Panasonic

NEW

Programmable Controller

FP7 SERIES

CE Conforming to EMC Directive

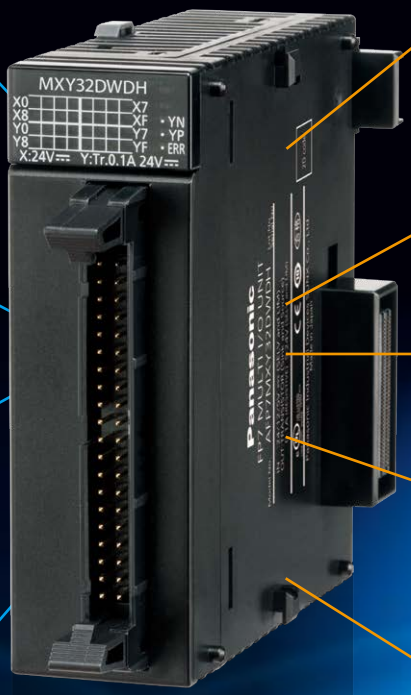
Select the functions you need and control various devices!

5 V input
(Encoder / microcomputer / two-wire system sensor, etc.)

DC input

Interrupt input

High-speed counter input



Transistor output
NPN, PNP, Differential output and 5 V

Comparison output

Pulse output

PWM output

Positioning output*

*Supports only positioning type

Multi Input/Output Unit
AFP7MXY32DWDH
NEW
Positioning type

■Multi Input/Output Unit
AFP7MXY32DWD

Best value model CPU unit
AFP7CPS21

■Multi Input/Output Unit
AFP7MXY32DWDH
NEW
Positioning type

Best value model CPU unit
AFP7CPS21

Select the functions you need among the many available and achieve a wide range of control with one unit.

You can choose. Maximum Input: 16 points Output: 16 points

Add-on cassettes
- Serial port
- Analog input and output
- Ethernet port

Best value model
CPU unit
AFP7CPS21

RS232C port

Multi Input/Output Unit **NEW**
AFP7MXY32DWDH Positioning type

Input

■Choose among total 16 points as follows. **High-speed**
- DC input: Max. 16 points
- High-speed counter: Max. 4 channels, 500 kHz (at input voltage 5 V/12 V), 250 kHz (at input voltage 24 V)
- Interrupt input: Max. 8 points

Supports wide range of devices such as encoders and two-wire system sensors. Industry first*
- Input level: 5 to 24 V (automatic switchover)
- Input time constants: None, 1 µs, 2 µs, 4 µs, 8 µs, 16 µs, 2 ms, 4 ms

*Based on our research as of April, 2016

Output

■Choose among total 16 points as follows. **High-speed**
- Transistor output: Max. 16 points
- Pulse output: Max. 4 channels, 500 kHz
- PWM output: Max. 4 channels, 100 kHz
- Positioning output: Max. 4 channels, 500 kHz
- Comparison output: Max. 8 points

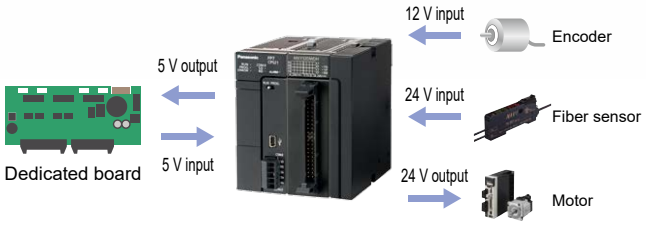
Supports ultra-high speed pulse output and dual polarity Industry first*
- Output polarity: N/P channel, Both channels (push pull) and Differential output

*Based on our research as of April, 2016

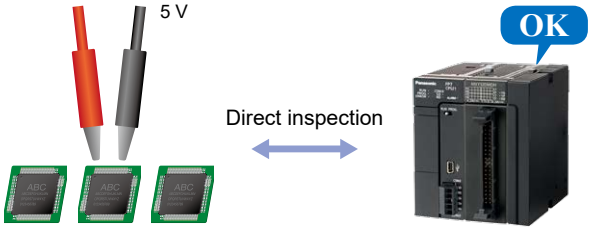
For example

Control possible of connected dedicated boards, custom-built jigs, and all types of sensors

Can also be used for central control of devices with different voltage and as a converter for 5 V devices.



Capable of direct inspection in inspection lines for 5 V drive electronic components.



