Not available
Number of I/O points	No expansion	Conventional type	Max. 768 points	Max. 768 points		
		H type	Max. 512 points	Max. 512 points		
	w/expansion	Conventional type	Max. 1600 points	Max. 1600 points		
		H type	Max. 2048 points	Max. 2048 points		
	w/ remote I/O	Max. 2048 points		Max. 8192 points		
Operation memory	Internal relay	4048 points		14192 points		
	Data register	6000 words		10240 words		
	File register	0 to 143333 words (w/expansion 0 to 30717 words)		32765 words x 3 banks		
	Link register	256 words		8448 words		
Optional memory		F-ROM/EP-ROM		F-ROM/EP-ROM	Small PC card (F-ROM/S-RAM)	
Comment memory		Optional memory unit		Available		
Clock/Calendar function		Optional memory unit		Available		

## ■ Power supply units

Item		FP2-PSA1 (AFP2631)	FP2-PSA2 (AFP2632)	FP2-PSA (3AFP2633)	FP2-PSD2 (AFP2634)
Input	Rated voltage	100 V - 120 V AC	200 V - 240 V	100 V - 240 V AC	24 V DC
	Current Current	0.4 A or less (at 100 V AC)	0.2 A or less (at 200 V AC)	0.7 A or less (at 100 V AC) 0.4 A or less (at 200 V AC)	2.5 A or less
	Surge current	40 A or less (55°C)		30 A or less (25°C)	10 A or less
	Rated frequency	47 Hz ~ 63 Hz			-
	Operating	85 to 132 V AC	170 to 264 V AC	85 to 264 V AC	20.4 to 31.2 V DC <sup>note)</sup>
Output	Voltage range	2.5A max.		5 A max.	
Alarm contact capacity		30 V DC 1 A			
Alarm contact operation		When the ALARM LED of CPU unit is lit			
Alarm contact type		1c contact			
Leakage current		Between input and ground terminals, 0.75 mA or less			
Breakdown voltage		1500V AC for 1 minute (between input and ground terminals)			
Insulation resistance		100 MΩ 500V DC (between input and ground terminals)			
Guaranteed lifetime		20000 hours at 55°C			
Overcurrent protection function		Built-in overcurrent protection			
Fuse		Built-in type			
Terminal screw		M3			
Module size		1 module	1 module	2 module	2 module

Note)

Allowable voltage fluctuation range after startup for the FP2-PSD2 is -35% to +30%. At startup, apply -15% to +30% the rated voltage for 100 ms or more.

## ■ Input units

Item	DC input unit			I/O mixed unit (input side)	
	16-point DC input type	32-point DC input type	64-point DC input type <sup>note 1)</sup>	DC input type/Transistor output (NPN) type <sup>note 2)</sup>	DC input type/Transistor output (PNP) type <sup>note 3)</sup>
	FP2-X16D2 (AFP23023)	FP2-X32D2 (AFP23064)	FP2-X64D2 (AFP23067)	FP2-XY64D2T (AFP23467)	FP2-XY64D2P (AFP23567)
Rated input voltage	12 - 24 V DC	24 V DC	24 V DC	24 V DC	24 V DC
Rated input current	Approx. 8 mA (at 24 V DC)	Approx. 4.3 mA (at 24 V DC)	Approx. 4.3 mA (at 24 V DC)	Approx. 4.3 mA (at 24 V DC)	Approx. 4.3 mA (at 24 V DC)
Input impedance	Approx. 3 kΩ	Approx. 5.6 kΩ	Approx. 5.6 kΩ	Approx. 5.6 kΩ	Approx. 5.6 kΩ
Min. ON voltage/Min. ON current	9.6 V/4 mA	19.2 V/4 mA	19.2 V/4 mA	19.2 V/4 mA	19.2 V/4 mA
Max. OFF voltage/Max. OFF current	2.5 V/1 mA	5.0 V/1.5 mA	5.0 V/1.5 mA	5.0 V/1.5 mA	5.0 V/1.5 mA
Response time	OFF→ON	0.2 ms or less	0.2 ms or less	0.2 ms or less	0.2 ms or less
	ON→OFF	0.2 ms or less	0.3 ms or less	0.3 ms or less	0.3 ms or less
Input points per common	8 points/common (Either the positive or negative of the input power supply can be connected to the common terminal.)	32 points/common	32 points/common	32 points/common	32 points/common
Connection method	Terminal block (M3 screw)	One 40-pin connector	Two 40-pin connectors	Two 40-pin connectors	Two 40-pin connectors

Note: The number of ON points that can be actuated simultaneously is limited by the input voltage and the ambient temperature.

1) The specifications also apply to the input side of the CPU unit with 64 input points "FP2-C1D" (AFP2212).

2) The specifications also apply to the DC-input, transistor-output (NPN) type I/O-mixed unit with ON pulse catch input "FP2-XY64D7T" (AFP23477).

However, the response time is as follows: OFF→ON: 0.2 ms or less (X0-X1F); ON→OFF: 0.3 ms or less (X0-X1B), 1.0 to 5.0 ms (X1C-X1F)

3) The specifications also apply to the DC-input, transistor-output (PNP) type I/O-mixed unit with ON pulse catch input "FP2-XY64D7P" (AFP23577).

