Panasonic

Programmable Controller

FP7 SERIES

CE
Conforming to
EMC Directive
(except AFPRP2□)

2014.02

Seven Steps
to Higher Efficiency

All about efficiencies for your manufacturing

FP7 features

Compact design

Incorporates the functionality and performance of a modular PLC in an outstanding compact format

Local & remote connectivity

Dedicated to the total integration into Web applications

Security & reliability

Provides different security levels according to customer needs, automatically stores backup programs and allows users to update programs only after a functional check

Traceability

Traces the values of variables over a certain time frame during program execution

FP7: Seven steps to higher efficiency

Maintenance

Integrates several features that facilitate maintenance, diagnostics and troubleshooting

Advanced motion control (cam & gear)

Offers a variety of control options, from simple position control to synchronized control of multiple axes to advanced cam control and gearing

Performance

Equipped with a large memory capacity (up to 234 k program steps or up to 976 k data words) and a high-speed processor (11 ns/step)
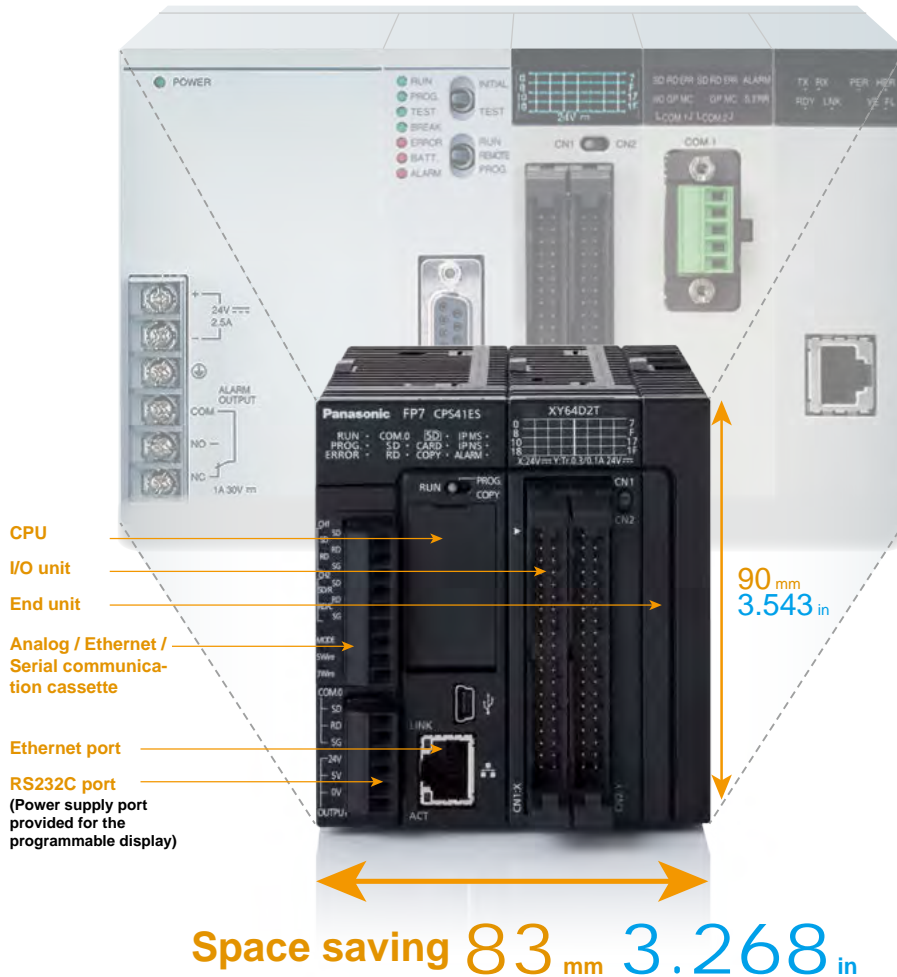
Content

① Compact design

The FP7 represents the top of the range of our PLCs and incorporates all the functionality and performance of a modular PLC in an outstanding compact format with a height of only 90 mm 3.543 in!

CPU

I/O unit

End unit

Analog / Ethernet / Serial communica-tion cassette

Ethernet port

RS232C port
(Power supply port provided for the programmable display)

90 mm
3.543 in

Space saving 83 mm 3.268 in

No power supply unit needed

No power supply unit is needed if the CPU is directly connected to DC power. Expansion units are clipped together without backplane.

• Reduced costs
• Smaller footprint

No power supply unit

No backplane

Add a power supply unit if AC power is required.
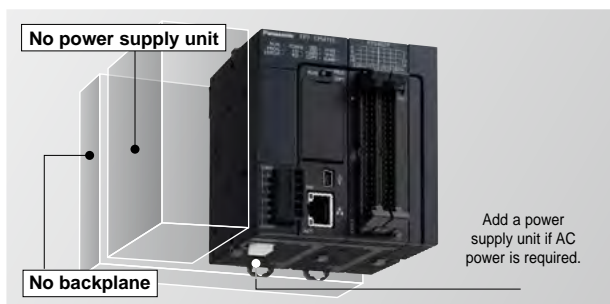
No communication unit needed

Enhancing communication features can be added using communication cassettes.

