Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Panasonic
ideas for life

Advantages of PLC control

Powerful hardware solutions

Panasonic PLCs offer an outstanding price-performance ratio which incorporates numerous functions into a very compact body. Even in the smallest size they provide a powerful instruction set which allows the system to handle demanding tasks such as analog control, networking and positioning control.

Innovative programming software

Our PLC programming software Control FPWIN Pro was one of the first on the market conforming to the international standard IEC 61131-3. Numerous libraries that incorporate a lot of our know-how ensure the reusability of ready-made functions and function blocks and save time for programming and debugging.
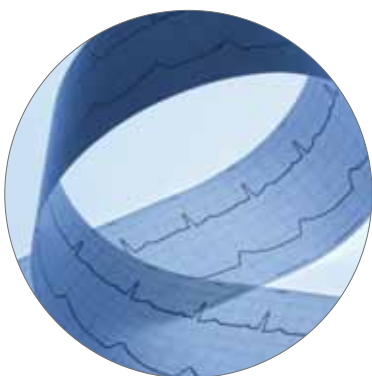
Long-life quality

As with all Panasonic products, the PLCs undergo extremely rigorous testing during development that far exceeds the demands that will actually be placed on them. This is a guarantee for the long life of the product in the application.

Benefit from good service

In addition to a comprehensive PLC range, Panasonic also offers the high-quality care demanded from a service-oriented company certified according to ISO 9001.
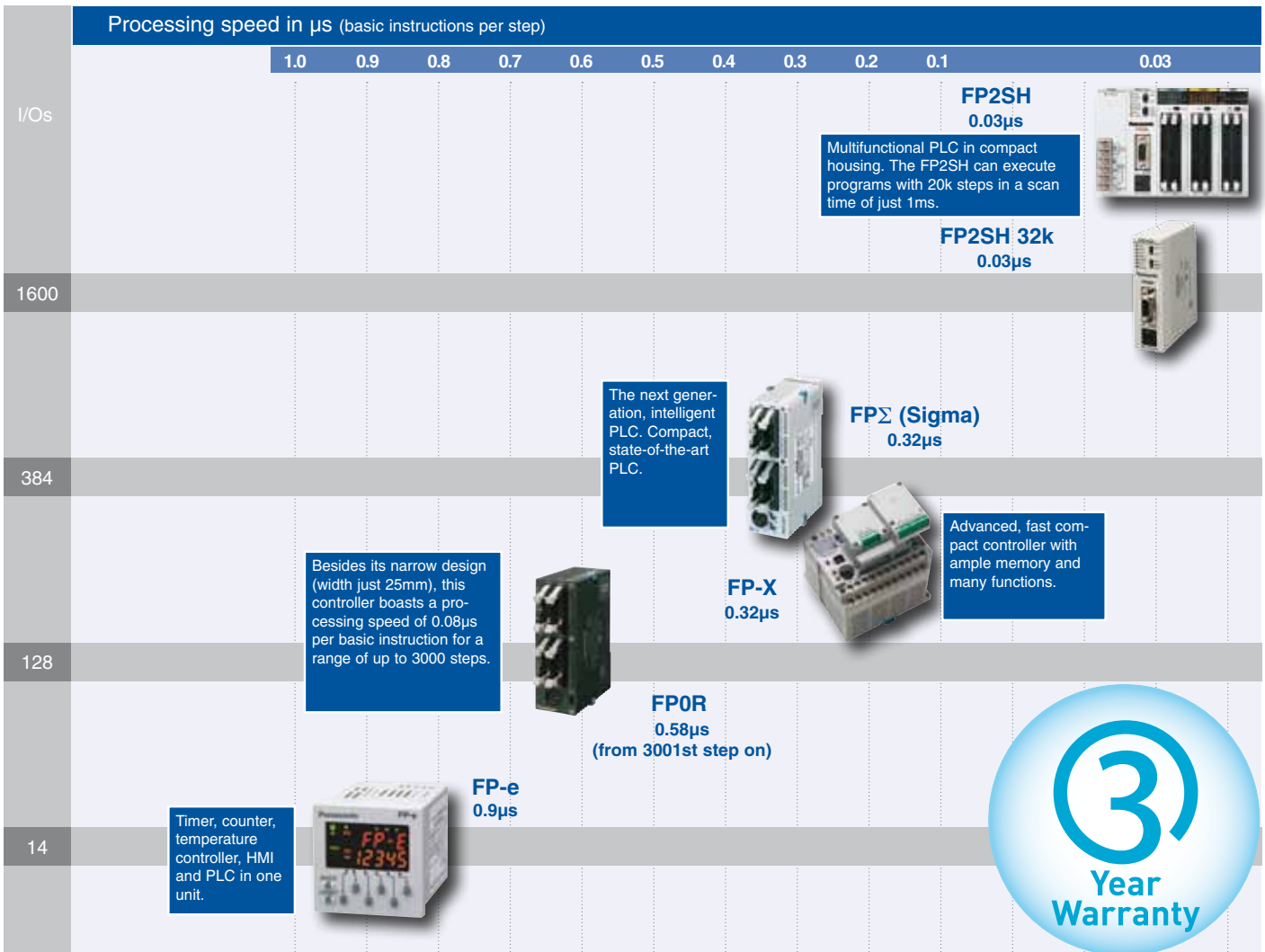Highly trained application engineers can provide custom designed systems. The sales staff regularly participates in hardware and software training courses.

Content

Overview

Processing speed in μs (basic instructions per step)

| I/Os | 1.0 | 0.9 | 0.8 | 0.7 | 0.6 | 0.5 | 0.4 | 0.3 | 0.2 | 0.1 | 0.03 |

FP2SH
0.03μs

Multifunctional PLC in compact housing. The FP2SH can execute programs with 20k steps in a scan time of just 1ms.

FP2SH 32k
0.03μs

1600

The next generation, intelligent PLC. Compact, state-of-the-art PLC.

FPΣ (Sigma)
0.32μs

384

Advanced, fast compact controller with ample memory and many functions.

Besides its narrow design (width just 25mm), this controller boasts a processing speed of 0.08μs per basic instruction for a range of up to 3000 steps.

FP-X
0.32μs

128

FP0R
0.58μs
(from 3001st step on)

FP-e
0.9μs

Timer, counter, temperature controller, HMI and PLC in one unit.

14

3 Year Warranty

3

Selection of products

Model	FP-e		FP0R			FPΣ (Sigma)		
Features	PLC + Display + Switch • All-in-one controller with six functions • Mountable in a 48mm square cut in a panel • 14 I/O points (input: 8, output: 6) • Can serve as a temperature controller with a thermocouple input • Motor control by the built-in pulse output • Heater control by the PWM output • Serial communications by the RS232C/RS485 port		Pocket-size ultra-compact controller ideal for use in extremely narrow spaces • Ultra-high processing speed of 80 nsec/step within range of 0 to 3000 steps • Wide selection of program capacity from 16k to 32k steps • Wide selection of the number of I/O points from 10 to 128 • Up to 24 thermocouple inputs connectable for multipoint temperature control • Multi-axis control available without expansion units • Battery-less backup of all data			High performance ultra-compact controller reliably supports the control of higher speed equipment with more functions featured • Excellent basic performance, including program capacity of 32k steps, operation speed of 0.32µs/step and 384 I/O points • Built-in two-axis 100kHz pulse output capable of interpolation control • Positioning units capable of controlling network servomotors • Can be equipped with up to three ports for general-purpose serial communication without expansion unit • Compatible with PROFIBUS, DeviceNet, CANopen and other open field networks		
CPU (control unit) model	Basic type	Thermocouple input type	C10/C14/C16	C32	T32/F32	C24	C28	C32
Maximum controllable I/O points	14 points	12 points	106 to 112 points	128 points		376 points	380 points	384 points
Connectable expansion units	N/A		3 units			7 units (right: 3 left: 4)		
Program capacity	2.7k steps		16k steps	32k steps		32k steps		
Comment memory	N/A		A (built-in memory)			A (built-in memory)		
Operation speed	0.9µs/step (basic instructions)		0.08 - 0.58µs/step (basic instructions)			0.32µs/step (basic instructions)		
Data registers	1660 words		12k words	32k words		32,765 words		
Internal relays	1008 points (63 words)		4096 points (256 words)			4096 points (256 words)		
Network compatibility — Ethernet	A (with FP Web-Server 2)		A (with FP Web-Server 2)			A (with FP Web-Server 2)		
PROFIBUS DP	N/A		Slave			A (master, slave)		
DeviceNet	N/A		N/A			A (master, slave)		
CANopen	N/A		N/A			A (master, slave)		
PROFINET IO	N/A		N/A			A (slave)		
Modbus-RTU	A (RS485 type)		A (RS232C)			A (communication cassette/unit)		
CC-Link	N/A		A (slave, CC-Link unit)			A (slave, CC-Link unit)		
Computer link (MEWTOCOL-COM)	A (Tool port, COM port)		A (Tool port, COM port)			A (Tool port, communication cassette)		
Program controlled	A (COM port)		A (Tool port, COM port)			A (Tool port, communication cassette)		
PLC Link — W	N/A		N/A			N/A		
PLC Link — W0	N/A		A			A (RS485 communication cassette)		
PLC Link — W2	N/A		N/A			N/A		
PLC Link — VE	N/A		N/A			N/A		
Remote I/O (MEWNET-F)	N/A		A (64-point slave stations, I/O link unit)			A (64-point slave stations, I/O link unit)		
S-LINK	N/A		A (FP0-SL1 control unit)			A (S-LINK unit)		
Motor control — Built-in pulse output	2 axes/10kHz	2 axes/5kHz	4 axes/50kHz (C16,C32,T32, F32)			2 axes/100kHz (transistor output type)		
Positioning unit	N/A		N/A			2-axis/4-axis type unit, up to 16 axes		
PWM output	2 points/1kHz/1000 resolution		4 points/6Hz to 4.8kHz (C16, C32, T32, F32)			2 points/12kHz/1000 resolution (transistor output type)		
High-speed counter	4 ch/10kHz	4 ch/5kHz	single phase: 6ch/50kHz; 2-phase: 3ch/15kHz			4 ch/50kHz		
Channels — Voltage/current input	N/A		8 ch/unit	2-ch input and 1-ch output mixed unit		8 ch/unit	2-ch input and 1-ch output mixed unit	
Voltage/current output	N/A		4 ch/unit			4 ch/unit		
Temperature input	N/A	2 ch (thermocouple)	8 ch thermocouple unit, 6 ch RTD unit			8 ch thermocouple unit, 6 ch RTD unit, 2 thermistor inputs on the CPU		
Calendar timer (clock function)	A (calendar timer type)		A (T32 only)			A		
Others	Front panel switch input: 8 points					Potentiometer input: 2 points		