However, the response time is as follows: OFF→ON: 0.2 ms or less (X0-X1F); ON→OFF: 0.3 ms or less (X0-X1B), 1.0 to 5.0 ms (X1C-X1F)

## ■ Output units

Item	Relay output unit				Transistor output unit				I/O mixed unit (output side) <sup>(note 3) and 4)</sup>	
	<sup>note 1)</sup> 6-point type	16-point type	NPN open collector <sup>(note 2)</sup> 16-point type	PNP open collector <sup>(note 2)</sup> 16-point type	NPN open collector	PNP open collector	NPN open collector	PNP open collector	DC input type/ Transistor output (NPN) type	DC input type/ Transistor output (PNP) type
	FP2-Y6R (AFP23101)	FP2-Y16R (AFP23103)	FP2-Y16T (AFP23403)	FP2-Y16P (AFP23503)	FP2-Y32T (AFP23404)	FP2-Y32P (AFP23504)	FP2-Y64T (AFP23407)	FP2-Y64P (AFP23507)	FP2-XY64D2T (AFP23467)	FP2-XY64D2P (AFP23567)
Rated control capacity	5A 250V AC (10A/common) 5A 30V DC (10A/common) Min. load: 100mA 10V (resistor load)	2A 250V AC (5A/common) 2A 30V DC (5A/common) Min. load: 100μA 10V (resistor load)	—	—	—	—	—	—	—	—
Rated load voltage	—	—	5-24 V DC	5-24 V DC	5-24 V DC	5-24 V DC	5-24 V DC	5-24 V DC	5-24 V DC	5-24 V DC
Max. load current	—	—	0.5 A (at 12 to 24 V DC) 0.1 A (at 5 V DC)	0.5 A (at 12 to 24 V DC) 0.1 A (at 5 V DC)	0.1 A (at 12 to 24 V DC) 50 mA (at 5 V DC)	0.1 A (at 12 to 24 V DC) 50 mA (at 5 V DC)	0.1 A (at 12 to 24 V DC) 50 mA (at 5 V DC)	0.1 A (at 12 to 24 V DC) 50 mA (at 5 V DC)	0.1 A (at 12 to 24 V DC) 50 mA (at 5 V DC)	0.1 A (at 12 to 24 V DC) 50 mA (at 5 V DC)
Max. surge current	—	—	3A 10 ms or less	3A 10 ms or less	0.3 A	0.3 A	0.3 A	0.3 A	0.3 A	0.3 A
OFF state leakage current	—	—	1μA or less	1μA or less	1μA or less	1μA or less	1μA or less	1μA or less	1μA or less	1μA or less
ON state maximum voltage drop	—	—	0.5 V or less	0.5 V or less	1 V or less (at 6 to 26.4 V DC) 0.5 V or less (at 6 V DC or less)	1.5 V or less (at 6 to 26.4 V DC) 0.5 V or less (at 6 V DC or less)	1 V or less (at 6 to 26.4 V DC) 0.5 V or less (at 6 V DC or less)	1.5 V or less (at 6 to 26.4 V DC) 0.5 V or less (at 6 V DC or less)	1 V or less (at 6 to 26.4 V DC) 0.5 V or less (at 6 V DC or less)	1.5 V or less (at 6 to 26.4 V DC) 0.5 V or less (at 6 V DC or less)
Repose time	OFF→ON	10 ms or less	10 ms or less	0.1 ms or less	0.1 ms or less	0.1 ms or less	0.1 ms or less	0.1 ms or less	0.1 ms or less	0.1 ms or less
	ON→OFF	8 ms or less	8 ms or less	0.3 ms or less	0.3 ms or less	0.3 ms or less	0.3 ms or less	0.3 ms or less	0.3 ms or less	0.3 ms or less
Power supply for driving internal circuit	Voltage	24V DC±10% (21.6V to 26.4V DC)	24V DC±10% (21.6V to 26.4V DC)	4.75 to 26.4V DC	4.75 to 26.4V DC	4.75 to 26.4V DC	4.75 to 26.4V DC	4.75 to 26.4V DC	4.75 to 26.4V DC	4.75 to 26.4V DC
	Current	70mA or less	160 mA or less	120 mA or less (at 24 V DC)	70 mA or less (at 24 V DC)	140 mA or less (at 24 V DC)	150 mA or less (at 24 V DC)	250 mA or less (at 24 V DC)	270 mA or less (at 24 V DC)	120 mA or less (at 24 V DC)
Input points per common	2 points/common	8 points/common	8 points/common	8 points/common	32 points/common	32 points/common	32 points/common	32 points/common	32 points/common	32 points/common
Connection method	Terminal block (M3 screw)	Terminal block (M3 screw)	Terminal block (M3 screw)	Terminal block (M3 screw)	One 40-pin connector	One 40-pin connector	Two 40-pin connectors	Two 40-pin connectors	Two 40-pin connectors	Two 40-pin connectors

Notes 1: The number of ON points that can be actuated simultaneously is limited by the input voltage and the ambient temperature.

2: The maximum load current is limited by the external power supply voltage.

1) The current capacity of each common terminal is 5 A max.

2) The maximum load current of the transistor output unit is limited by the external power supply voltage.

3) The specifications also apply to the DC-input, transistor-output (NPN) type I/O-mixed unit with ON pulse catch input "FP2-XY64D7T" (AFP23477).

4) The specifications also apply to the DC-input, transistor-output (PNP) type I/O-mixed unit with ON pulse catch input "FP2-XY64D7P" (AFP23577).