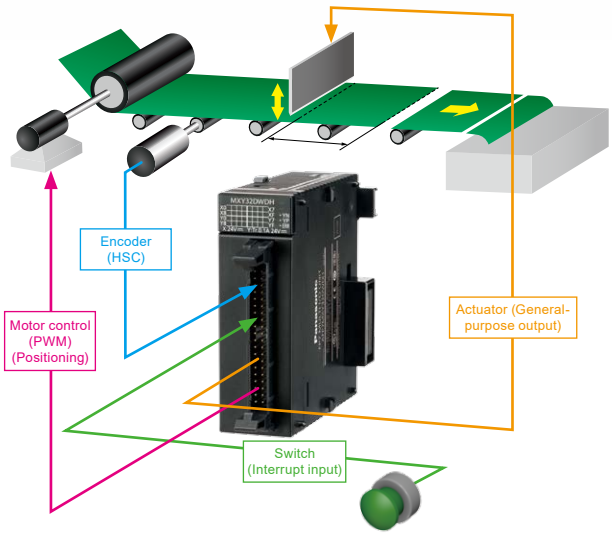
Accomplish motor positioning at the best price.

Complex control achieved in one unit

Control high-speed counter, positioning and I/O with one unit

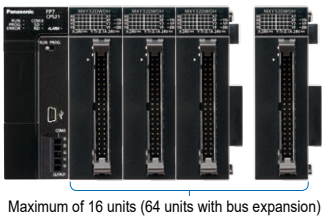
Example
Encoder input × 1 channel — Interrupt input × 4 points
Positioning output × 1 channel — General-purpose output × 4 points

Applications are only limited by the terminal allocations possible.



CPU unit can be expanded with maximum of 16 units

Total of 512 inputs and outputs possible



Maximum of 16 units (64 units with bus expansion)

Total 256 inputs
- DC input: Max. 256 points
- High-speed counter: Max. 64 channels
- Interrupt input: Max. 128 channels

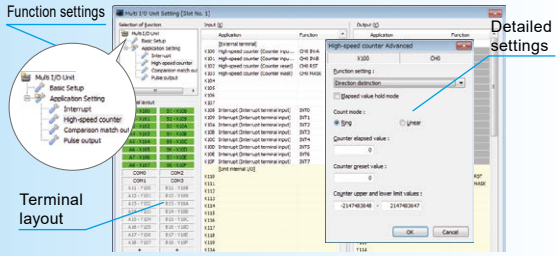
Total 256 outputs
- Transistor output: Max. 256 points
- Pulse output: Max. 64 channels
- PWM output: Max. 64 channels
- Comparison output: Max. 128 channels

Control FPWIN GR7

Easily accomplish complex control!
Rich in support functions for programs that utilize many functions.

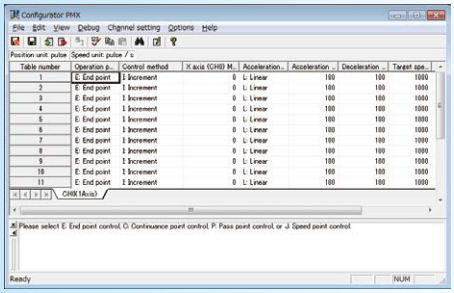
1 Initial settings screen (Function allocation setting)

Easily select the functions to use and the I/O number allocations.



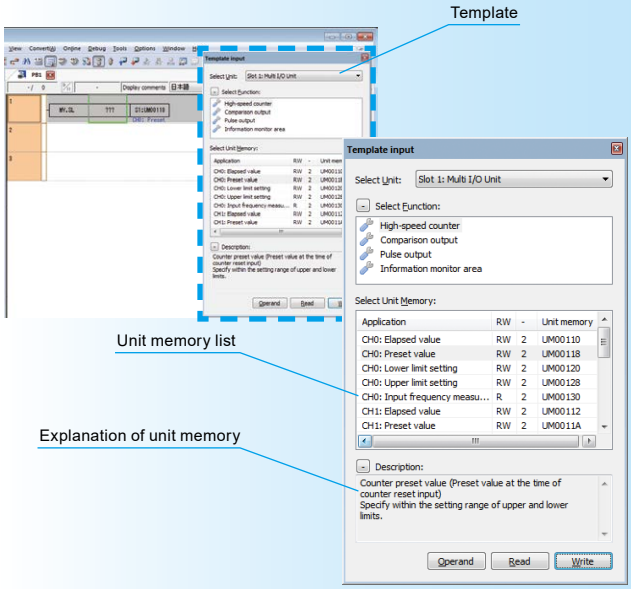
2 Configurator PMX (Setting tool for positioning output)

To set the positioning table, simply select the parameters at the configuration screen.