• Reduced costs
• Smaller footprint

Ethernet communication cassette

Serial communication cassette

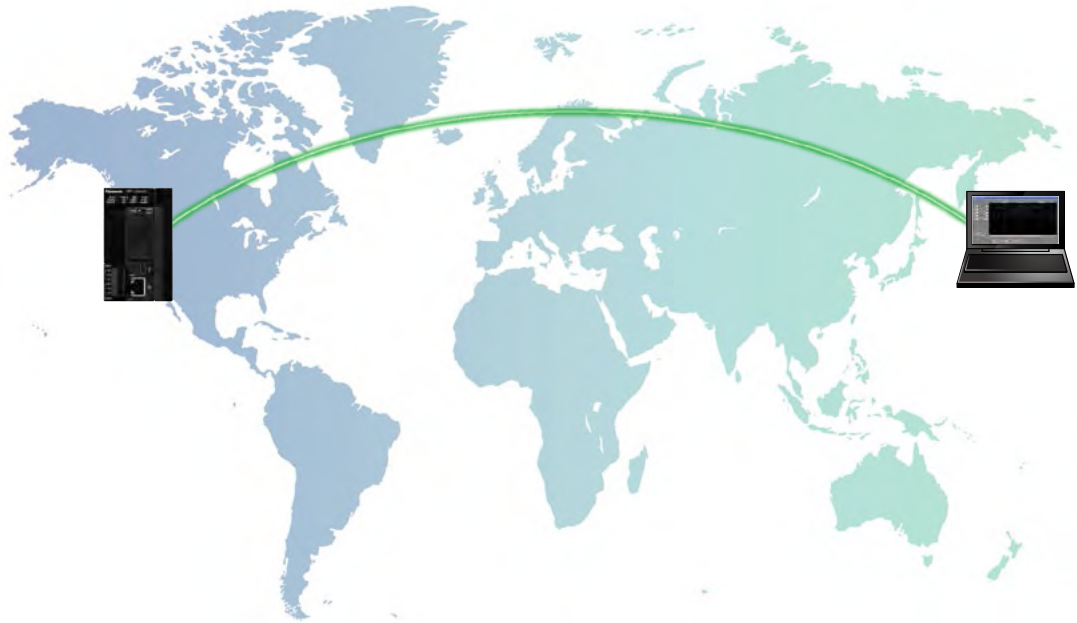Analog cassette

No communication unit

Local & remote connectivity

The FP7 is dedicated to the total integration into Web applications. The standard CPU boards with Ethernet interface offer connectivity without limits, from remote programming to monitoring and data logging to FTP server and Modbus TCP.
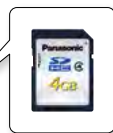
Data load to SD memory card from remote place

Logging function to SD memory card
Transfer function through Ethernet

- **Collection of traceability information**
- **Accessible from remote locations**
- **No logger unit offers lower costs.**

Data logging possible
- Constant-frequency logging
- Event trigger logging (instruction trigger type, bit-specific type)

FTP server

CSV format file

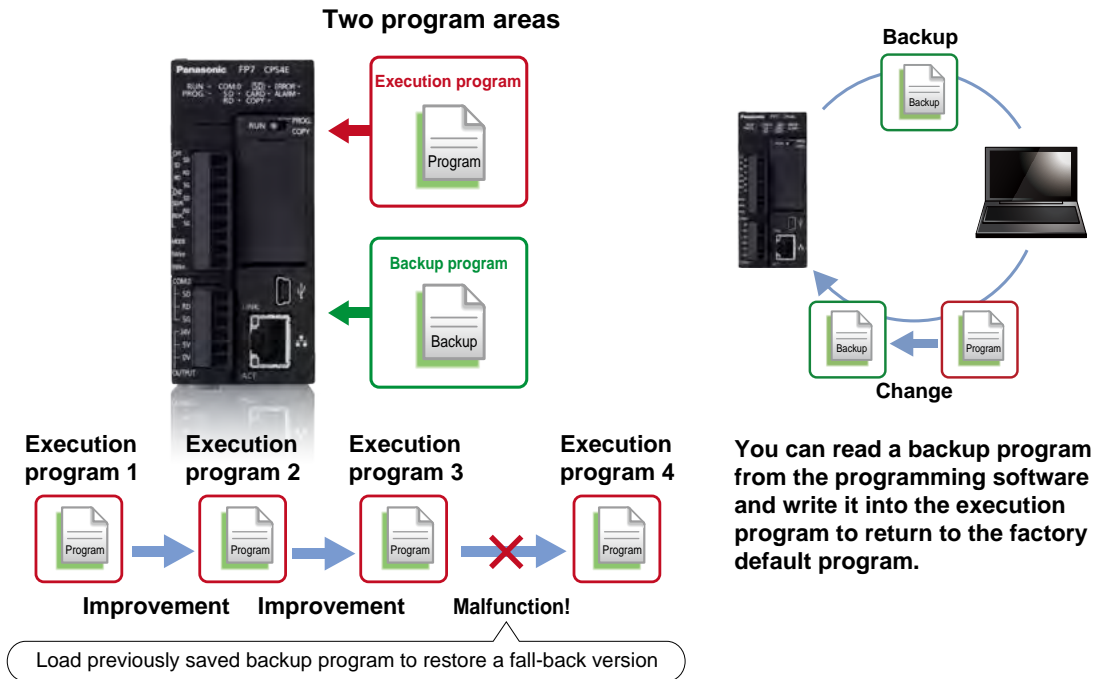Graphs can be created using spreadsheet software.