Model	FP-X series										FP2SH
	FP-X				**FP-X0**						
	C14	C30	C38	C60	L14R	L30R	L40R	L40MR	L60R	L60MR	C2L / C2 / C2P / C3P
Features	High performance compact terminal-block type controller. Wide selection of add-on cassettes allows space-saving use of the controller for a variety of purposes • Up to three add-on cassettes can be attached to the top of the control unit. The unit is of the terminal block type, but is space-saving and allows a variety of applications • Ethernet cassette available for data collection • Built-in four-axis pulse output. Two axes for linear interpolation • Comment memory for simple maintenance work • USB port for direct connection to a PC				Body equipped with combined relay and transistor output. Super-high processing speed. Number of I/O points expandable up to 216 max.						Scan time: 1ms/20k steps. Advanced version of FP2 capable of ultra-high speed processing • Ultra-high speed model that shares units with FP2, ideal for high-speed control of electronic device manufacturing equipment • High program capacity of 120k steps • 32k, 60k step type also available • Compatible with Small PC Cards, which serve as a program backup or extended memory for processing a large volume of data • 8192 I/O points max. (remote I/O system)
CPU (control unit) model	C14	C30	C38	C60	L14R	L30R	L40R	L40MR	L60R	L60MR	C2L / C2 / C2P / C3P
Maximum controllable I/O points	328	352	360	382	14	30	40	40	60	60	2048 (8192 with remote I/O system)
Connectable expansion units	8 units + add-on cassettes (up to 3)				N/A		3 units				32 units (when the H type backplane is used)
Program capacity	16k steps	32k steps			2,5k		8k				32k / 60k / 120k steps
Comment memory	A (built-in memory)				A (built-in memory)						A (built-in memory)
Operation speed	0.32μs/step (basic instructions)				0.08μs/step (basic instructions)						0.03μs/step (basic instructions)
Data registers	12,285 words	32,765 words			2500 words		8192 words				10,240 words (Exc. file register. See the end of this table.)
Internal relays	4096 points (256 words)				1008 points		4096 points				14,192 points
Network compatibility – Ethernet	A (Ethernet communication cassette, FP Web-Server 2)				A (FP Web-Server 2)						A (ET-LAN unit)
Network compatibility – PROFIBUS DP	A (slave, FP0 DP-S unit)				A (slave, FP0 DP-S2 unit)						A (master, slave)
Network compatibility – DeviceNet	N/A				N/A						A (master, slave)
Network compatibility – CANopen	N/A				N/A						A (master, slave)
Network compatibility – PROFINET IO	N/A				N/A						A (slave)
Network compatibility – Modbus-RTU	A (communication cassette)				N/A		A	N/A	A	A	A (with library)
Network compatibility – CC-Link	A (slave, FP0 CC-Link unit)				N/A						N/A
Network compatibility – Computer link (MEWTOCOL-COM)	A (Tool port, communication cassette)				A						A (COM port, CCU, MCU)
Network compatibility – Program controlled	A (Tool port, communication cassette)				A						A (COM port, SDU, MCU)
Network compatibility – PLC Link – W	N/A				N/A						A (MW link unit)
Network compatibility – PLC Link – W0	A (RS485 communication cassette)				N/A		A	N/A	A	A	A (MCU)
Network compatibility – PLC Link – W2	N/A				N/A						N/A
Network compatibility – PLC Link – VE	N/A				N/A						A (VE link unit)
Network compatibility – Remote I/O (MEWNET-F)	A (64-point slave stations, FP0 I/O link unit)				A (FP0 I/O link unit)						A (Master: MW link unit) (Slave: RMS unit)
Network compatibility – S-LINK	N/A				N/A						A (S-LINK unit)
Motor control – Built-in pulse output	2 axes/100kHz + 2 axes/20kHz (transistor output type)				1 axis/20kHz	2 axes/20kHz	2 axis/50kHz				N/A
Motor control – Positioning unit	1 axis/100kHz (pulse I/O add-on cassette)				N/A						RTEX, multifunction type, interpolation type
Motor control – PWM output	4 points/12kHz/1000 resolution (transistor output type)				1-ch (1.6 kHz max.)	2-ch (1.6 kHz max.)	2-channel (3.0 kHz max.)				4 points/30kHz/100 resolution (Pulse I/O unit)
Motor control – High-speed counter	8 ch/50kHz				4 ch/20kHz		4 ch/50kHz				4 points/200kHz (FP2-HSCT, FP2-PXYT)
Channels – Voltage/current input	2 ch/cassette	2-ch input and 1-ch output mixed cassette			N/A		2-ch input/ voltage, poti a. thermistor)				8 ch (FP2-AD8VI, FP2-AD8X)
Channels – Voltage/current output	2 ch/cassette				N/A						4 ch (FP2-DA4)
Channels – Temperature input	2 ch thermocouple/input cassette				N/A		2-ch thermistor if voltage input not used				8 (FP2-AD8X, FP2-RTD)
Clock/calendar function	A (MRTC cassette) / A (built-in type) for C38				N/A		A (built-in type)				A (built-in type)
Others	With a USB port (C30/C60)										File register (32,765 words, 3 banks)

Compatible network diagram

Ethernet (Information)

Ethernet

FP2SH FP0R FPΣ (Sigma) FP-X Other company's PLC

Open field networks (Control)

PROFIBUS-DP	CANopen
DeviceNet	FL-net

Connectable as masters

PROFIBUS-DP	CANopen	PROFINET IO
DeviceNet	CC-Link	

For details, see page 7.

Connectable as slaves

FP2SH + FMU FPΣ (Sigma) + FMU

FP2SH FPΣ (Sigma) FP2SH FP-X FP0R

Matsushita protocol PLC link (Control)