## ■ Analog I/O units

### 1. Analog input

Item	FP2-AD8X (AFP2401)	FP2-RTD (AFP2402)	FP2-AD8VI (AFP2400L)
Number of input points	8 channels	8 channels	8 channels
Voltage	±10 V (1/65536)	—	±10 V (1/65536)
	1 V ± 5 V (1/13107)	—	1 V to 5 V (1/13107)
Current	±100 mV (1/65536)	—	—
	— <sup>note 1)</sup>	—	±20 mA (1/32768) 4 mA to 20 mA (1/13107)
Input range (resolution)	S: 0 to +1500°C (0.1°C)	—	—
	J: -200 to +750°C (0.1°C)		
	J: -100 to +400°C (0.1°C)		
	K: -200 to +1200°C (0.1°C)		
	K: -200 to +1000°C (0.1°C)		
	K: -200 to +600°C (0.1°C)		
	T: -200 to +350°C (0.1°C)		
	R: 0 to +1500°C (0.1°C)		
	N: -200 to +1300°C (0.1°C)		
	R.T.D		
Conversion speed	Voltage	500 μs/ch (insulated), 5 ms (insulated)	500 μs/ch
	Current	—	500 μs/ch
	Thermocouple	20 ms/ch	—
	R.T.D	20 ms/ch	—
Overall accuracy	Voltage: ±0.1% F.S. (25 °C) Voltage temperature coefficient: ±0.3% (0 to 55 °C)	±0.3% F.S. (0 to 55°C)	±1.0% F.S. (0 to 55°C)
Insulation method	Between the input terminal and FP2 internal circuits: Photocoupler and DC/DC converter	—	Between the input terminal and FP2 internal circuits: Photocoupler
	Between channels: PhotoMOS relay	—	—
Digital output	Averaging	Selectable from 3 to 64 times for each channel (Moving average after cutting the maximum and minimum values)	
	Offset setting	Selectable from K -2048 to +2047 for each channel	
Broken wire sensing	Each channel (only when a thermocouple or RTD is inputted)	Each channel	—
Input range change method	Batch switching of all channels: By the range setting switch		
	Each channels: By shared memory setting		

Note 1) Current inputs can be converted into voltage inputs by attaching the supplied external resistor to the input terminal section.

### 2. Analog output

Item	Analog output unit FP2-DA4(AFP2410)	
Number of output points	4 channels	
Output range (digital input)	Voltage	±10 V (K-2048 to K+2047)
	Current	0 to 20 mA (K0 to K4095)
Resolution	1/4096	
Conversion speed	500 μs/ch	
Overall accuracy	±1.0% F.S. or less (0 to 55°C)	
Insulation method	- Between the output terminal and FP2 internal circuits: Photocoupler - Between channels: No insulation	
Analog output	Hold/Non-hold setting by shared memory setting	

# Specifications ②

## ■ ET-LAN units (AFP2790)

### ● Performance Specification

Item	Specifications
Communications function	- MEWTOCOL-COM: computer link function (Max. 2K B) - MEWTOCOL-DAT: data transfer (Max. 1020 words) - Transparent communication
Number of communication connections	8 connections max.
Transparent communications buffer	Transmit Factory setting: 1k words/connection x 3
	Receive Factory setting: 1k words/connection x 3

### ● Transmission Specifications for Communication Interface

Item	100BASE-TX <sup>note 1)</sup>	100BASE-T <sup>note 1)</sup>	100BASE5
Transmission speed	100M bit/s	10M bit/s	10M bit/s
Transmission method	Base band	Base band	Base band
Max. segment length	100 m <sup>note 2)</sup>	100 m <sup>note 2)</sup>	500 m
Max. distance between nodes	205 m (2 segments)	500 m (5 segments)	2500 m (5 segments)
Communication cable or connection	Category 5 UTP cable	Category 3, 4 and 5 UTP cable	Transceiver cable
Max. transceiver cable length	-	-	50 m <sup>note 3)</sup>
Max. number of nodes	-	-	100 nodes/segment
Node spacing	-	-	Integer multiples of 2.5 m

Notes: 1) Switching between 100BASE-TX and 10BASE-T is done automatically by auto negotiation function.  
2) The standards cite 100 m 328.08 ft. as the maximum, but noise resistance measures such as attaching a ferrite core may be necessary in some cases, depending on the usage environment. Also, if the hub is positioned close to a control board, we recommend using it at a distance of 10 m 32.808 ft. or less.  
3) The standards cite 50 m 164.04 ft. as the maximum, but noise resistance measures such as attaching a ferrite core may be necessary in some cases, depending on the usage environment. Also, if the transceiver is positioned close to a control board, we recommend using it at a distance of 5 m 16.404 ft. or less.

## ■ Multi-communication units (AFP2465)

Item	General-purpose serial communications		Computer link <sup>note 1)</sup> (Matsushita open protocol "MEWTOCOL" should be used.)		PLC link function
	1:1 communications	1:N communications	1:1 communications	1:N communications	
Communication block used	AFP2803 AFP2804	AFP2805	AFP2803 AFP2804	AFP2805	AFP2803 AFP2805
Interface	RS232C RS422	RS485	RS232C RS422	RS485	RS232C RS485
Communication method	Full duplex	Two-wire half duplex	Full duplex	Two-wire half duplex	Token passing (Floating master)
Synchronization	Start-stop synchronization				
Transmission line	Three-core or five-core shielded wire	Twisted-pair cable or VCTF	Three-core or five-core shielded wire	Twisted-pair cable or VCTF	Twisted-pair cable or VCTF
Transmission distance	15 m Length: 1,200 m max.	Length: 1,200 m max.	15 m Length: 1,200 m max.	Length: 1,200 m max.	1200m (RS485) 15m (RS232C)
Transmission speed (To be set in the system register)	300 to 230400bps	300 to 230400bps (19,200 bps when our C-NET adapter is connected)	300 to 230400bps	300 to 230400bps (19,200 bps when our C-NET adapter is connected)	115200bps
Transmission code	ASCII, JIS7, JIS8, and binary		ASCII, JIS7, JIS8		
Transmission format (To be set in the system register)	Data length: 7 bits/8 bits				
	Parity: 0/Invalid/Valid (Odd/Even)				
	Stop bit: 1 bit/2 bits				
	Start code: With STX / Without STX			-	-
End code: CR/CR+LF/Time setting/ETX			-	-	
Number of stations	-	99 stations max. (32 stations max. when our C-NET adapter is connected)	-	99 stations max. (32 stations max. when our C-NET adapter is connected)	16 stations max.
PLC link capacity	-	-	-	-	Link relay: 1,024 points Link register: 128 words
COM1 (upper channel)	A	A	A	A	A
COM2 (lower channel)	A	A	A	A	N/A
Number of attachable units	23 units max. (including 8 units for the computer link and 2 channels for the PLC link)				
Supported versions	CPU unit (both FP2 and FP2SH): Ver. 1.4 or later, FPWIN-GR: Ver. 2.4 or later, EPWIN-PRO: Ver. 5.1 or later				