③ Security & reliability

The PLC programs can be password protected. Additionally, different security levels can be set, according to customer needs. The CPU unit can store two programs. In the event of fault, no SD memory card is needed to return to a previously saved backup program.
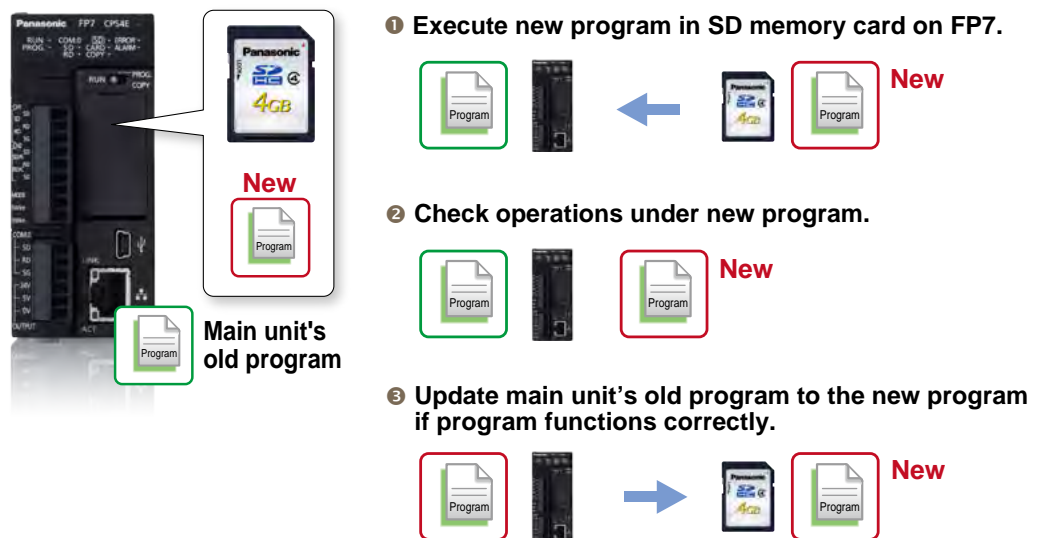
Built-in program backup

- Production can resume in the event of fault
- Original program is immediately to hand

Two program areas

Execution program

Backup program

Execution program 1	Execution program 2	Execution program 3	Execution program 4
Program	Program	Program	Program

Improvement   **Improvement**   **Malfunction!**

Load previously saved backup program to restore a fall-back version

Backup

Change

You can read a backup program from the programming software and write it into the execution program to return to the factory default program.

Update PLC program only after functional check

- Operation can be tested on SD memory card

New

Main unit's old program

❶ **Execute new program in SD memory card on FP7.**

New

❷ **Check operations under new program.**

New

❸ **Update main unit's old program to the new program if program functions correctly.**

New

Traceability

Operational and program editing events are logged. Automatic logs of program download and upload are useful, especially for program debugging.

Automatic recording of program change history

• Useful for debugging

Date of occurrence	Time	Trigger
2012/11/21	14:05:35	Power: ON
2012/11/21	14:07:13	Open cover
2012/11/21	14:20:25	Insert SD memory card.
2012/11/21	14:30:19	Close cover
2012/11/21	14:31:00	Download program
2012/11/21	14:33:10	Switch operation mode to RUN
2012/11/21	14:35:12	Program edition during RUN
2012/11/21	14:35:32	Upload program
2012/11/21	14:40:07	Power: OFF

* Image

The log data stored on SD memory card.

• Collection of traceability information
• No logger unit offers lower costs.

Maintenance

The FP7 integrates several features that facilitate maintenance, diagnostics and troubleshooting. Set a maintenance schedule that is based on automatic measurement of contact switching cycles or overall ON time.

Hour meter operation

• Indication of maintenance schedule for peripheral equipment
• Indication of maintenance schedule for the PLC itself

Monitor input and output contact states.

Power-on time ≠ Equipment operating time

Input contacts (X)
Automatically measures and logs total ON times and number of ON operations of connected sensors.

Output contacts (Y)
Automatically measures and logs total ON times and number of ON operations of connected actuators. The maintenance schedules for relays, motors, etc. can be optimized.

$$T = T1 + T2 + T3$$

| | T1 | T2 | T3 |

Contact ON time

Number of ON operations of contact: 1 time, 2 times, 3 times
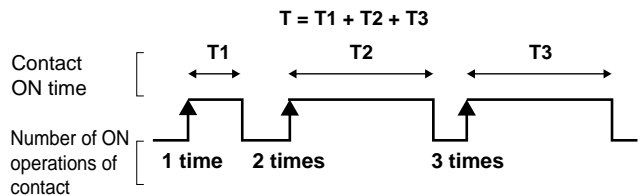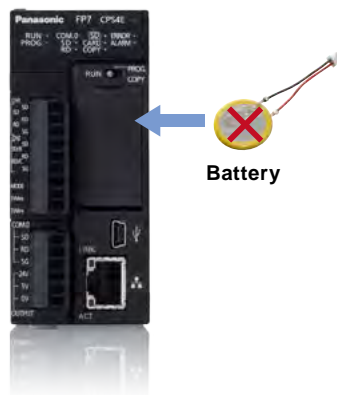
Records the PLC's ON time
Equipment operating time can be estimated. You can decide which equipment to give priority to reactivate if more than one item of equipment is idle.

Data backup without battery

• Simplified maintenance of equipment

Battery

Item	Without battery	With battery
Program holding	Yes	Yes
Data register holding	Yes	Yes
Clock/calendar operation	No (Note 1)	Yes

Note: 1) Clock / calendar operation can be held for about a week if the equipment is switched off. (Allow at least 30 minutes of equipment ON time.)