MEWNET-VE MEWNET-W0 MEWNET-W2 MEWNET-W

FP2SH FP2SH FP-X FPΣ (Sigma) FP2SH FP0R FP2SH FP2SH FP2SH FP2SH

C-NET (RS485) 1:N serial communications

C-NET

FP-X FPΣ (Sigma) FP0R FP-e KT Temperature Controller KW Eco-Power Meter

RS232C 1:1 serial communications

RS232C

GT Display PV Imagechecker

Compatible network table

Network		Applications and features	Trans-mission cable	Trans-mission speed	Trans-mission distance	Supported function				Compatible PLCs					
						PLC Link	Master/ Slave	Remote I/O systems	MEW-TOCOL-COM	FP2SH	FP-X	FP-X0	FPΣ (Sigma)	FP0R	FP-e
	Ethernet	• Connection to PCs or workstations by a standard LAN, Ethernet • For data collection and operation control	UTP cable or transceiver cable	10Mbit/s / 100Mbit/s	Max. distance 100m	A	A	N/A	N/A	A	A (x1)	A (x1)	A	A	A
Open networks	CC-Link	• Capable of 10 Mbit/s high-speed or 1200m long distance communications	CC-Link dedicated cable (twisted pair cable)	10Mbit/s (100m) 5Mbit/s (160m) 2.5Mbit/s (400m) 625kbit/s (900m) 156kbit/s (1200m)		N/A	A	A	N/A	N/A	A	N/A	A	A	N/A
	PROFIBUS-DP	• One of the world's most popular open fieldbuses • 12Mbit/s high-speed communications • Transmission up to 12km is possible by using a repeater	Type A cable for PROFIBUS-DP (twisted pair cable)	12Mbit/s	12km when using a repeater	N/A	A	A	N/A	A (master/ slave)	A (x2)	A (x2)	A (master/ slave)	A (slave)	N/A
	DeviceNet	• Developed based on CAN, as popular as PROFIBUS. • Master-slave configuration as well as peer-to-peer configuration is possible	Dedicated 4-wire shielded cable (Thick/ Thin)	500kbit/s (100m) 250kbit/s (250m) 125kbit/s (500m)		N/A	A	N/A	N/A	A (master/slave)	N/A	N/A	A (master/ slave)	N/A	N/A
	CANopen	• As with DeviceNet, CAN-based industrial network • Widespread, particularly in Europe 128-station multi-master-slave communications	Twisted-pair shielded cable Also compatible with four-wire power bus cables	1Mbit/s (25m) to 10kbit/s (500m)		N/A	A	N/A	N/A	A (master/slave)	N/A	N/A	A (master/ slave)	N/A	N/A
	Profinet IO	• Real time, open industrial Ethernet communication • Three types are classified: IO controllers, IO devices and IO supervisors	Standard PROFINET Ethernet cable with standard RJ45 connector	Full duplex, 100Mbit/s		N/A	A (slave only)	N/A	N/A	A (device)	N/A	N/A	A (device)	N/A	N/A
PLC links	MEWNET-VE	• 10-Mbit/s high-speed large-capacity PLC link • 4 layers, 254 nodes, 8k-bit link relay, 8k-word link data	UTP-cable or transceiver cable	10Mbit/s	Max. distance 100m	A	N/A	N/A	N/A	A	N/A	N/A	N/A	N/A	N/A
	MEWNET-W0	• PLC link capable of mixed connection of FP2SH, FP2, FP-X, and FPΣ (Sigma) • Distributed control allows target PLCs to be selected	Twisted-pair cable	115 kbit/s	1200m	A	N/A	N/A	N/A	A	A	A (x3)	A	N/A	N/A
	MEWNET-W2	• 32 stations, 1200m max. • 4k bit link relay, 4k word link data	Twisted-pair cable	500kbit/s (800m) 250kbit/s (1200m)		A	N/A	N/A	N/A	A	N/A	N/A	N/A	N/A	N/A
	MEWNET-W	• 16 stations, 800m max. • 1k bit link relay, 128 word link data	Twisted-pair cable	500kbit/s	800m	A	N/A	N/A	N/A	A	N/A	N/A	N/A	N/A	N/A
Serial communications	C-NET (RS485)	• Capable of 1:N MEWTOCOL-COM connections) for small-size PLCs and other RS485 devices	VCTF or twisted-pair cable	19,200bit/s / 9600bit/s	1200m	N/A	A	N/A	A	A	A	A (x3)	A	A	A
	CCU (RS232C)	• 1:1 computer links (MEWTOCOL communications) by RS232C • For communications with GT Displays, PV Image-checker, etc.	RS232C	19,200bit/s / 9600bit/s	15m	N/A	A	N/A	A	A	A	A	A	A	A
	Modem (phone line)	• Capable of monitoring PLCs in remote locations or updating programs via the public telephone line	RS232C and phone line	56kbit/s	Up to 20km	A	A	N/A	A	A	A	N/A	A	A	A

Notes:
1) : FP Web-Server 2
2) : slave, FP0 DP-S unit
3) : for L40MR/L60MR

N/A: not available   A: available

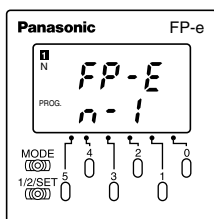# Timer, counter, hour meter, temperature controller & PLC in one unit

Features

- 5-character, 2-line, 3-color display
- Front operation switch
- Easy programming using wizard
- Smooth debug
- Panel mounted type
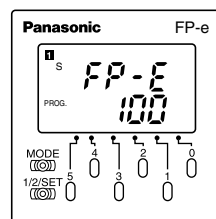
Display modes and functions

N mode

(Normal mode)

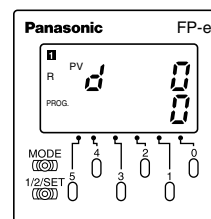Displays any characters and numerical values, and numerical data can be changed.

S mode

(Switch mode)

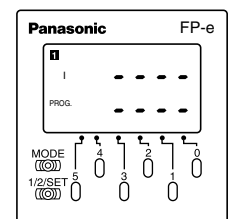Can also display characters and numerical values. Operation switches can be used for input.

R mode

(Register mode)

Operation memory in the controller can be monitored and its data can be changed.

I mode

(I/O monitor mode)

I/O status (X, Y) in the controller can be displayed.

Specifications

| Performance specifications					
Model	AFPE224300 Basic type (RS232C)	AFPE224302 Basic type (RS485)	AFPE224305 RTC type (RS232C)	AFPE214325 Thermocouple input type (RS232C)	AFPE214322 Thermocouple input type (RS485)
Number of I/O points — Control unit	14 points [Input: 8, Output: 6 (Tr. NPN: 5/Ry: 1)]			12 points [Input: 6, Output: 6 (Tr. NPN: 5/Ry: 1)]	
Number of I/O points — Front switch input	8 points				
Program memory — Built-in memory	Built-in EEPROM				
Program capacity	2720 steps				
Processing speed	0.9µs/step (for basic instruction)				
Clock/calendar function	–	Available (year, month, day, hour, minute, second and day of week). However, this can only be used when a battery has been installed.		–	
Battery life	–	220 days or more (actual usage value: approx. 870 days (25°C) (Periodic replacement interval: 1 year) (Value applies when no power is supplied at all.)		–	
Pulse catch input/ Interrupt input	6 points in total (X0 and X1: 50 µs, X2 to X5: 100 µs)				
COM port note	RS232C	RS485	RS232C	RS232C	RS485
Periodical interrupt	0.5ms to 30s				
Special functions — High speed counter * The combination of 1-phase x 2ch and 2-phase x 1ch is also possible for the high-speed counter	Counter mode: Addition/subtraction (1-phase) - input points: 4ch (max.)				
Special functions — Pulse output — Output points	2 independent points (Y0 and Y1) (No interpolation function)				
Special functions — Pulse output — Output frequency	40Hz to 10kHz (Y0/Y1: 1-point) 40Hz to 5kHz (Y0/Y1: 2-points)			40Hz to 5kHz (1-point) 40Hz to 2.5kHz (2-points)	
Special functions — PWM output — Output points	2 points (Y0 and Y1)				
Special functions — PWM output — Output frequency	Frequency: 0.15Hz to 1kHz Duty: 0.1% to 99.9%				

Optimized for a wide range of applications

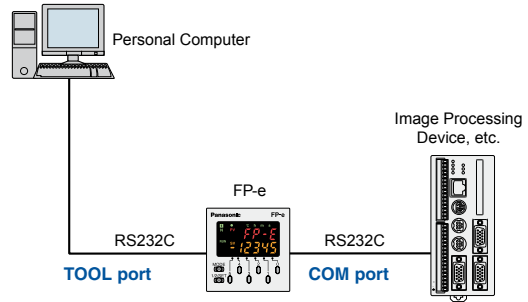## Equipped with RS485 and RS232C interfaces

Up to 99 MEWTOCOL-COM stations possible with RS485 (RS485 type)

Up to 32 computer link stations are possible using a C-NET adapter and up to 99 are possible using a commercially available adapter. You can easily monitor operation status or perform control.
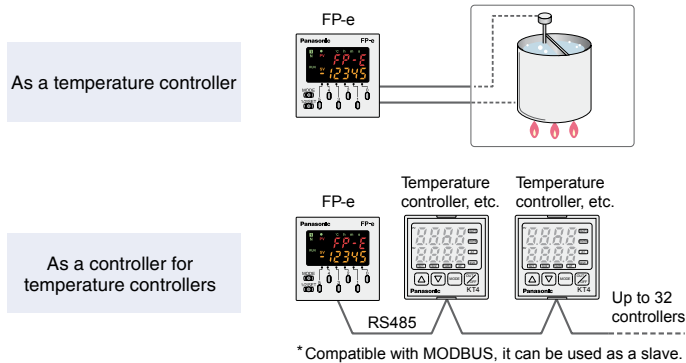
MEWTOCOL-COM

Personal Computer

RS232C

FP-e   FP-e   FP-e

Commercially available adapter

RS485
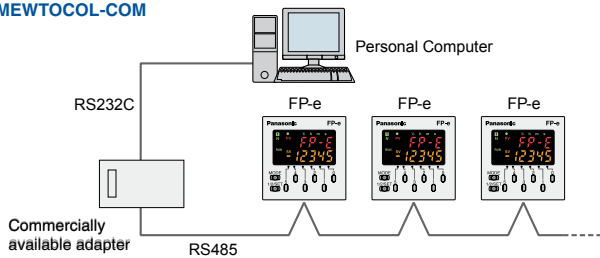
With RS232C, communication possible with up to two ports (RS232C type)

Personal Computer

Image Processing Device, etc.