Note: 1) The protocol can be downloaded from: <http://www.mew.co.jp/ac/fasys/plc>

A: Available  
N/A: Not available

## ■ Multi-wire link units

Item	FP2-MW (AFP2720)		
	W mode	W2 mode	F mode
Communication method	Token bus		
Transmission method	Polling		
Transmission speed	Base band		
Transmission speed	500k bit/s	500k bit/s, 250k bit/s	500k bit/s
Transmission distance	Extendable to 800 m	Extendable to 800 m 250 kbits/s: 1,200 m max. 500 kbits/s: 800 m max.	Extendable to 700 m
Number of connectable stations	32 stations max.		1 master + 32 slave stations max.
Transmission error check	CRC (cyclic redundancy check) system		
Synchronization	Start-stop synchronization		
Interface	RS485 compatible		
Transmission line	Twisted-pair cable		Twisted-pair cables or VCTF cables
RAS function	Hardware self-diagnosis function		

Note: 1) When the unit is used in W2 mode, it must be set by user programs.

## ■ MEWNET-VE link units (AFP27960)

**NEW**

	VE mode (PLC link)	FL-net mode
Communication interface	Ethernet 10BASE5/10BASE-T	
Communication speed	10Mbit/s	
Cycle time example	50 ms/32 units (2,048 points/2,048 words)	
Cable length	10BASE5 : 500m (2500m) 10BASE-T : 100m (500m)	* The lengths in parentheses are available when a repeater is used.
Communication protocol	MEWTOCOL	FL-net [FA link protocol (UDP/IP)]
Link communication specifications	Link relay 8,192 points/unit Link register 8,192 words/unit	
Message communication specifications	2,048 bytes max. (Compatible with MEWTOCOL)	1,024 bytes max. (Not compatible with MEWTOCOL)
Number of nodes	99 units max.	254 units max.
Other functions	Data transfer Remote programming Multilevel link communications	Interconnection with other companies' units

\* For FP2SH (Cannot be used for FP2)

## ■ S-LINK units

Item	S-LINK units FP2-SL2 (AFP2780)	CPU unit with S-LINK ports FP2-C1SL (AFP2214)
	Number of channels	1
Number of I/O points	128 points max.	128 points max. x 2
Rated power supply voltage	The number of input and output points for each channel can be selected by the switch in the unit body. Input: 0/32/64/96/128 points Output: 0/32/64/96/128 points +24 V DC ±10% Maximum allowable ripples (P-P): ±10% (S-LINK terminal block IN-24 V DC 1.6 A or less)	
Power consumption <sup>note 1)</sup>	[Current consumption of the S-LINK controller (incl. D-G line current consumption)] +24 V DC 1.6 A or less [Maximum allowable current supply (Supply to the S-LINK and I/O devices through the 24 V - 0 V line)] +24 V DC 5 A (Fuse: 5A or less)	
Transmission method	Bi-directional time division multiplex transmission	
Synchronization	Bit/Frame synchronization	
Transmission protocol	S-LINK protocol	
Transmission speed	28.5k bit/s	
Transmission distance <sup>note 2)</sup> FAN-OUT <sup>note 2)</sup>	Main signal line: Extendable to 200 m (max. 400 m when a booster is used) 320	
Connection method	T-branch multi-drop wiring or standard multi-drop wiring [+24, 0 V, D-G (with a function of D-G short-circuit protection)]	

Notes: 1) Refer to the "Power Capacity Determination" section of SUNX Limited's S-LINK Design Manual for details of the current consumption.

2) Refer to SUNX Limited's S-LINK Design Manual for the booster and FAN-OUT.

# Specifications ③

## ■ Positioning units: RTEX (Network type) **NEW**

Item		2-axis type	4-axis type	8-axis type
Part No.		AFP243610	AFP243620	AFP243630
Model No.		FP2-PN2AN	FP2-PN4AN	FP2-PN8AN
Unit specifications	Control method	PTP control, continuous path (CP) control		
	Interpolation control	Two/Three-axis linear interpolation, two-axis circular interpolation, three-axis helical interpolation		
	Unit of control	pulse/ $\mu$ m/inch/degree		
	Positioning data	600 points per axis		
	Backup	Parameters and data tables can be saved in FROM.		
	Acceleration/deceleration method	Linear/S-curve acceleration and deceleration		
	Acceleration/deceleration time	0 to 10,000 ms (in increments of 1 ms)		
Positioning range	(-1073741823 to +1073741823 pulses) Increment/Absolute specification			
Speed control function	Supported by a JOG operation (free-run operation)			
Torque control function	Supported by a real-time torque control function			
Home return	Search method	Home proximity (DOG) search		
	Creep rate	Can be set freely		
Others		Pulser input operation supported		
		Auxiliary output code and auxiliary output contact		
		Dwell time		
		In-position contact		
Communication speed	100Mbps			
Cables	Commercially available LAN straight cable (Category 5e shielded cable)			
Connection system	Ring			
Communication cycle/ Number of connectable stations	0.5 ms, 8 axes max./system (Command cycle: 1 ms)			
Transmission distance	Between terminals: 60 m Total: 200 m			