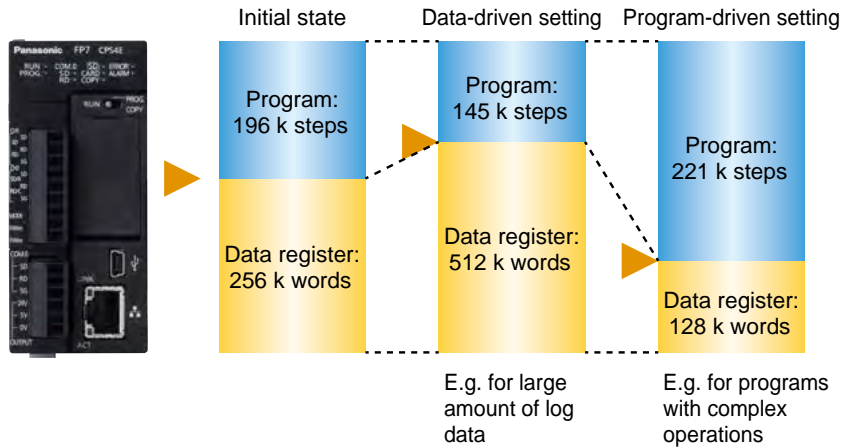**The built-in clock/calendar function can be adjusted via Ethernet.**

Performance

The FP7 has a large memory capacity for program and data (up to 234 k program steps or up to 976 k data words) and a high-speed processor (11 ns/step). Control FPWIN Pro is (up-and downward) compatible with all Panasonic PLCs.

Shareable program and data memory

• Both expandable when more capacity needed
• No need to purchase upgrade models

| | Initial state | Data-driven setting | Program-driven setting |

	Program: 196 k steps	Program: 145 k steps	Program: 221 k steps
	Data register: 256 k words	Data register: 512 k words	Data register: 128 k words
		E.g. for large amount of log data	E.g. for programs with complex operations

AFP7CPS41E
Reference value: for 196 k steps type CPU unit

Program	Data register
234 k steps approx.	64 k words approx.
221 k steps approx.	128 k words approx.
196 k steps approx.	256 k words approx.
145 k steps approx.	512 k words approx.
52 k steps approx.	976 k words approx.

Note: For data register (DT), data up to 256 k words can be backed up.

AFP7CPS31E / AFP7CPS31

Program	Data register
120 k steps approx.	128 k words approx.
96 k steps approx.	256 k words approx.
64 k steps approx.	416 k words approx.
32 k steps approx.	576 k words approx.

AFP7DA4H

AFP7AD4H

New analog units with high-speed DA and AD conversion

• Conversion speed 20 times faster than in previous models
• High-accuracy control
• Noise-resistant with isolated channels

Advanced motion control (cam & gear)

FP7 programmable controllers are perfectly integrated with MINAS A5 servo drivers for accurate and sophisticated control in applications with up to 64 axes.

Besides, it is possible to set linear or sinusoidal acceleration and deceleration; startup/stop and speed changes are easy to accomplish in applications with high inertia loads.

AFP7PP02T   AFP7PP04T   AFP7PP02L   AFP7PP04L

FP7 positioning units can handle complex motion control tasks, e.g.

- Position and speed control
- Electronic cam control
- Axis synchronization operations (gear and clutch functions)
- Linear, circular and spiral interpolation (2/3 axes)

MINAS
A5 series

Positioning can be tested with only the tool.

Since the positioning tool is independent of the ladder program, trial operation and debugging is possible using only the positioning unit.

Tool operation

Motor

FP7 CPU unit   Motor amplifier   Slider (table)
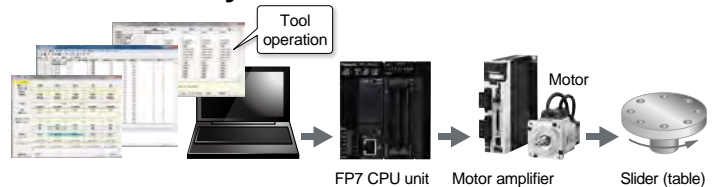
Electronic cam control

Electronic cam control allows fast and precise movements and increases the productivity and dynamics in all non-linear movements. Using a configurator software, it is possible to create advanced motion profiles quickly and easily. The tool offers the possibility to insert electronic cam profiles for master and slave axes. Up to 16 cam profiles per slave axis and 20 different sections per master axis can be managed. The master axis can be either a physical or a virtual axis as well as an external encoder.

You can even manage complex movements in processes where you have to work on moving material without interruption, e.g. in wood, textile, plastic or paper applications with flying saws.

Typical applications

- Wrapping and packaging machines
- Bottling machines
- Binding machines
- Pick and place
- Assembly machines
- Molding and sealing machines
- Machines for binding
- Wood and metal machines
- Textile machines
- Cutting, welding, sawing
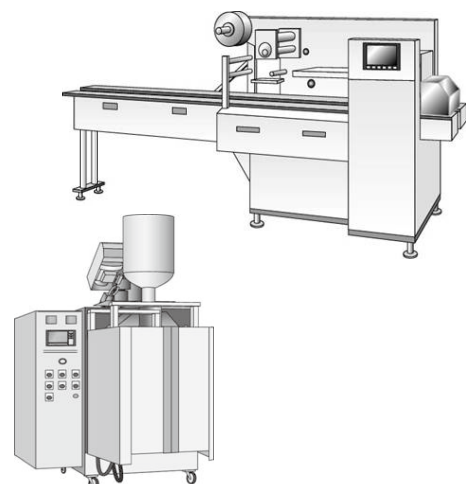
FP7 series Lineup