FP-e

RS232C

TOOL port

RS232C

COM port

Can even handle temperature control

Two-point K-type thermocouple (-30 to 300°C) connection possible (equipped with thermocouple input)

Can be used in place of a temperature controller or used to control them.

As a temperature controller

FP-e

As a controller for temperature controllers

FP-e   Temperature controller, etc.   Temperature controller, etc.

RS485   Up to 32 controllers

*Compatible with MODBUS, it can be used as a slave.

PID instruction function

High-performance temperature control can be achieved with the PID instruction.

Y0   PID instruction

Heater

A0   Thermocouple input
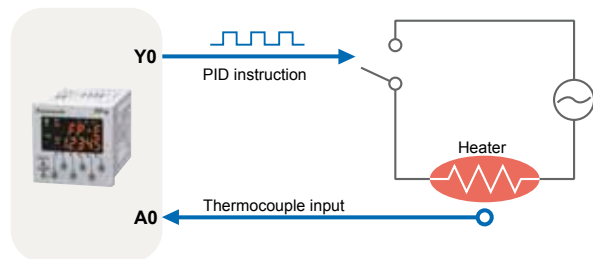
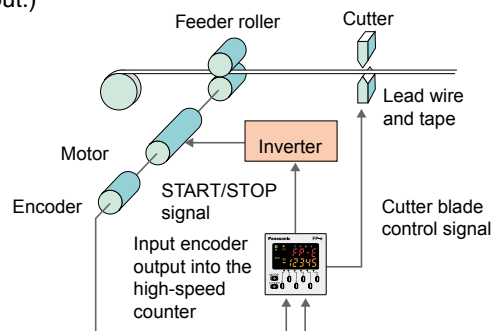## Equipped with high-speed counter for support of 2-axis independent positioning
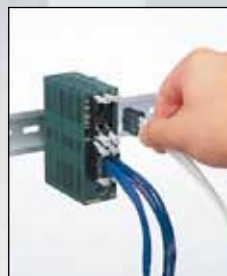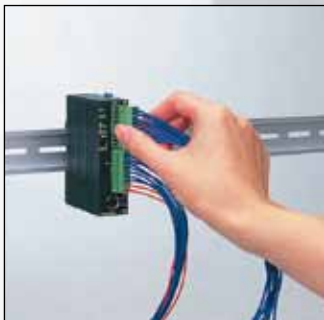
Pulse output function

The unit comes equipped with 2 channels for pulse output of up to 10kHz pulses. Since these two channels can be separately controlled, the FP-e is also suitable for 2-axis independent positioning.

Y0   Pulse output
Y2   CW/CCW output
Motor driver 1

Y1   Pulse output
Y3   CW/CCW output
Motor driver 2

Stepping motor Servo motor
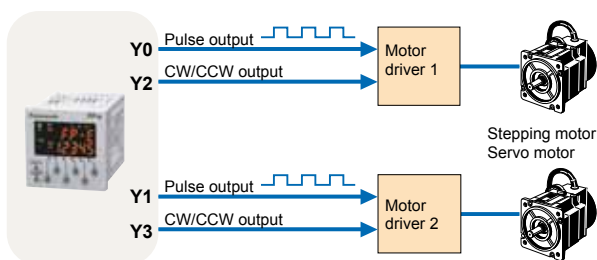
High-speed counter function

In single phase, the 4-channel total is 10kHz, and in 2-phase the 2-channel total is 2kHz total speed, making the FP-e suitable for inverter control, etc. (One half for the type with thermocouple input.)

Feeder roller   Cutter

Lead wire and tape

Motor   Inverter

Encoder   START/STOP signal

Input encoder output into the high-speed counter

Cutter blade control signal

FP0R series: The ultra-compact PLCs

Features

- Ultra high-speed processing enhances productivity
- An ultra high speed of 0.08µs/step for basic instructions for the first 3000 steps and 0.58µs/step thereafter. The FP0R is ideal for positioning and process automation applications, e.g. in labeling machines.
- Large programming capacity of 16k or 32k steps
- Generous data register of up to 12k or 32k words
- Independent comment memory for documenting purposes
- USB2.0 port provides high-speed program transfer
- The new F-type FP0R provides maintenance-free and complete backup of all data without requiring a battery. Industry's first!
- Highly advanced, built-in positioning functions for up to 4 axes (servo/stepping motor)
- Jog operation
- Individual settings for acceleration and deceleration for ramp functions
- Target speed can be changed by an external signal input during jog operation or trapezoidal control
- Can read encoder signals of up to 50kHz (pulse frequency measurement)
- 6-channel high-speed counters and 4-axis pulse outputs can be used simultaneously
- FP0R units provide various kinds of networking communication using a built-in interface or expansion units
- Ethernet (Modbus TCP/IEC60870)

- Profibus
- CC-Link
- MEWNET-W0
- C-NET
- RS232C + RS484 serial communication
- FP0R – same ultra compact size as FP0
- FP0R – fully compatible with FP0 units

Spezifications for the CPU types of the FP0R

CPU type	C10 series (relay output)	C14 series (relay output)	C16 series (transistor output)	C32 series (transistor output)	T32 series (transistor output)	F32 series (transistor output)
Number of inputs	6	8	8	16	16	16
Number of outputs	4 relay	6 relay	8 NPN/PNP	16 NPN/PNP	16 NPN/PNP	16 NPN/PNP
Output capacity	2A	2A	0.2A	0.2A	0.2A	0.2A
Digital I/O (max.)	106	110	112	128	128	128
Internal relays (R)	4096					
Processing speed	Up to 3000 steps: 0.08µs/step (basic instruction) After 3000 steps: 0.58µs/step (basic instruction)					
Program memory	EEPROM (no back-up battery required)					
Program capacity	16,000 steps			32,000 steps		
Data register (DT)	12,315 words			32,765 words		
Memory backup (Flash ROM)	Backup with F12, P13 instruction for all areas					
	Auto backup when power is off: Counters: 16 Internal relays: 128 Data register: 315 words					--
Memory backup (RAM)	--				Backup of the entire area by a built-in secondary battery	Backup of the entire area by FRAM (without the need for a battery)
High-speed counter	Single-phase: 6 channels (50kHz); 2-phase: 3 channels (15kHz)					
Pulse output	--		4 channels (50kHz), two channels can be controlled individually			
PWM output	--		4 channels (6Hz to 4.8kHz)			
RS232C interface	Up to two serial interfaces					
RS485 port	One RS485 port is mounted on each of C10MRS, C14MRS, C16MT, C16MP, C32MT, C32MP, T32MT, T32MP, F32MT, F32MP type (3P terminal block) Transmission speed (Baud rate): 19,200bits/s 115,200bits/s, Transmission distance: 1200m 9.843ft. Communication method: half duplex					
Clock/calendar function	--				Available	--
Other functions	Rewriting in RUN mode, download in RUN mode (incl. comments) 8-character password setting, and program upload protection					
Operating voltage	24V DC (± 10%)					

A wide variety of both single and combined units

Control units

Relay output type

Transistor output type

10 points	
Input 6 points	Output 4 points
AFP0RC10RS AFP0RC10CRS with 2nd RS232C AFP0RC10MRS with RS485	

14 points	
Input 8 points	Output 6 points
AFP0RC14RS, AFP0RC14CRS with 2nd RS232C AFP0RC14MRS with RS485	

16 points	
Input 8 points	Output 8 points
AFP0RC16P (PNP), AFP0RC16T (NPN) AFP0RC16CP (PNP), AFP0RC16CT (NPN) with 2nd RS232C AFP0RC16MT, AFP0RC16MP with RS485	

32 points	
Input 16 points	Output 16 points
AFP0RC32P (PNP), AFP0RC32TC (NPN) AFP0RC32CP (PNP), AFP0RC32CT (NPN) with 2nd RS232C AFP0RC32MT, AFP0RC32MP with RS485	

32 points (T-type)	
Input 16 points	Output 16 points
AFP0RT32CP (PNP), AFP0RT32CT (NPN) with 2nd RS232C AFP0RT32MT, AFP0RF32MT with RS485	

32 points (F-type)	
Input 16 points	Output 16 points
AFP0RF32CP (PNP), AFP0RF32CT (NPN) with 2nd RS232C AFP0RT32MP AFP0RF32MP with RS485	

FP Memory Loader
AFP8670

- Read or write programs(up to 60k steps) from or to a PLC
- Personal computer is not required
- Applicable with FP0R, FP-e, FPΣ (Sigma), FP-X and FP2SH

S-LINK MASTER CPU
FP0-SL1

- Control of 64 input and 64 output points is possible with one unit
- Simple connection of S-LINK I/O devices
- Sensors can be easily connected with plug-in connections

Up to three expansion units can be directly connected without connection cables

The expansion unit can be attached easily without any cables to the control unit. Special expansion cables, backplanes, and so forth, are unnecessary as the expansion unit employs a stacking system that uses expansion connectors and lock levers on the surface of the unit itself.