## ■ Positioning units: Multifunction type (Pulse output type)

Item		AFP2432	AFP2433	AFP2434	AFP2435
		FP2-PP21	FP2-PP41	FP2-PP22	FP2-PP42
Output type		Transistor		Line driver	
Number of axes controlled		2 axes, independent	4 axes, independent	2 axes, independent	4 axes, independent
Position command	Command units	Pulse unit (The program specifies whether Increment or Absolute is used.)			
	Max. pulse count	Signed 32 bits (-2147483648 to +2147483647 pulses)			
Speed command	Command range	1 pps to 500 kpps (can set in 1 pps.)		1 pps to 4 Mpps (can set in 1 pps.)	
	Acceleration/deceleration	Linear acceleration/deceleration, S acceleration/deceleration (this takes the form of an "S")			
Acceleration/deceleration command	"S" Acceleration/deceleration	Can select from Sin curve, Secondary curve, Cycloid curve and Third curve.			
	Acceleration/deceleration time	0 to 32767 ms (can set in 1 ms)			
Home return	Home Return speed	Speed setting possible (changes return speed and search speed)			
	Input terminals	Home input, Near home input, Over limit input (+), Over limit input (-)			
	Output terminals	Deviation counter clear output signal			
Operation mode		<ul style="list-style-type: none"> <li>● E point control (Linear and S accelerations/decelerations selecting possible)</li> <li>● P point control (Linear and S accelerations/decelerations selecting possible)</li> <li>● Home return function (Home search)</li> <li>● JOG operation function</li> <li>● JOG positioning function</li> <li>● Pulser input function</li> <li>Transfer multiplication ratio (<math>\times 1, \times 2, \times 5, \times 10, \times 50, \times 100, \times 500, \times 1000</math> selecting possible)</li> <li>● Real-time frequency change function</li> <li>● Infinity output function</li> </ul>			
Startup time		0.02 ms or 0.005 ms possible			
Output interface	Output mode	1 pulse output (Pulse/Sign), 2 pulse output (CW/CCW)			
Feedback counter	Countable range	Signed 32-bit (-2147483648 to +2147483647 pulse)			
	Input mode	2-phase input*, Direction distinction input, Individual input (transfer multiple available for each.)			
Other functions		The flag to compare the elapsed value is built in. (The timing signal outputs at the optional position during an operation.)			
Internal current consumption (at 5 VDC)		200mA max.	350mA max.	200mA max.	350mA max.
External power supply	Voltage	21.6 V DC to 26.4 V DC			
	Current consumption	50 mA	90 mA	50 mA	90 mA

Note: Previous FP2 positioning units AFP2430 (FP2-PP2) and AFP2431 (FP2-PP4) are not compatible with the multi-function type FP2 positioning unit. Please contact us.  
\* 2-phase input cannot be used with multiples of one.

## ■ High-speed counter units and Pulse I/O units

Item		FP2 High-speed counter unit	FP2 Pulse I/O unit	
Part No.		AFP2441 (NPN)	AFP2442 (NPN)	
		AFP2451 (PNP)	AFP2452 (PNP)	
Part No.	Insulation method	Photocoupler insulation		
	Rated voltage	24 V DC		
	Rated current	Approx. 7.5 mA (when using 24 V DC)		
	Input impedance	Approx. 3.2 k $\Omega$		
	Usage voltage range	20.4 V DC to 26.4 V DC		
	Min. ON voltage/Min. ON current	19.2 V / 6 mA		
	Min. OFF voltage/Min. OFF current	5.0 V / 1.5 mA		
	Response time <sup>note 1)</sup>	OFF→ON	1 $\mu$ s or less	
		ON→OFF	2 $\mu$ s or less	
	Input time constant setting	None, 4 $\mu$ s, 8 $\mu$ s, 16 $\mu$ s, 32 $\mu$ s (set in 2-input units)		
Common method	16 points/common (+ common)			
Counter	Number of counter channels	4 channels		
	Calculation range	32-bit with sign (-2,147,483,648 to +2,147,483,647)		
	Max. calculation speed <sup>note 1)</sup>	200 kHz		
	Input modes	3 modes (direction control, individual input, phase input)		
	Max. calculation speed <sup>note 1)</sup>	2.5 $\mu$ s		
Other	8 comparison outputs, multiplier function (1, 2, 4)			
Interrupt	Number of interrupt points <sup>note 2)</sup>	None, 1/unit, 8/unit (set with mode setting switches)		
	Interrupt processing delays	160 $\mu$ s max. (when using FP2 CPU unit) 50 $\mu$ s max. (when using FP2SH CPU unit)		
Output specifications	Insulation method	Photocoupler insulation		
	Rated load voltage	5 - 24 V DC		
	Rated load voltage range	4.75 V DC to 26.4 V DC		
	Max. load current	0.1 A (A11 to A18, B11 to B14 pins), 0.8 A (B15 to B18 pins)		
	Leakage current when off	1 $\mu$ A max.		
	Max. voltage drop when on	0.5 V max.		
	Response time	OFF→ON	1 $\mu$ s max.	
		ON→OFF	1 $\mu$ s or less (NPN) 5 $\mu$ s or less (PNP)	
	Surge absorber	Zener diode		
	Common method	16 points/common		
External power supply	Voltage	20.4 V DC to 26.4 V DC		
	Current <sup>(when using 24 V DC)</sup>	90 mA or less (NPN) 200 mA or less (PNP)		
Counter	Surge absorber	8 points (A11 to A18 pins)		
Pulse output	Channels	4CH (B11 to B18 pins)		
	Max. output frequency	100 kHz		
	Output modes	2 modes (direction control, individual output)		
PWM output	Number of output points	-		
	Max. load current	4CH (B15 to B18 pins) 0.8 A		
	Cycle <sup>note 3)</sup>	1 Hz to 30 kHz		
	Duty <sup>note 3)</sup>	0 to 100% (unit: 1%)		

Notes:

- 1) This value is effective when the input time constant (filter) setting was set to "No setting".
- 2) If interrupts are used at the 1/unit setting, the interrupt from the external input terminal B1 (X8) or the interrupt program from the comparison 0 (one of among INT16 to INT23) is booted.
- 3) At maximum load current and resistance load. There may be distortion in the output waveform, depending on the load current and type of load.