CPU units

►P.12

Standard model

196 k steps with Ethernet
AFP7CPS41E

120 k steps with Ethernet
AFP7CPS31E

120 k steps
AFP7CPS31

Standard model Security enhanced type

196 k steps with Ethernet
AFP7CPS41ES

120 k steps with Ethernet
AFP7CPS31ES

120 k steps
AFP7CPS31S

End unit

*Included with CPU unit

Add-on cassettes

►P.13, 14

Communication cassettes

RS232C 1 channel
AFP7CCS1

RS232C 2 channels
AFP7CCS2

RS422 / RS485 1 channel
AFP7CCM1

RS422 / RS485 2 channels
AFP7CCM2

RS232C 1 channel and RS485 1 channel
AFP7CCS1M1

Ethernet 1 channel
AFP7CCET1

Function cassettes

Analog input
AFP7FCAD2

Analog input and output
AFP7FCA21

Thermocouple input
AFP7FCTC2

Power supply units

►P.22

AC power supply units

AC power supply unit
AFP7PSA1

AC power supply unit (High-capacity type)
AFP7PSA2

Digital input and output units

►P.15

Input units

Terminal block 16 points, 12 to 24 V DC input
AFP7X16DW

MIL connector 32 points, 24 V DC input
AFP7X32D2

MIL connector 64 points, 24 V DC input
AFP7X64D2

Output units

Terminal block 16 points, relay output
AFP7Y16R

Terminal block 16 points, transistor output (sink)
AFP7Y16T

MIL connector 32 points, transistor output (sink)
AFP7Y32T

MIL connector 64 points, transistor output (sink)
AFP7Y64T

Terminal block 16 points, transistor output (source)
AFP7Y16P

Output units

MIL connector 32 points, transistor output (source)
AFP7Y32P

MIL connector 64 points, transistor output (source)
AFP7Y64P

Input and output units

MIL connector 32 points, 24 V DC input 32 points, transistor output (sink)
AFP7XY64D2T

MIL connector 32 points, 24 V DC input 32 points, transistor output (source)
AFP7XY64D2P

Analog input and output units
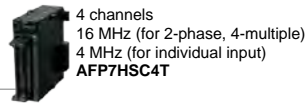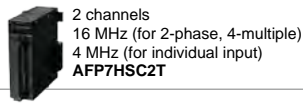
►P.18

Input unit

High-speed and high-accuracy type 4 points, voltage and current
AFP7AD4H

Output unit

High-speed and high-accuracy type 4 points, voltage and current
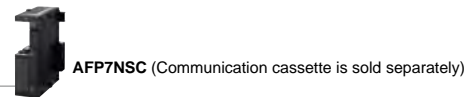**AFP7DA4H**

High-speed counter units ►P.19

2 channels
16 MHz (for 2-phase, 4-multiple)
4 MHz (for individual input)
AFP7HSC2T

4 channels
16 MHz (for 2-phase, 4-multiple)
4 MHz (for individual input)
AFP7HSC4T

Positioning units ►P.20

Pulse train

Transistor output
2 axes
500 kpps
AFP7PP02T

Transistor output
4 axes
500 kpps
AFP7PP04T

Line driver output
2 axes
4 Mpps
AFP7PP02L

Line driver output
4 axes
4 Mpps
AFP7PP04L

Pulse output units ►P.21

Transistor output
2 axes
500 kpps
AFP7PG02T

Transistor output
4 axes
500 kpps
AFP7PG04T

Line driver output
2 axes
4 Mpps
AFP7PG02L

Line driver output
4 axes
4 Mpps
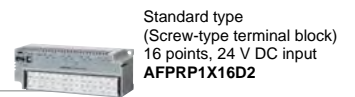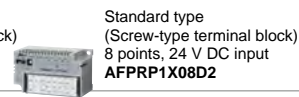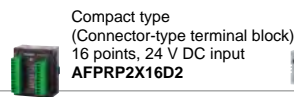**AFP7PG04L**

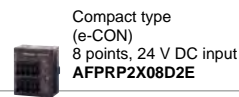## Serial communication unit ►P.22

AFP7NSC (Communication cassette is sold separately)

PHLS (remote I/O) units ►P.23

PHLS master unit **AFP7PHLSM**

PHLS slave units
Input type

Compact type
(e-CON)
8 points, 24 V DC input
AFPRP2X08D2E

Compact type
(Connector-type terminal block)
16 points, 24 V DC input
AFPRP2X16D2

Standard type
(Screw-type terminal block)
8 points, 24 V DC input
AFPRP1X08D2

Standard type
(Screw-type terminal block)
16 points, 24 V DC input
AFPRP1X16D2

PHLS slave units
Output type

Compact type
(Connector-type terminal block)
16 points, transistor output (sink)
AFPRP2Y16T

Compact type
(Connector-type terminal block)
4 points, relay output
AFPRP2Y04R

Standard type
(Screw-type terminal block)
16 points, transistor output (sink)
AFPRP1Y16T
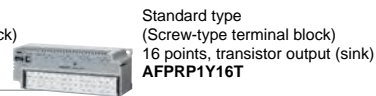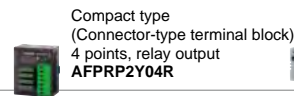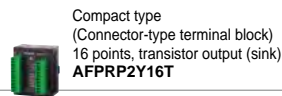
PHLS slave units
Input and output types

Compact type
(Connector-type terminal block)
8 points, 24 V DC input
8 points, transistor output (sink)
AFPRP2XY16D2T

Standard type
(Screw-type terminal block)
8 points, 24 V DC input
8 points, transistor output (sink)
AFPRP1XY16D2T
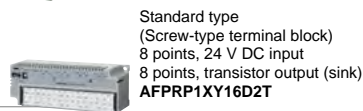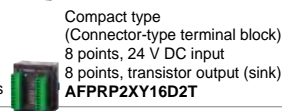
Note: Compact type **AFPRP2□** is not conforming to EMC Directive.