Control unit ◀ Expansion unit ◀ Expansion unit ◀ Expansion unit (Up to 3 units can be added.)
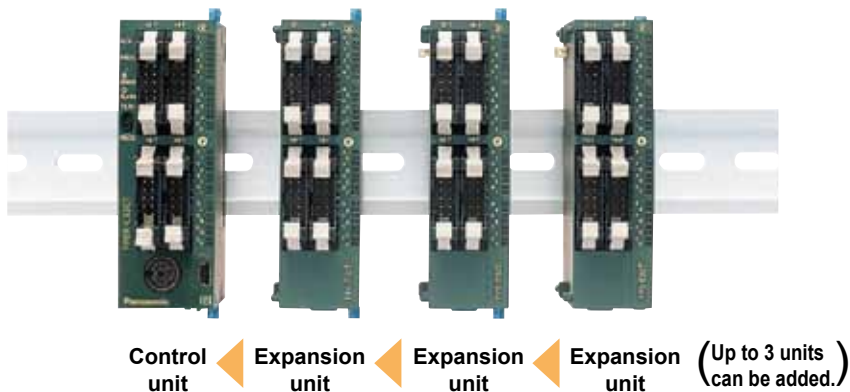
A maximum of 3 expansion units can be added to the control unit

Digital I/O units

Relay output type

8 points		16 points		32 points	
Input 4 points	Output 4 points	Input 8 points	Output 8 points	Input 16 points	Output 16 points
AFP0RE8RS		AFP0RE16RS		FP0-E32RS	

8 points
Output 8 points
AFP0RE8YRS

Input only type

8 points	16 points
Input 8 points	Input 16 points
AFP0RE8X	AFP0RE16X

Transistor output type
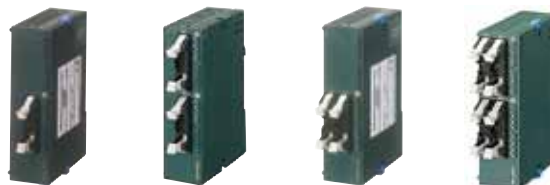
8 points	16 points		16 points	32 points	
Output 8 points	Input 8 points	Output 8 points	Output 16 points	Input 16 points	Output 16 points
AFP0RE8YP (PNP) AFP0RE8YT (NPN)	AFP0RE16P (PNP) AFP0RE16T (NPN)		AFP0RE16YP (PNP) AFP0RE16YT (NPN)	AFP0RE32P (PNP) AFP0RE32T (NPN)	

Analog I/O units

3 points		4 points	4 points	8 points
Input 2 points	Output 1 point	Output 4 points	Output 4 points	Input 8 points
FP0-A21		FP0-A04I	FP0-A04V	FP0-A80

- Input (12 bit): ± 10V, 0 – 5V, 0 – 20mA
- Output (12 bit): ± 10V, 0 – 20mA

FP0-A04I	FP0-A04V	FP0-A80
– –	– –	± 10V, ± 100mV 0 – 5V, 0 – 20mA
4 – 20mA	± 10V	–

Temperature control units

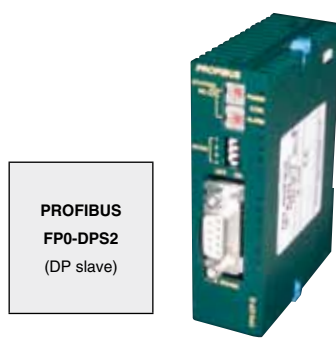| 4 points	8 points	6 points
Input 4 points	Input 8 points	Input 6 points
FP0-TC4	FP0-TC8	FP0-RTD6

- K, J, T, R type thermocouples can be used
- Resolution: 0.1°C
- Accuracy: 0.8°C (R type: 3°C)
- Temperature range: -100 to 1500°C

- Pt100, Pt1000, Ni1000
- Temperature range: -200 to 500°C

Networking units

Ethernet FPWEB2 (Web-Server unit) FPWEBEX (Web-Expansion)

PROFIBUS FP0-DPS2 (DP slave)

FP Modem-56k (FP analog modem)

Add-on unit

Switch 2A loads within the network

Switch electrically insulated loads of AC 250VAC reliably using the FP0 Relay Terminal FP0-RT8Y-6A directly within the network.

The FP0-RT8Y-6A unit provides reliable insulation between peripheral equipment and the PLC system, even for large electrical loads.
Standardized MIL connectors establish a direct connection to the FP0 unit. Thereby the FP0 can act as decentralized intelligence on site and be placed directly next to the power element of the machine – be it the motor, a protective device, a magnetic valve, etc.

Many more connection products are available, please refer to "Panasonic connection technology for PLC" catalog

Specifications FP0-RT8Y-6A

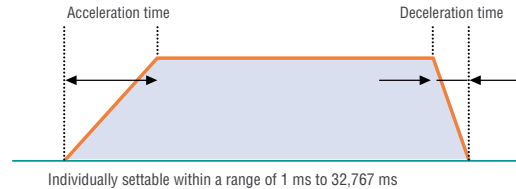| Item		Description
Rated operating voltage		24V DC
Operating voltage range		21.6V DC to 26.4V DC
Power consumption		Max. 100mA (at 24V DC)
Over voltage protection		Surge absorber
Connection method		With spring cotter via flat cable to FP0-C16P/C16CP/C32P/C32CP/T32CP/E8YP/E16YP/E16P/E32P
Contacts		
Contact type		1 normally open contact
Contact class		II according to VDE 0435 Section 120
Connection method		MC connector (for conductor cross-sections up to 2.5mm²)
Rated resistive load		250V AC, 30V DC
Limiting continuous current		2A/output (at max. ambient temperature)
Startup	„0" → „1"	Typical 8ms
	„1" → „0"	Typical 4ms
Limiting continuous current	mechanical	Approx. 5×10^6 switching cycles
	electrical	Rated load 2A, 230V AC, 5×10^4 switching cycles
		Motor load 230VAC, surge current 1A, cos φ0.4
General		
Overvoltage category		III
Pollution degree		2
Ambient temperature		0 – 55°C

FP0R positioning

Jog positioning control (F171 instruction)

Motion can be started without a preset target value. When a stop signal is input, the target value is set, and the motion is slowed to a stop.

The speed can be changed during the jog operation.

Start signal

Stop signal
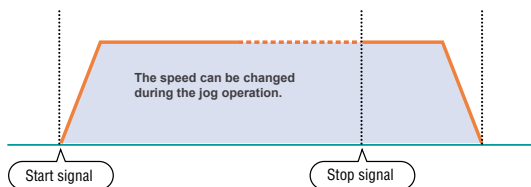
Useful for
- **Labelers: Stopping the motion at a constant distance from the point where a label end detection signal is triggered**
- **Processing machines: Stopping the motion at a constant distance from the point where a processing object edge detection signal is triggered, and cut/drill the object**

Changing the speed (F171 and F172 instructions)

The target speed can be changed by an external signal input during the jog or trapezoidal control operation.
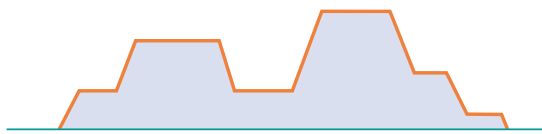
Useful for
- **Speed synchronization of transfer/processing equipment**

Built-in 4-axis pulse outputs (Transistor output type)

Multi-axis (4-axis) control is available without expansion units.

FP0R

Y0
Y2
Y4
Y6

M
M
M
M

50kHz max. each

Simultaneously usable high speed counters (6 channels) and pulse outputs (4 channels)

The right-hand figure, the speed of conveyor 1, which is inverter-controlled, is measured based on the encoder pulse count, and pulses are output to the slave motor (for jog operation) according to the measured speed in order to synchronize the speed of conveyor 2.

Inverter

Motor (master)

Conveyor 1

Encoder

Conveyor 2

Motor (slave)

High speed counter

Pulse output

Individual settings for acceleration and deceleration (F171, F172, F174, and F175 instructions)

Acceleration time

Deceleration time

Individually settable within a range of 1 ms to 32,767 ms

Useful for
- **Labelers: Starting the operation at a relatively low acceleration to prevent tape from breaking**
  Stopping the operation at high deceleration when detecting the label end to save the tape
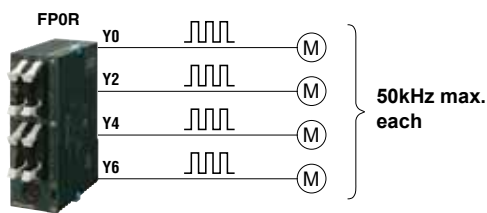
Measuring the pulse frequency (F178 instruction)

Pulses input in a specified period by a single instruction are counted, and the frequency is calculated.
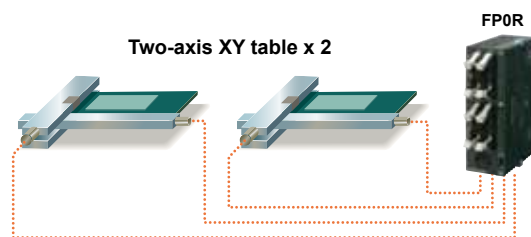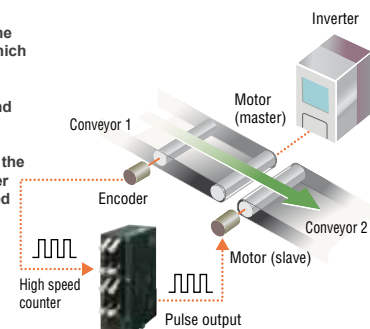
Specified period

Setting range: 1 ms to 5000 ms
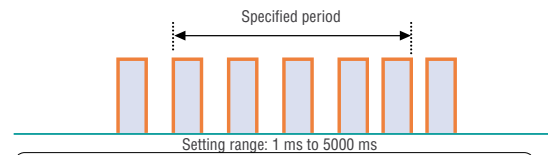
Useful for
- **Detection of motor rotation speed for encoder feedback control**

Two sets can simultaneously undergo two-axis linear interpolation (F175 instruction).