# Product types

## ■ CPU units (Built-in RAM)

Product name		Operation speed	Built-in RAM	Optional memory			Other		Product number	Part number
				Expansion RAM	ROM	IC memory card	Clock/calendar	Comment memory		
FP2	Standard type CPU unit	From 0.35 μs	16 k steps <sup>note 1)</sup>	Available	Available	Not available	Available <sup>note 2)</sup>	Available <sup>note 3)</sup>	FP2-C1	AFP2211
	CPU unit 64-point input			(See below.)	(See below.)				FP2-C1D	AFP2212
	CPU unit with S-LINK								FP2-C1SL	AFP2214
FPSH	Standard type CPU unit	From 0.03 μs	60 k steps	Not available	Available (See below.)	Not available	Available (Built-in)	Available (Built-in)	FP2-C2	AFP2231
	CPU unit with IC memory card interface		60 k steps	Not available	Available (Built-in)	Available (See below.)	Available (Built-in)	Available (Built-in)	FP2-C2P	AFP2235
	CPU unit with IC memory card interface		120 k steps	Not available	Available (Built-in)	Available (See below.)	Available (Built-in)	Available (Built-in)	FP2-C3P	AFP2255

Notes: 1) For FP2 CPU unit, the capacity can be expanded up to 32 k steps using the expansion RAM of the optional memory.  
 2) The expansion memory unit (optional memory) with clock/calendar function is required for FP2 CPU unit.  
 3) The expansion memory unit (optional memory) with comment input function is required for FP2 CPU unit.

## ■ Optional memories for FP2

Product name		Function				Product number	Part number
		Comment input	Clock/calendar	Expansion RAM	ROM socket		
For FP2	Expansion memory unit	Available	Available	Not available	Not available	FP2-EM1	AFP2201
		Available	Available	Available	Not available	FP2-EM2	AFP2202
		Available	Available	Available	Available	FP2-EM3	AFP2203
		Not available	Not available	Available	Available	FP2-EM6	AFP2206
		Not available	Not available	Not available	Available	FP2-EM7	AFP2207
	F-ROM	FLASH-ROM for program copy and ROM operation. Equivalent to SST-29EE010-120-4C-PH Enables writing with the programming tool when attached to the CPU unit.				FP2-EM4	AFP2204
EP-ROM	EP-ROM for program storage and ROM operation. Equivalent to M27C1001-12F1 A commercially available ROM writer is required.				FP2-EM5	AFP2205	

## ■ Optional memories for FP2SH

Product name		Specification	Part number
ROM for FP2SH AFP2231	Expansion memory unit	Socket for fitting ROM to the CPU unit	AFP2207
	F-ROM	FLASH-ROM for program copy and ROM operation. Equivalent to SST-29EE020-150-4C-PH Enables writing with the programming tool when attached to the CPU unit.	AFP5208
	EP-ROM	EP-ROM for program storage and ROM operation. Equivalent to M27C2001-150F1. A commercially available ROM writer is required.	AFP5209
IC memory card (Small PC card) for FP2SH CPU unit with IC memory card interface	F-ROM	Backup unnecessary. Perfect for program memory Used for readout when using data memory.	AIC50020
	SRAM	Perfect for data memory Can also be used for program backup. Battery backups.	AIC52000

Note: Please refer to "FPΣ Product Types" for FP Memory Loader.

## ■ Backplane

Product name		Specification	Product number	Part number
FP2 Backplane	Conventional type	5-module type (for basic)	FP2-BP05	AFP25005
		7-module type (for basic and expansion)	FP2-BP07	AFP25007
		9-module type (for basic and expansion)	FP2-BP09	AFP25009
		12-module type (for basic and expansion)	FP2-BP12	AFP25012
		14-module type (for basic and expansion)	FP2-BP14	AFP25014
	H type	8 slots (for basic )	FP2-BP11MH	AFP25011MH
		8 slots (for expansion)	FP2-BP10EH	AFP25010EH
FP2 Expansion cable		0.6 m	FP2-EC	AFP2510
		2 m	FP2-EC2	AFP2512

## ■ Power supply unit

Product name	Specification	Product number	Part number
FP2 Power supply unit	Input: 100 to 120 V AC, Output: 2.5 A	FP2-PSA1	AFP2631
	Input: 200 to 240 V AC, Output: 2.5 A	FP2-PSA2	AFP2632
	Input: 100 to 240 V AC, Output: 5 A	FP2-PSA3	AFP2633
	Input: 24 V AC, Output: 5 A	FP2-PSD2	AFP2634