CPU units

AFP7CPS41E(S)

AFP7CPS31E(S)

AFP7CPS31(S)

Compact size with room for expansion functions

- **Equipped with a cassette interface.**
  Add-on cassettes can be added to the CPU to increase functionality without increasing the width of the unit. Communication cassettes support RS232C, RS422 and RS485 serial communications.

- **Up to 16 different units can be connected to a single CPU**

- **High-capacity SD (SDHC) memory cards of up to 32 GB are supported.**

- **High performance (min. scan time 1ms, max. 20 μs for 60 k steps); the processing speed is less susceptible to frequent Ethernet communication**

- **GT power supply terminals for connecting 5 V or 24 V DC type GT series programmable displays**

- **High function types, increased security (encryption), are available.**

■Performance specifications

Item		AFP7CPS41E(S) (Note 6)				
Memory capacity	Memory selection pattern (Note 1)	1	2	3	4	5
	Program (steps)	234,000	221,500	196,000	144,500	51,500
	Data register (words) (Note 2)	65,536	101,072	262,144	524,288	999,424
	Number of max. program block (PB)	468	443	392	289	103

Item		AFP7CPS31E(S) / AFP7CPS31(S) (Note 6)			
Memory capacity	Memory selection pattern (Note 1)	1	2	3	4
	Program (steps)	121,500	96,000	64,000	32,000
	Data register (words) (Note 2)	131,072	262,144	425,984	589,824
	Number of max. program block (PB)	243	192	128	64

Item	AFP7CPS41E(S) / AFP7CPS31E(S) / AFP7CPS31(S) (Note 6)
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. 11 ns/step
External input (X)/output (Y)	8,192 points (Note 3) / 8,192 points (Note 3)
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
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
SD memory card function	SDHC memory cards of up to 32 GB are usable.
Constant scan	Available (0 to 125 ms)
Real time clock (Note 4)	Built in. Date backup with battery.
Battery life (Value applies when no power is supplied at all.)	3.3 years or more (when no power is supplied)actual usage value: 20 years approx. (at 25 °C 77 °F)
Safety function (Note 5)	Password / Read disable setting / Encryption (every PB)
PLC Link function	Max. 16 units, link relays: 1,024 points, link registers: 128 words. (Data transfer and remote programming are not supported)

Notes 1) The factory default setting is pattern 3 for **AFP7CPS41E(S)** and pattern 1 for **AFP7CPS31E(S)** and **AFP7CPS31(S)**.
2) For data register (DT), data up to 262,144 words can be backed up.
3) Hardware configuration governs the actually usable number of I/O points. When I/O points are not actually used, usable as internal relays
4) 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
5) Encryption can be used for **AFP7CPS41ES**, **AFP7CPS31ES** and **AFP7CPS31S**.
6) Products with an **"S"** at the end of a part number have the encryption function.

■COM port communication specifications

Item	Specifications
Interface	RS232C, 1 channel
Transmission distance	15 m 49 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

■Dedicated power supply output port specifications for GT series programmable display

Terminal	Connecting Programmable Display model
5 V	For 5 V DC type GT series Programmable Display
24 V	For 24 V DC type GT series Programmable Display

Note: 5 V and 24 V DC types are not usable at the same time.

■LAN port communication specifications [without AFP7CPS31(S)]

Item	Specifications
Communication interface	Ethernet 100BASE-TX / 10BASE-TX
Baud rate	100 Mbps, 10 Mbps auto negotiation function
Total cable length	100 m 328 ft (500 m 1,640 ft when a repeater is used)
Number of nodes	Max. 254 units
Number of simultaneous connections	Max. 20 connections (user connection: 16, system connection: 4)
Communication protocol (Communication layer)	TCP / IP, UDP
DNS	Supports name servers
DHCP / DHCPV6	Automatic IP address acquisition
FTP server	File transfer, server function, number of user: 3
SNTP	Time adjustment function
General-purpose communication	16 kB / 1 connection
Dedicated communication	Slave communication (MEWTOCOL-COM,MEWTOCOL7-COM, MEWTOCOL-DAT,MODBUS-TCP) Master communication (MEWTOCOL-COM,MEWTOCOL-DAT, MODBUS-TCP)

Add-on cassettes (communication cassettes)

AFP7CCM2 AFP7CCS1M1 AFP7CCET1

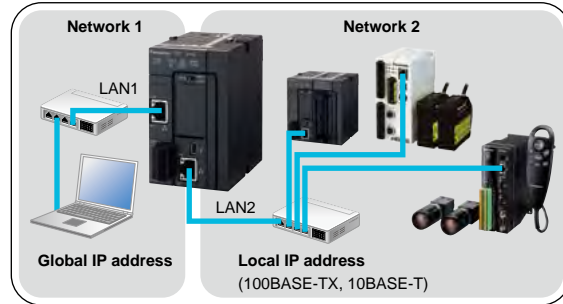AFP7CCS1 AFP7CCS2 AFP7CCM1

For communication with programmable displays or PCs and for data exchange between PLCs

- **Serial communication functions can be added to the CPU.**
  6 types are available including RS232C dedicated cassettes, cassettes to support either RS422 or RS485 or Ethernet, and cassettes that support any combination of RS232C and RS485.