3 Template screen (Programming aid)

In the window for unit memory access, simply select from the list and click either the “Read” or the “Write” button to build the transfer commands on the ladder. You no longer need to consult the manual nor worry about incorrect data sizes.



■Product types

Product name		Standard program capacity	Max. program capacity	Operation speed	Ethernet function	SD memory card function	Encryption function (Note 2) (Note 3)	Part No.
FP7 CPU units	Standard model	196 k steps	234 k steps	From 11 ns	Built-in	Built-in	–	**AFP7CPS41E**
		120 k steps	120 k steps	From 11 ns	Built-in	Built-in	–	**AFP7CPS31E**
		120 k steps	120 k steps	From 11 ns	–	Built-in	–	**AFP7CPS31**
	Security enhanced type	196 k steps	234 k steps	From 11 ns	Built-in	Built-in	Built-in	**AFP7CPS41ES**
		120 k steps	120 k steps	From 11 ns	Built-in	Built-in	Built-in	**AFP7CPS31ES**
		120 k steps	120 k steps	From 11 ns	–	Built-in	Built-in	**AFP7CPS31S**
	Best value model	64 k steps	64 k steps	From 14 ns	–	–	–	**AFP7CPS21**

Notes: 1) One end unit is attached to the CPU unit.
2) When exporting to China, please use a CPU that does not have an encryption function.
3) For CPU units with encryption function, please use the security enhanced type programming tools.

■Unit lineup (extract)

Product name	Number of points	Connection method	Specifications	Part No.
Input unit (DC input)	16 points	Terminal block	12 to 24 V DC, common polarity: +/- common, input time constant setting	**AFP7X16DW**
Output unit [Transistor output, sink (NPN)]	16 points	Terminal block	Load current: 1.0 A, 5 A/common, 16 points/common	**AFP7Y16T**
Multi input/output unit	Input: 16 points Output: 16 points	MIL connector	Input: Total 16 points •DC input: Max. 16 points •High-speed counter: Max. 4 channels (1 channel: 4 points) •Interrupt input: Max. 8 points Output: Total 16 points •Transistor output: Max. 16 points •Pulse output: Max. 4 channels (Note) (1 channel: 4 points) •PWM output: Max. 4 channels (1 channel: 4 points) •Comparison output: Max. 8 points •Positioning: Max. 4 channels (Only **AFP7MXY32DWDH**)	NEW **AFP7MXY32DWD**
Positioning type				NEW **AFP7MXY32DWDH**
High-speed counter units	2 channels	MIL connector	Liner counter / ring counter, Individual input: 1 multiple, 2-multiple, Direction distinction input: 1 multiple, 2-multiple, 2-phase input: 1 multiple, 2-multiple, 4-multiple	**AFP7HSC2T**
	4 channels			**AFP7HSC4T**
Pulse output units	2 axes	MIL connector	Transistor, 1 pps to 500 kpps	**AFP7PG02T**
	4 axes			**AFP7PG04T**

Note: Trapezoidal control with acceleration / deceleration not yet supported.

■Programming tools

Product name		Type	Specifications	Part No.
Programming software for Windows® **Control FPWIN GR7**	Japanese version	Supports only CPU without encryption function	Windows®10 (32 bit / 64 bit) / Windows®8 (32 bit / 64 bit) / Windows®8.1 (32 bit / 64 bit) / Windows®7 SP1 and over (32 bit / 64 bit) / Vista SP2 / XP SP3	**AFPSGR7JP**
	Security enhanced type	Supports both CPU with / without encryption function		**AFPSGR7JPS**
	English version	Supports only CPU without encryption function		**AFPSGR7EN**
	Security enhanced type	Supports both CPU with / without encryption function		**AFPSGR7ENS**
Programming software for Windows® **Control FPWIN Pro7**	English, Japanese, Korean and Chinese	Supports only CPU without encryption function	Windows®10 (32 bit / 64 bit) / Windows®8 (32 bit / 64 bit) / Windows®8.1 (32 bit / 64 bit) / Windows®7 SP1 and over (32 bit / 64 bit) / Vista SP2 / XP SP3	**AFPSPR7A**
	Security enhanced type	Supports only CPU with encryption function * The encryption function will be offered in the future.		**AFPSPR7AS**

Notes: 1) Windows® 10, 8, 7, Vista and XP are trademarks or registered trademarks of Microsoft Corporation in the United States and other countries.
2) When exporting to China, CPU without encryption function is required.