## ■ I/O units

Product name	Type	Number of point	Connection method	Specification	Product number	Part number
FP2 Input unit	DC input	16 points	Terminal	12-24V DC	FP2-X16D2	AFP23023
		32 points	Connector	24V DC	FP2-X32D2	AFP23064
		64 points	Connector	24V DC	FP2-X64D2	AFP23067
FP2 Output unit	Relayoutput	6 points	Terminal	5 A, 2 points per one common	FP2-Y6R	AFP23101
		16 points	Terminal	2 A, 8 points per one common	FP2-Y16R	AFP23103
	Transistor output NPN	16 points	Terminal	0.5A (12-24V DC), 0.1A (5V DC)	FP2-Y16T	AFP23403
		32 points	Connector	0.1A (12-24V DC), 50mA (5V DC)	FP2-Y32T	AFP23404
	Transistor output PNP	64 points	Connector	0.1A (12-24V DC), 50mA (5V DC)	FP2-Y64T	AFP23407
		16 points	Terminal	0.5A (12-24V DC), 0.1A (5V DC)	FP2-Y16P	AFP23503
		32 points	Connector	0.1A (12-24V DC), 50mA (5V DC)	FP2-Y32P	AFP23504
		64 points	Connector	0.1A (12-24V DC), 50mA (5V DC)	FP2-Y64P	AFP23507
FP2 I/O mixed unit	DC input, Transistor output NPN	Input 32 points	Connector	Input 24 V DC Output 0.1 A (12 to 24 V DC), 50 mA (5 V DC)	FP2-XY64D2T	AFP23467
		Output 32 points		Input 24 V DC Output 0.1 A (12 to 24 V DC), 50 mA (5 V DC) with on pulse catch input	FP2-XY64D7T	AFP23477
	DC input, Transistor output PNP	Input 32 points	Connector	Input 24 V DC Output 0.1 A (12 to 24 V DC), 50 mA (5 V DC)	FP2-XY64D2P	AFP23567
		Output 32 points		Input 24 V DC Output 0.1 A (12 to 24 V DC), 50 mA (5 V DC) with on pulse catch input	FP2-XY64D7P	AFP23577

Note: Pressure welding socket is supplied. A special tool (Part number AXYS2000) is needed for connection. Please purchase separately if you are using a terminal or flat cable socket.

## ■ Maintenance parts

Product name	Specification	Part number
Battery	For FP2, button type battery, CR2450 or equivalent	AFC8801
Dummy unit	For FP2SH CPU unit, battery with cable	AFP8801
	For blank slot	AFP2300



## Intelligent units for remote I/O control

Product name	Specification	Controllable I/O points	Product number	Part number
FP2 Multi-wire link unit	Can connect as the remote I/O system MEWNET-F master station. Perfect for remote I/O systems using many points	Max. 2048 points per one unit	FP2-MW	AFP2720
FP2 CPU unit with S-LINK	Direct connection to SUNX Co., Ltd., S-LINK reduced-wiring system CPU unit with 128 points x 2 channels	256 points at S-LINK section	FP2-C1SL	AFP2214
FP2 S-LINK unit	Direct connection to SUNX Co., Ltd., S-LINK reduced-wiring system CPU unit with 128 points x 2 channels	128 points per one unit	FP2-SL2	AFP2780

## Intelligent units for analog I/O

Product name	Specification	Number of I/O points	Product number	Part number
FP2 Analog input unit	FP2-AD8VI Not insulated Voltage: 1 to 5 V, -10 to +10 V Current: 4 to 20 mA, -20 to +20 mA	Analog input: 8 channels	FP2-AD8VI	AFP2400L
	FP2-AD8X Insulated Voltages, currents, thermocouples, resistance thermometer devices	Analog input: 8 channels	FP2-AD8X	AFP2401
	FP2-RTD R.T.D. type: Pt 100, JPt 100, JPt 1000 type	R.T.D. input: 8ch	FP2-RTD	AFP2402
FP2 Analog output unit	Voltage range: -10 to +10 V Current range: 0 to 20 mA Resolution: 1/4096	Analog input: 4 channels	FP2-DA4	AFP2410

## Positioning unit, High-speed counter unit and Pulse I/O unit

Product name	Specification			Product number	Part number
	Output type	Number of axes controlled	Speed command		
FP2 Positioning unit RTEX		2 axes		FP2-PN2AN	AFP243610
		4 axes		FP2-PN4AN	AFP243620
		8 axes		FP2-PN8AN	AFP243630
Control Configurator PM	Tool software for positioning unit RTEX (English)			-	AFPS66510
FP2 Positioning unit Multifunction type <sup>note 3)</sup>	Transistor	2 axes, independent	1 pps to 500 kpps	FP2-PP21	AFP2432
		4 axes, independent		FP2-PP41	AFP2433
	Line drive	2 axes, independent	1 pps to 4 Mpps	FP2-PP22	AFP2434
		4 axes, independent		FP2-PP42	AFP2435
FP2 High-speed counter unit	8 interrupt inputs 4-channel high-speed counter 8 comparison outputs Input: 24 V DC Output: 5 to 24 V DC (0.1 A, 12 points/0.8 A, 4 points)		NPN output	FP2-HSCT	AFP2441
			PNP output	FP2-HSCP	AFP2451
FP2 Pulse I/O unit	8 interrupt inputs 4-channel high-speed counter 8 comparison outputs 4 pulse output channels 4 PWM output channels Input: 24 V DC Output: 5 to 24 V DC (0.1 A, 12 points/0.8 A, 4 points)		NPN output	FP2-PXYT	AFP2442
			PNP output	FP2-PXYP	AFP2452

Notes: 1) Pressure welding socket is supplied. A special tool (part no. AXYS2000) is needed for connection. Please purchase separately if you are using a terminal or flat cable socket.  
2) Please refer to "FPΣ Product Types" for Motor driver I/F terminal II.  
3) Previous FP2 positioning units AFP2430 (FP2-PP2) and AFP2431 (FP2-PP4) are not compatible with the multi-function type FP2 positioning unit. Please contact us.