[Configuration example]

Network 1 Network 2

LAN1

LAN2

Global IP address Local IP address (100BASE-TX, 10BASE-T)

- **Protocol supports MODBUS-RTU.**
  Communication can easily be accomplished using comfortable communication instructions.

■Specifications

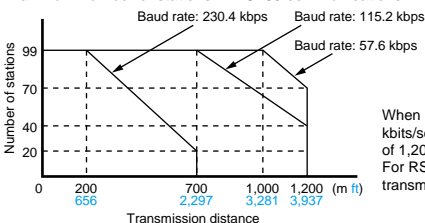| Item	AFP7CCS1	AFP7CCS2 (Note 6)	AFP7CCM1 (Note 5)	AFP7CCM2 (Note 5)	AFP7CCS1M1	
Interface	RS232C, 1 channel	RS232C, 2 channels	RS422 or RS485, 1 channel	RS422 or RS485, 2 channels	RS232C, 1 channel and RS485, 1 channel	
Transmission distance	Max. 15 m 49 ft (Note 1)		Max. 1,200 m 3,937 ft at RS485 mode (Note 2 and 3) Max. 400 m 1,312 ft at RS422 mode (Note 2 and 3)		Max. 15 m 49 ft (RS232C) (Note 1)	Max. 1,200 m 3,937 ft (RS485) (Note 2 and 3)
Transmission speed	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400 bits/sec.					
Communication method	Half-duplex					
Synchronous method	Start-stop synchronization					
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.					
Max. number of stations (Note 2, 3 and 4)	–	–	For program controlled communication: max. 99 (Note 7)	–	For program controlled communication: max. 99	
			For MEWTOCOL COM: max. 99 (Note 7)		For MEWTOCOL COM: max. 99	
			For PLC link: max. 16 (Note 7)		For PLC link: max. 16	
			For MODBUS-RTU: max. 99 (Note 7)		For MODBUS-RTU: max. 99	

When connecting a commercially available device that has an RS485 / RS422 interface, please confirm operation using the actual device.
In some cases, the number of station units, transmission distance and communication speed vary depending on the connected device.
Notes: 1) Cable length should be no longer than 3 m 9.8 ft if communicating at a rate of 38.4 kbits/sec. or higher.
If you are using RS232C wiring, shielded cable should be used to improve noise immunity.
2) For RS485 setting, the values for transmission distance, transmission speed and number of connected units should be within the values noted in the graph below.

Maximum number of stations in RS485 communications

Baud rate: 230.4 kbps Baud rate: 115.2 kbps
Baud rate: 57.6 kbps

Number of stations: 99 70 40 20

Transmission distance: 0 200 656 700 2,297 1,000 3,281 1,200 3,937 (m ft)

When using a transmission speed of 38.4 kbits/sec. or less, you can set up a maximum of 1,200 m 3,937 ft and 99 units.
For RS422 setting, you can set up a maximum transmission distance of 400 m 1,312 ft.

3) If mixed C-NET adapters are used, up to 32 units can be connected, but transmission speed will be limited to a maximum of 19.2 kbits/sec..
4) The converter SI-35 manufactured by LINE EYE Co., Ltd. is recommendable for the RS485 at the computer side.
When you use the SI-35, please adjust time after **FP7** series PLC receives a command until it returns a response by a program.
5) RS422 or RS485 can be selected using the DIP switch built into the communication cassette.
6) Using the DIP switch built into the communication cassette allows the interface to be used as RS232C 5-wire system × 1 channel.
7) 1:1 for RS422 interface

Item	AFP7CCET1
Interface	Ethernet 100BASE-TX / 10BASE-TX
Communication speed	100 Mbps, 10 Mbps Auto negotiation function
Total cable length	100 m 328.084 ft (500 m 1,640.420 ft when a repeater is used)
Number of nodes	Max. 254 units
Number of simultaneous connections	Max. 4 connections (User connection: 3, System connection: 1)
Communication protocol (Communication layer)	TCP / IP, UDP
DHCP	Automatic IP address acquisition
General-purpose communication	4 kB / 1 connection
Dedicated communication	Slave communication (MEWTOCOL-COM, MEWTOCOL7-COM, MEWTOCOL-DAT)
	Master communication (MEWTOCOL-COM, MEWTOCOL7-COM, MEWTOCOL-DAT)

Notes: 1) Please connect the Ethernet cable with the power turned off.
2) You cannot use this cassette "AFP7CCET1" with the serial communication unit.

Add-on cassettes (function cassettes)

Add Analog I/O, temperature input function
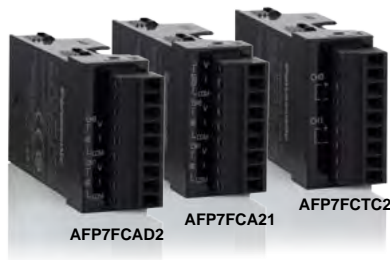
- **Analog I/O and temperature input functions can be added to the CPU unit.**

  Low cost expansion of the CPU unit with an analog function is easy and installation space can be reduced.

  Analog cassette
  - Analog input (2 channels)
  - Analog input and output (input: 2 channels, output: 1 channel)
  - Thermocouple (2 channels)

- **Low cost addition of functions**

  Reduced cost and space are realized compared to the analog input and output unit.