Two-axis XY table x 2

FP0R

Built-in multipoint PWM outputs (4 channels)

A single FP0R unit can control the speeds of up to six DC motors/fan motors. It also can serve as an analog voltage output unit.

FP0R

5-24V

DC motor/ Fan motor

Y0,Y2,Y4,Y6
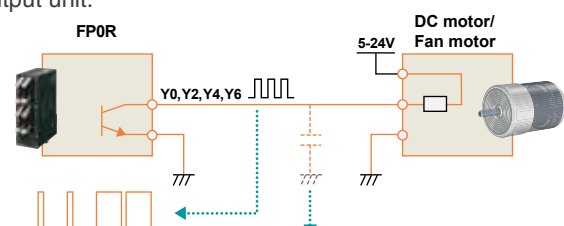
The speed can be controlled by changing the ON width of the PWM output within a range of 0.1% to 99.9%.

The unit can also serve as an analog voltage output unit (resolution: 1/1000) when a smoothing capacitor is inserted in the circuit.
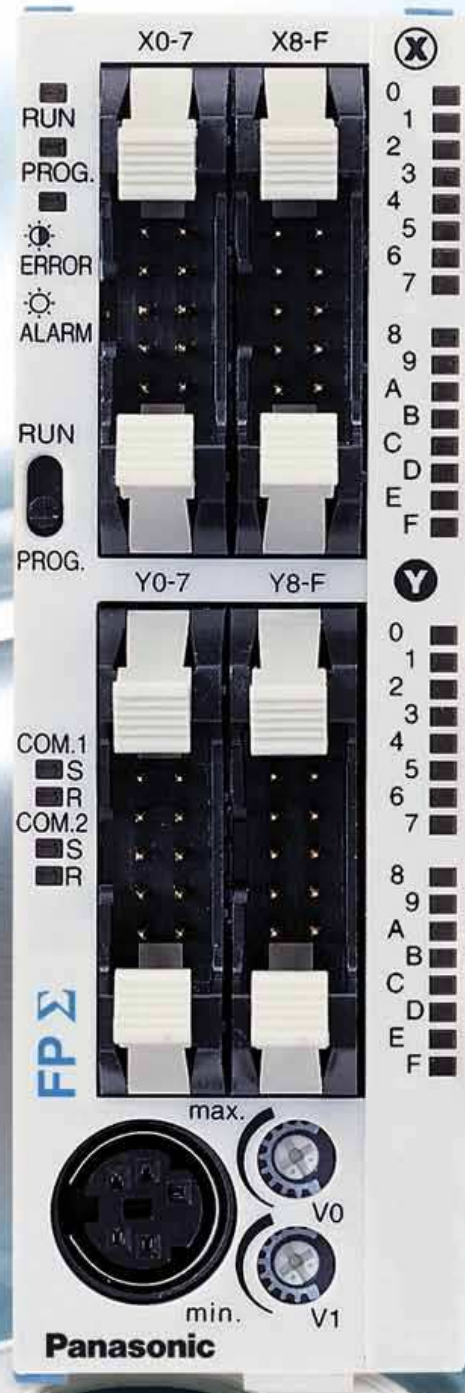
FPΣ (Sigma): The next generation compact PLC

Features

- Abundant program capacity – 32k steps
- The 32k step program capacity can accommodate an in-crease in the number of programs accompanying functionality enhancements, expansions, or changes of equipment.
- Equipped with an independent comment memory
- All of 100,000 I/O comments, 5000 lines of line-space comments, and 5000 lines of remark comments are saved in FPΣ (Sigma) together with programs.
- Equipped with a high-speed RISC processor
  Equipped with an RISC processor, achieving high-speed processing with a scan time of less than 2ms for 5000 steps.

- High-speed positioning unit
  The 4Mbps maximum frequency and startup speed of 0.005ms allow use for linear servo control.
- Simple temperature control
  A temperature control program can be written in only one line by using the PID F356 (EZPID) instruction, facilitating temperature control by a PLC, which had previously been considered difficult.

Performance specifications

Part number	32k type	FPG-C32T2H FPG-C32T2HTM	FPG-C24R2H FPG-C24R2HTM	FPG-C28P2H FPG-C28P2HTM
Number of I/O points	Control unit	32 points (DC input: 16, NPN output: 16)	24 points (DC input: 16, relay output: 8)	28 points (DC input: 16, PNP output: 12)
	With FP0R expansion units	Max. 128 points (up to 3 units) when using transistor output type expansion units	Max. 120 points (up to 3 units) when using transistor output type expansion units	Max. 124 points (up to 3 units) when using transistor output type expansion units
	With FPΣ (Sigma) expansion units	Max. 288 points (up to 4 units) when using transistor output type expansion units	Max. 280 points (up to 4 units) when using transistor output type expansion units	Max. 284 points (up to 4 units) when using NPN output type expansion units
	With FP0R and FPΣ (Sigma) expansion units	Max. 384 points when using transistor output type expansion units	Max. 376 points when using transistor output type expansion units	Max. 380 points when using NPN output type expansion units
Programming method/Control method		Relay symbol/cyclic operation		
Program memory		Built-in flash ROM (without backup battery)		
Program capacity		32k steps (32k type)		
Number of instructions	Basic	93		
	High-speed	218	216	218
Operation speed		Basic instruction: 0.32μs/step (32k type)		
Operation memory points	Relay	Internal relays (R)	4096 points (32k type): R0 to R255F		
		Timers/counters (T/C)	1024 points [1] [2] (factory settings: timers: 1008 points (T0 to T1007), counters: 16 points (C1008 to C1023) Timer: counts in units of up to 32767 times (units: 1ms, 10ms, 100ms, or 1s). Counter: Counts 1 to 32,767		
		Link relays (L)	2048 points (32k type)		
	Memory area	Data registers (DT)	32,765 words (DT0 to DT32764) [1]		
		Link data registers (LD)	256 words (32k type)		
		Index registers (IX,IY)	14 words (I0 to ID)		
Master Control Relay points (MCR)		256		
Labels (JMP + LOOP)		256		
Differential points		Unlimited		
Number of step ladder		1000 stages		
Number of subroutines		100		
Pulse catch input		8 points (X0 to X7)		
Interrupt program		9 programs (8 external input points (X0 to X7), 1 periodical interrupt point '0.5ms to 30s')		
Self-diagnostic function		E. g. watchdog timer, program syntax check		
Clock/Calendar function		Available (year, month, day, hour, minute, second and day of week); however, this function can only be used when a battery has been installed [3].		
Potentiometer (Volume) input		2 points, resolution: 10 bits (K0 to K1000)		
Battery life		220 days or more (actual usage value: approx. 840 days (25°C). Suggested replacement interval: 1 year. Value applies when no power at all is supplied.		
Comment storage		All kinds of comments, including I/O comments, remarks and block comments, can be stored (without backup battery).		
Link function		Computer Link (1:1, 1:N) [4] General-purpose communication (1:1, 1:N) [4] [5] PLC Link [6]		
Other functions		Online editing, constant scan, forced on/off, password, floating-point operation and PID processing		
Linear/Circular interpolation for positioning		Available	Not available	Available

Notes: 1) If no battery is used, only the fixed area is backed up (counters 16 points: C1008 to C1023, internal relays 128 points: R900 to R97F, data registers 55 words: DT32710 to DT32764). When the optional battery is used, hold-type data can be backed up. Areas to be held and not held can be specified using the system registers.
2) The number of points can be increased by using an auxiliary timer.
3) Precision of clock/calendar function:
   - At 0°C 32°F, less than 119 seconds error per month.
   - At 25°C, less than 51 seconds error per month.
   - At 55°C, less than 148 seconds error per month.

4) An optional communication cassette (RS232C type) is required in order to use 1:1 communication.
5) An optional communication cassette (RS485 type) is required in order to use 1:N communication.
6) An optional communication cassette (RS485 type) is required. The number of points actually available for use is determined by the hardware configuration.