■Specifications

Control specifications (AFP7CPS21)

Item		AFP7CPS21	
Memory capacity	Memory selection pattern (Note 1)	1 (Factory default)	2
	Program (steps) (Note 2)	64,000	32,000
	Data register (words) (Note 2)	131,072	262,144
	Number of max. program block (PB)	128	64
Programming method		Relay symbol method	
Control method		Cyclic operation method	
Program memory		Built-in flash ROM (no backup battery required)	
Operation speed		Basic instruction: Min. 14 ns/step	
External input (X) / output (Y)		8,192 points (Note 4) / 8,192 points (Note 4)	
Internal relays (R)		32,768 points	
System relays (SR)		Indicate operation status of various relays is shown.	
Link relays (L)		16,384 points	
Timers (T)		4,096 points: Timer capable of counting (units: 10 μs, 1 ms, 10 ms, 100 ms or 1 sec.) × 4,294,967,295	
Counters (C)		1,024 points, Counter capable of counting 1 to 4,294,967,295	
Link data registers (LD)		16,384 words	
System data registers (SD)		Internal operation status of various registers is shown.	
Index registers (I0 to IE)		15 long words / With switching function	
Master control relay (MCR)		Unlimited	
Number of labels (LOOP)		Max. 65,535 points for each program block (PB)	
Differential points		Unlimited	
Number of step ladders		Unlimited	
Number of subroutines		Max. 65,535 points for each program block (PB)	
Number of interrupt programs		1 periodical interrupt program	
Constant scan		Available (0 to 125 ms)	
Real time clock (Note 3)		Built in. Date backup with battery.	
PLC link function		Max. 16 units, link relays: 1,024 points, link registers: 128 words. (Data transfer and remote programming are not supported) (Link area allocation is switchable between the first and the second half)	

Notes: 1) The factory default setting is pattern 1.
2) For data register (DT), data up to 262,144 words can be backed up.
3) Precision of calendar; At 0 °C 32 °F, less than 95 seconds error per month, At 25 °C 77 °F, less than 15 seconds error per month, At 55 °C 131 °F, less than 130 seconds error per month
4) Hardware configuration governs the actually usable number of I/O points. When I/O points are not actually used, usable as internal relays.

COM port communication specifications (AFP7CPS21)

Item	Specifications
Interface	RS232C, three-wire system, 1 channel (Note)
Transmission distance	15 m 49.213 ft
Transmission speed	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400 bits/sec.
Communication method / Synchronous method	Half-duplex system / Start-stop synchronization system
Transmission format	Stop bit: 1 bit / 2 bits
	Parity: none / odd / even
	Data length: 7 bits / 8 bits
	Start code: with STX / without STX
	End code: CR / CR + LF / none / ETX
Data transmission order	Transmit from bit 0 in character units.
Communication mode	General-purpose communication, Computer link and MODBUS-RTU

Note: SD, RD and SG terminals are isolated from internal circuits.

Dedicated power supply output port specifications for GT series programmable display (AFP7CPS21)

Output terminal	Connecting programmable display model
5 V	For 5 V DC type **GT** series Programmable Display

Function specifications (AFP7MXY32DWD / AFP7MXY32DWDH)