## Serial communication and Link-related intelligent units

Product name	Specification	Number of channels	Product number	Part number
FP2 MEWNET VE-link unit	10 Mbps, 8,192 points/8,192 words, 99 units max. (VE mode), 254 units max. (FL-net), 2,500 m * For FP2SH (Cannot be used for FP2)	1ch	FP2-VE	AFP27960
FP2 ET-LAN unit	Ethernet-compatible unit for FP2/FP2SH To be mounted on the CPU backplane	1ch	FP2-ET1	AFP2790
Control Configurator ET	ET-LAN unit setting software (English)	-	-	AAFPS32510
FP2 Multi-wire link unit	For PLC links Compatible with MEWNET-W/MEWNET-W2	1ch	FP2-MW	AFP2720
FP2 Multi-communication unit	Up to two blocks to be attached can be selected among RS485, RS232C, and RS422 blocks. General-purpose serial communications, computer links, PLC links (MEWNET-W0)	2ch	FP2-MCU	AFP2465
RS232C block	(For the multi-communication unit) 230 kbps, 15 m max.	1ch	FP2-CB232	AFP2803
RS422 block	(For the multi-communication unit) 230 kbps, 1,200 m max.	1ch	FP2-CB422	AFP2804
RS485 block	(For the multi-communication unit) For PLC links (MEWNET-W0): 115 kbps, 16 stations, 1,200 m	1ch	FP2-CB485	AFP2805
FP2 Computer communication unit	For 1:1 communication between a PLC and a computer RS232C x 2 ch Connection with a control panel is also possible.	2ch	FP2-CCU	AFP2462
FP2 Serial data unit	For communications with general-purpose RS232C devices The serial input/output is executed by sequence commands.	2ch	FP2-SDU	AFP2460

## Control FPCWIN GR for Windows

Product name	Type	Part number	Applicable PLC										
			FP-X	FPΣ	FP0 FP-e	FP0 10k	FP1*1	FP2	FP2SH	FP-M*1	FP3*1 FP10SH		
FPCWIN GR for Windows	English: Full type	CD-ROM for Windows	AFPS10520	A	A	A	A	A	A	A	A	A	A
	English: Small type	CD-ROM for Windows	AFPS11520	A	A	A	A	A	N/A	N/A	A	A	N/A
	English: Ver. up type	CD-ROM for Windows	AFPS10520R										
	Chinese	CD-ROM for Windows	AFPS10820	A	A	A	A	A	A	A	A	A	A
	Chinese: Ver. up type	CD-ROM for Windows	AFPS10820R										
	Korean	CD-ROM for Windows	AFPS10920										

\*1 FP1, FP-M, and FP3/FP10SH have been discontinued.

A: Available, N/A: Not available

## Control FPCWIN Pro (IEC61131-3 compliant Windows version software)

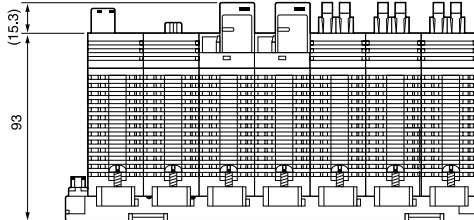
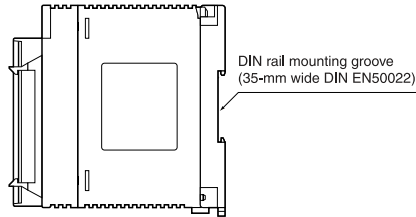
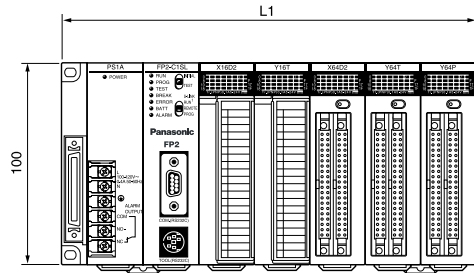
Product name	Type	Part number	Applicable PLC										
			FP-X	FPΣ	FP0 FP-e	FP0 10k	FP1*1	FP2	FP2SH	FP-M*1	FP3*1 FP10SH		
FPCWIN Pro for Windows	English: Full type	CD-ROM for Windows	AFPS50550	A	A	A	A	A	A	A	A	A	A
	English: Small type	CD-ROM for Windows	AFPS51550	A	A	A	A	A	N/A	N/A	A	A	N/A

\*1: Ver. 5.1 or later will be supported soon.

\*2: FP1, FP-M, and FP3/FP10SH have been discontinued.

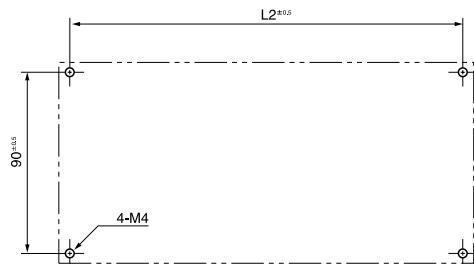
A: Available, N/A: Not available

# FP2/FP2SH Dimensions



\* The illustration shows a conventional 7-module type backplane.

Mounting dimension (Tolerance:  $\pm 1.0$ )



### ● Conventional backplanes

	5-module	7-module	9-module	12-module	14-module
L1 (mm)	140	209	265	349	405
L2 (mm)	130	199	255	339	395

Note: The 5-module type does not have an expansion connector.

### ● H type backplane

	11-module (master backplane)	10-module (expansion backplane)
L1 (mm)	349	349
L2 (mm)	339	339

Contact for inquiries about MINAS AC servomotor series: Motor Company, Matsushita Electric Industrial Co., Ltd.  
 Telephone: +81-72-870-3057 Facsimile: +81-72-870-3120 <http://panasonic.co.jp/motor/eng/>

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