Control units: Outstanding performance in a compact design

FPΣ – Transistor output type

28 points	
Input 16 points	Output PNP 12 points
MIL connector type FPG-C28P2H	

32 points	
Input 16 points	Output NPN 16 points
MIL connector type FPG-C32T2H	

FPΣ – Relay output type

24 points	
Input 16 points	Output relay 8 points
Screw terminal type FPG-C24R2H	

FPΣ – Transistor output type with thermistor input

28 points	
Input 16 points	Output PNP 12 points
2 thermistor inputs FPG-C28P2HTM	

32 points	
Input 16 points	Output NPN 16 points
2 thermistor inputs FPG-C32T2HTM	

FPΣ – Relay output type with thermistor input

24 points	
Input 16 points	Output relay 8 points
2 thermistor inputs FPG-C24R2HTM	

High expansion capability

FPΣ can use the expansion units of the FP0R on the right-hand side. New FPΣ units can be added to the left hand side.

Max. 4 expansion units each 64 I/Os = 256 I/Os
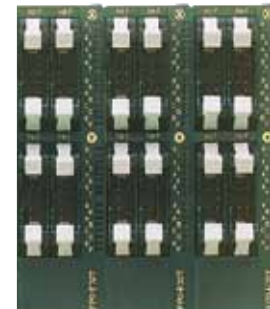
…up to 384 I/O!

Control unit max. 32 I/Os

Max. 3 expansion units each 32 I/Os = 96 I/Os

Parallel expansion BUS

Serial expansion BUS

Expansion units: Wide variety – left side

FPΣ
I/O expansion unit

64 points	
Input 32 points	Output (PNP) 32 points
MIL connector type FPG-XY64D2P	

FPΣ
I/O expansion unit

64 points	
Input 32 points	Output (NPN) 32 points
MIL connector type FPG-XY64D2T	

FPΣ
Memory expansion unit

FPG-EM1
Memory: 256k words
FPG-EM1

FPΣ
Analog unit

8 points	
Input 4 points	Output 4 points
MIL connector type FPGAD44D50(with 50Ω) FPGAD44D250 (with 250Ω)	

- Input (16 bit):
  0 – 10V, 0 – 20mA
- Output (12 bit):
  0 – 10V, ± 10V,
  4 – 20mA

FPΣ positioning expansion units RTEX
Real-time Ethernet system for Minas A5N servo drives

2-axis
FPG-PN2AN

4-axis
FPG-PN4AN

8-axis
FPG-PN8AN

FPΣ positioning expansion units

1-axis
Transistor output FPG-PP11

1-axis
Line driver output FPG-PP12

2-axis
Transistor output FPG-PP21
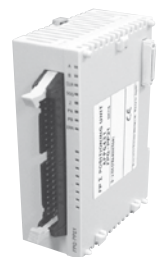
2-axis
Line driver output FPG-PP22

Expansion units left side: Network units

FPΣ Fieldbus master expansion units

PROFIBUS Master	CANopen Master	DeviceNet Master	S-Link Master
FPG-DPV1-M	FPG-CAN-M	FPG-DEV-M	FPG-SL

FPΣ Fieldbus slave expansion units

CC-Link Slave	PROFIBUS Slave	DeviceNet Slave	CANopen Slave	PROFINET I/O Slave	BACnet Slave
FPG-CCLS	FPG-DPV1-S	FPG-DEV-S	FPG-CAN-S	FPG-PRT-S	FPG-BACIP-S FPG-BACMSTP-S

Communication cassette

Other network units

Communication Cassette

FPG-COM1:	1 channel RS232C
FPG-COM2:	2 channels RS232C
FPG-COM3:	1 channel RS485
FPG-COM4:	1 channel RS232C & 1 channel RS485

Ethernet	FP Modem 56k	3channel RS485
FPWEB2 FPWEBEXP	FP Modem-56k	AFPG951T34

Analog value processing:
Analog units FPGAD44D50 / FPGAD44D250

Features

- Multimode A/D or D/A conversion. Voltage or current can be set separately for each channel.

- 4 analog inputs (current input: 50Ω input impedance, FPGAD44D50) 4 analog inputs (current input: 250Ω input impedance, FPGAD44D250) – standard 0 to 10V or 0 to 20mA

- 4 analog outputs: -10V to +10V, 4 to 20mA

- High resolution: 16-bit input and 12-bit output

- Fast conversion speed: Inputs: 10ms / 4 channels: outputs: 10ms / 4 channels

- MC terminal type connector

General specifications

	Description
Rated voltage	24VDC
Operating voltage	21.6 to 26.4VDC
Current consumption	< 100mA
Ambient temperature	0°C to +55°C
Storage temperature	-20°C to +70°C
Size	90 x 30 x 60mm (W x L x H)
Weight	150g

Analog input specification

Article no.		FPGAD44D50	FPGAD44D250
No. of channels		4 channels/unit	
Input range	Voltage:	0 to 10V	
	Current:	0 to 20mA	
Digital value		0 to 10V, 0 to 20mA; K0 to K65535	
Resolution		16-bit (1/65536)	
Conversion speed	Voltage:	10ms / 4 channels	
	Current:		
Accuracy	Voltage:	0.1% at 25°C, 1% at 55°C	
Input impedance	Voltage:	100kΩ	–
	Current:	50Ω	250Ω
Max. input range	Voltage:	+15V	
	Current:	+30mA	
Insulation method		Between analog input terminals and FPΣ circuit: Optocoupler (no isolation between channels)	

Analog output specifications

| Article no.		FPGAD44D50	FPGAD44D250
No. of channels		4 channels/unit	
Output range	Voltage:	0 to 10V, -10V to +10V	
	Current:	4 to 20mA	
Digital value		4 to 20mA, 0 to 10V; K0 to K4095	
		-10V to +10V; K-4095 to K4095	
Resolution		12-bit (1/4096) plus sign	
Conversion speed		10ms / 4 channels	
Accuracy	Voltage:	0.1% at 25°C	
	Current:	0.3% at 25°C, 3% at 55°C	
Input impedance	Voltage:	100kΩ	–
	Current:	50Ω	250Ω
Permissible load resistance		Current: < 300Ω	Voltage: > 1kΩ
Insulation method		Between analog input terminals and FPΣ circuit: Optocoupler (no isolation between channels)	

Specially designed for positioning application

Max. 100kHz pulse output performance is now standard.
Powerful device capable of linear interpolation and circular interpolation.

Pulse output max. 100kHz

Because command processing at speeds up to 100kHz is available, high-speed, high-precision positioning is enabled. Along with stepping motor control, the specs also ensure plenty of scope for controlling servo motors.

Possible to combine with pulse-train input drivers.
Single unit enables two-axis control.
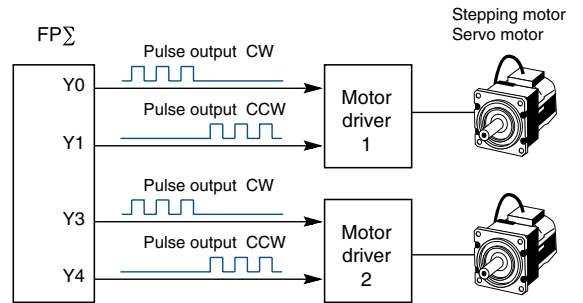
Rapid 0.02ms start (when JOG operation controls are executed)

The time taken to execute the JOG operation, from the instant the trigger (execution condition) goes on to the time of pulse output, is 0.02ms and 0.2ms even with trapezoidal control. Control time is reduced even for machines that quickly and repeatedly restart.

Linear interpolation and circular interpolation are built in (FPG-C32T2H-A and FPG-C28P2H-A)

Interpolation functions enable simultaneous control of two axes.
Applications that a compact PLC couldn't previously cope with are no longer a challenge.

Linear Interpolation

Circular Interpolation

Adhesive
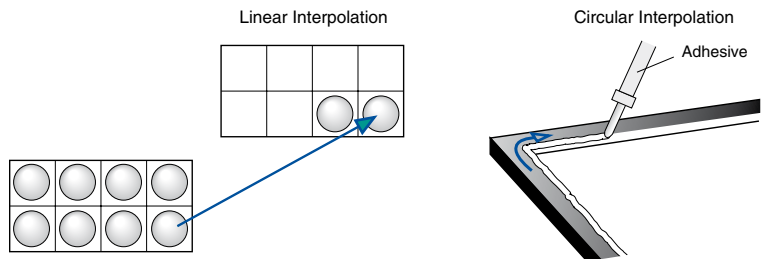
And there's more:

Smooth acceleration/deceleration

You can choose to set either 30 or 60 steps of acceleration/deceleration. This feature means you can achieve smoother movement during long acceleration/ deceleration periods of stepping motors.
Settings allow a maximum 60 accelaration/deceleration steps.
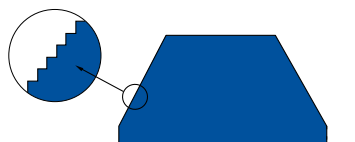
Support for CW/CCW method

Reduce overall costs by designing systems that combine with servo motors and small stepping motors without support for Pulse and Sign method.