Item			AFP7MXY32DWD	AFP7MXY32DWDH
Basic input and output	Number of occupied I/O points		Input/Output: 64 points each (4 words)	Input/Output: 96 points each (6 words)
	Number of external I/O points		Input: 16 points, Output: 16 points	
	Input time constant setting		None, 0.5 μs, 1 μs, 2 μs, 4 μs, 8 μs, 16 μs, 32 μs, 64 μs, 96 μs, 128 μs, 256 μs, 2 ms, 4 ms, 8 ms Setting possible in 2-point units	
	Output polarity setting		No output, N channel, P channel, Both channels (push pull output), Differential output Setting possible in 4-point units	
Interrupt	Number of points		8 points/unit (Max. of 8 units can be used with **FP7** system.)	
	Mode		Non-interrupt unit, Interrupt unit (Set using DIP switches)	
	Interrupt condition setting		Terminal input, Comparison match	
Counter	Counter type		Ring counter Linear counter	
	Input mode		Direction distinction, Individual input, Phase input	
	Number of channels		4 channels (Note 1)	
	Counting range		Signed 32 bit (-2,147,483,648 to +2,174,483,647) Setting possible of upper and lower limits	
	Max. counting speed		5 V input voltage: 500 kHz (Note 2) 12 V input voltage: 500 kHz (350 kHz with phase input) (Note 2) 24 V input voltage: 250 kHz (180 kHz with phase input) (Note 2)	
	Min. input pulse width		0.5 μs	
	Comparison output setting		Max. 8 points Terminal input counter: 4 channels	
	Others		Transfer multiplication function (× 1, × 2, × 4) Elapsed value offset/preset function Elapsed value hold function, setting of upper/lower count limits Input pulse frequency measurement Overflow/underflow detection	
Pulse output	Number of channels		4 channels	
	Output mode		Direction distinction, Individual output, Phase output, Comparison match stop	
	Output terminals	Pulse output function	2 terminals/channel (B11 to B18 terminals)	
		PWM output function	1 terminal/channel (B11, B13, B15 and B17 terminals)	
	Output frequency	Pulse output function	1 to 500 kHz (Note 3) (Settable by 1 Hz)	
		PWM output function	1 to 100 kHz (Note 3) (Settable by 1 Hz)	
	Duty ratio	Pulse output function	50 % approx. (Fixed)	
		PWM output function	0 to 100 % (Settable by 0.1%)	
	Other functions		Pulse number measurement function (dedicated pulse counter 4 channels)	

Notes: 1) When using elapsed value hold function, number of channels will be limited.
2) With 50 % duty input pulse.
3) When push pull setting or output current is 0.1 A. Varies according to load.

Positioning function specifications (AFP7MXY32DWDH)

Item		AFP7MXY32DWDH
Number of axes controlled		Max. 4 axes
Common specifications	Position setting mode	Increment, Absolute
	Output interface	Transistor open collector output, Push-pull, Line driver (Note 1)
	Pulse output method	Pulse + Sign, CW + CCW
	Max. output frequency	500 kHz
	Outptu pulse duty ratio	When using table setting mode: 50 % (Fixed)
	Control unit	Pulse
Position control	Position setting range	-1,073,741,824 to +1,073,741,823 pulses
	Speed command range	Pulse: 1 to 500,000 Hz
	Max. operation speed	500 kHz
	Acceleration/ deceleration method	Linear acceleration/deceleration
	Acceleration time	1 to 10,000 ms (Settable by 1 ms)
	Deceleration time	1 to 10,000 ms (Settable by 1 ms)
	Number of positioning tables	20 tables for each axis (Up to 2 tables can be executed consecutively.)
	Control method (Single axis)	PTP control (E point control, C point control), CP control (P point control), Speed control (J point control) (Note 2) (Note 3)
	Control method (2-axis linear interpolation)	E point, P point, C point controls, Composite speed or Long axis speed setting
	Dwell time	0 to 32,767 ms (Settable by 1 ms)
JOG operation	Speed command range	Pulse: 1 to 500,000Hz (Note 3)
	Acceleration/deceleration method	Linear acceleration/deceleration
	Acceleration time	1 to 10,000 ms (Settable by 1 ms)
	Deceleration time	1 to 10,000 ms (Settable by 1 ms)
Home return	Speed command range	Pulse: 1 to 500,000 Hz
	Acceleration/deceleration method	Linear acceleration/deceleration
	Acceleration time	1 to 10,000 ms (Settable by 1 ms)
	Deceleration time	1 to 10,000 ms (Settable by 1 ms)
	Return method	DOG methods (3 types), Home position method, Data set method
Stop function	Deceleration stop	Performs deceleration stop in the deceleration time of a running operation for each axis.
	Emergency stop	Stops in a deceleration time specified for the emergency stop for each axis.
	Limit stop	Stops in a deceleration time specified for the limit input for each axis.
	System stop	Stops all axes immediately.

Notes: 1) The number of axes is reduced when setting Line driver.
2) The J point control is executable only for the two axes of CH0 and CH1.
3) When performing the J point control or JOG operation, the speed can be changed after the startup.

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No. CE-FP7MXY32DWD-5 September, 2016