CW / CCW method

Pulse / Sign method
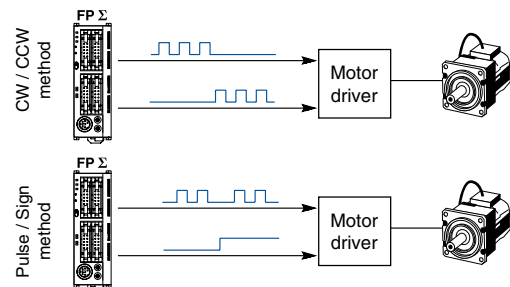
High-speed, high-precision positioning

## Programming with convenient and easy-to-understand instructions

- Uses a preset value table for starting speed, target speed, acceleration/deceleration time, and other factors. Easy-to-understand programming is possible since numbers can be specified intuitively.

- Comes with dedicated instructions for each mode: trapezoidal control, home return, JOG operation, free table operation, linear interpolation and circular interpolation.

Selectable home return mode

- The home return method may be specified even in situations such as when only a single sensor is being used, depending on the design.

- When the home position return is completed, a deviation counter clear signal can also be output.
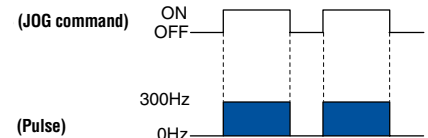
Home position return

- Pulse output diagram (when the near home input is not used).
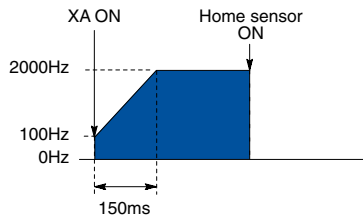
Home search automatically reverses the motor rotation when the positive or negative limit switch is reached and searches for the home position or near home position.

JOG operation

- Pulse output diagram.

This refers to an operation in which the motor is rotated only while operation commands are being input. This is used to forcibly rotate the motor using input from an external switch, for instance when making adjustments. Depending on the circumstances, unlimited feeding can be accomplished with the JOG operation.
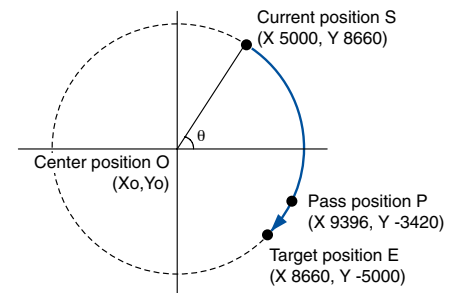
Linear interpolation
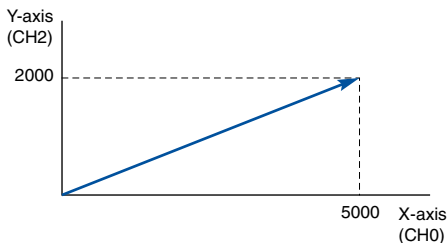
- Positioning locus.

A control function that automatically defines the continuum of points in a straight line based on only two coordinate positions.

Circular interpolation

- Positioning locus.
- Pass and center position methods are available.

Allows points to be smoothly traversed by arced paths for which the user specifies the orientation plane, the radius of curvature, motion path profile and direction of motion.

Precise positioning

Features

- Fast startup of 0.02 or 0.005ms makes cycle time reduction possible

- Feedback pulse count function makes output pulse counting from external encoders possible

- JOG positioning control supports a wide range of applications

- 4 types of S-curve acceleration/deceleration control makes smooth startup and stopping possible:
  Sine curve, quadratic curve, cycloid curve and cubic curve

FPG-PP11   FPG-PP12   FPG-PP21   FPG-PP22

- The FPΣ (Sigma) positioning unit can handle simultaneous startup of multiple axes, enabling simultaneous control of linear interpolation and other elements through user programs

- Transistor output type (open collector) and line driver output type are available

Unit type and product number		
Type	Output type	Part number
1-axis type	Transistor output type	FPG-PP11
2-axis type	Transistor output type	FPG-PP21
1-axis type	Line driver output type	FPG-PP12
2-axis type	Line driver output type	FPG-PP22

Positioning control using a stepping motor

Positioning unit → Pulse train → Driver → Stepping motor
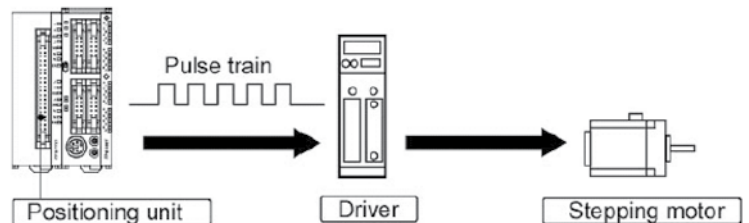
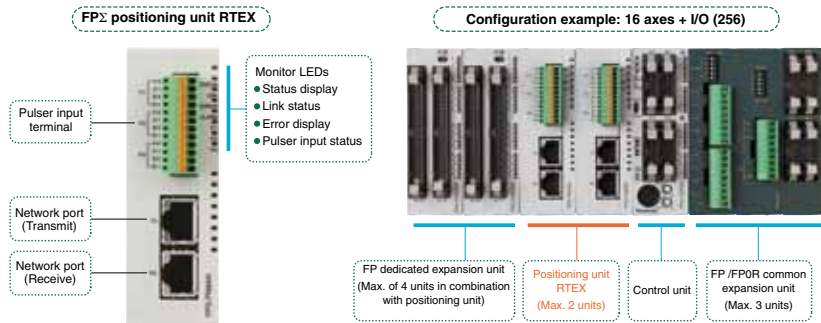**Positioning control using a servo motor**

Positioning unit → Pulse train → Driver → Servo motor, Encoder
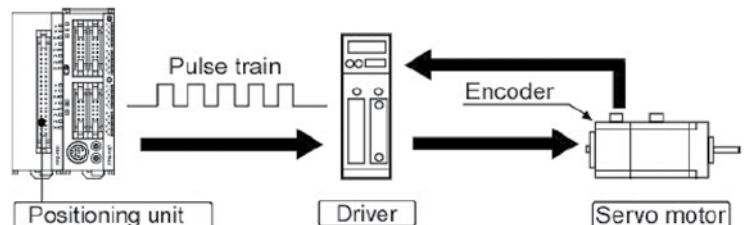
1-axis and 2-axis types are available.
Multiple axes (up to 2 axes) can be controlled with a single unit.

RTEX multi-axis network servo system

The RTEX positioning units support Minas A4N and Minas A5N network servo drives. A mutually optimized system consisting of PLC and servo drive greatly simplifies installation.

FPΣ positioning unit RTEX

- Pulser input terminal
- Monitor LEDs
  - ● Status display
  - ● Link status
  - ● Error display
  - ● Pulser input status
- Network port (Transmit)
- Network port (Receive)

Configuration example: 16 axes + I/O (256)

- FP dedicated expansion unit (Max. of 4 units in combination with positioning unit)
- Positioning unit RTEX (Max. 2 units)
- Control unit
- FP /FP0R common expansion unit (Max. 3 units)

System configuration:

- Maximum number of control axes: 16. Realization of highly accurate 2-axis circular interpolation, 3-axis linear interpolation and 3-axis spiral interpolation with high-speed 100Mbps communication.

- With 3 types in the product range, for 2 axes, 4 axes and 8 axes provide flexible support even for control of small numbers of axes.

- Loop wiring RTEX* provides high reliability by creating smooth communication conditions in which data always flows in the same direction.

   *Panasonic Realtime Express

Specifications:

		2-axis type	4-axis type	8-axis type
Part number FPΣ (Sigma)		**FPG-PN2AN**	**FPG-PN4AN**	**FPG-PN8AN**
Unit specifications — Positioning control functions	Control method	PTP Control, Cursor Path (CP) Control		
	Interpolation control	2-axis/3-axis linear interpolation, 2-axis circular interpolation, 3-axis spiral interpolation		
	Control units	Pulse/µm/inch/degree		
	Position data	600 points for each axis		
	Backup	Parameters and data file can be saved to FROM		
	Acceleration/deceleration method	Linear acceleration/deceleration/S-curve acceleration/deceleration		
	Acceleration/deceleration time	0 to 10,000ms (1ms units) different settings for acceleration and deceleration are possible		
	Positioning area	(-1,073,741,823 to 1,073,741,823 pulse) increment and absolute specification		
Speed control functions		Supported with JOG operation (free run operation)		
Origin functions	Search method	Origin proximity (DOG) search		
	Creep speed	Free settings possible		
Other functions		Pulser input operation support		
		Auxiliary output code, auxiliary output contact support		
		Dwell time support		
Communication specifications — Communication speed		100Mbps		
Cable		Commercially available LAN straight cable (shielded category 5e)		
Connection method		Ring method		
Communication cycle/no. of terminals		0.5ms; max. 8 axes/system (command cycle: 1ms)		
Transmission distance		Between terminals: 60m; total length: 200m		