AFP7FCAD2
AFP7FCA21
AFP7FCTC2

ANALOG INPUT CASSETTE / ANALOG INPUT AND OUTPUT CASSETTE
■Input specifications

Item		AFP7FCAD2 / AFP7FCA21
Number of input points		2 channels (non-insulated between channels)
Input range	Voltage	0 to 10 V / 0 to 5 V *Switch setting (individual settings possible)
	Current	0 to 20 mA
Digital conversion value		K0 to K4000
Resolution		1/4000 (12 bits)
Conversion speed		1 ms / channel
Overall precision		±1 % F.S. or less (0 to 55 ºC 32 to 131 ºF)
Input impedance	Voltage	1 MΩ
	Current	250 Ω
Absolute maximum input	Voltage	−0.5 V, +15 V
	Current	+30 mA
Insulation method		• Between analog input terminal and internal digital circuit: transformer insulation, isolation IC insulation • Between analog input terminal and analog output terminal: transformer insulation, isolation IC insulation
Connection method		Connector type terminal block

Note: Input specifications of the analog I/O cassette and analog input cassette are the same.

THERMOCOUPLE CASSETTE
■Specifications

Item		AFP7FCTC2
Number of input points		2 channels (insulated between channels)
Input range*	K type thermocouple	−50.0 to 500.0 ºC −58.0 to 932.0 ºF
	J type thermocouple	−50.0 to 500.0 ºC −58.0 to 932.0 ºF
Digital conversion value	Normal time	K−500 to K5000
	When range over	K−501, K5001 or K8000
	When the thermocouple broken	K8000
	When data preparation	K8001
Resolution		0.2 ºC 32.36 ºF (Display is 0.1 ºC 32.18 ºF with the software averaging process.)
Sampling cycle		100 ms / 2 channels
Overall precision		±0.5 % F.S. or less and cold contact accuracy: 1.5 ºC 34.7 ºF (0 to 55 ºC 32 to 131 ºF)
Input impedance		344 KΩ
Insulation method		• Between thermocouple input terminal and internal digital circuit: transformer insulation, isolation IC insulation • Between thermocouples: transformer insulation, isolation IC insulation
Connection method		Connector type terminal block

Note: Thermocouple setting can be switched with the switch on the front of the cassette.

ANALOG INPUT AND OUTPUT CASSETTE
■Output specifications

Item		AFP7FCA21
Number of output points		1 channel
Output range	Voltage	0 to 10 V / 0 to 5 V *Switch setting
	Current	0 to 20 mA
Digital conversion value		K0 to K4000
Resolution		1/4000 (12 bits)
Conversion speed		1 ms / channel
Overall precision		±1 % F.S. or less (0 to 55 ºC 32 to 131 ºF)
Output impedance		0.5 Ω (voltage output)
Max. output current		10 mA (voltage output)
Absolute output load resistance		600 Ω or less (current output)
Insulation method		• Between analog input terminal and internal digital circuit: transformer insulation, isolation IC insulation • Between analog input terminal and analog output terminal: transformer insulation, isolation IC insulation
Connection method		Connector type terminal block

Note: There is no analog output functionality in the analog input cassette.

Digital input and output units

AFP7X16DW **AFP7X32D2** **AFP7Y64P** **AFP7XY64D2P**

* Photograph shows typical models for each shape.

I/O points can be added as necessary.

- **Input/output mixed units are available.**

  A single I/O mixed unit has 32 input points and 32 output points. The necessary I/O points can be efficiently obtained, resulting in a compact PLC at reduced cost. Dedicated input or output units are also available.

- **Transistor output unit is designed for 300 mA current capacity.**

  The 64 points transistor output unit is equipped with 8 contact points with 300 mA current capacity. Large indicator lamps, magnetic contacts, etc. that previously required relay outputs or external relays can be driven directly. Equipment can be made both more compact and cheaper.

Relay Indicating lamp **Direct drive** **Reduced space and cost**

- **Input time constants are configurable.**

  Response speed can be selected from 0.1 ms, 0.5 ms, 1 ms, 5 ms, 10 ms, 20 ms or 70 ms, depending on the output equipment to be used.

ON OFF **Malfunction!** Adjust the time constant **Reduced malfunction**

■ Input/output specifications

Item		DC input units			I/O mixed unit (input side)
		16 points type	32 points type	64 points type	DC input / sink output type
Insulation method		Photocoupler			
Rated input voltage		12 to 24 V DC	24 V DC		24 V DC
Rated input current		6 mA approx. (at 24 V)	2.7 mA		2.7 mA
Impedance		3.6 kΩ	8.2 kΩ		8.2 kΩ
Min. ON voltage / min. ON current		9.6 V / 2 mA	19.2 V / 2.5 mA		19.2 V / 2.5 mA
Max. OFF voltage / max. OFF current		2.5 V / 1 mA	5 V / 1.5 mA		5 V / 1.5 mA
Response time	OFF→ON	0.1 ms or less	0.2 ms or less		0.2 ms or less
	ON→OFF	0.2 ms or less	0.2 ms or less		0.2 ms or less
Input points per common		8 points / common	32 points / common		32 points / common
Operating mode indicator		16 points LED display (lights when ON)	32 points LED display (lights when ON)		32 points LED display (lights when ON, selectable by switch)
Connection method		Terminal block	40-pin MIL connectors		40-pin MIL connectors

Note: Changeable by settable input time constant

| Item	Relay output unit	Transistor output units				I/O mixed unit (output side)
	16 points type	16 points (NPN)	32 points (NPN)	64 points (NPN)	16 points (PNP)	32 points (NPN)
Insulation method	Relay	Photocoupler				Photocoupler
Nominal switching capacity	2 A 250 V AC / 2 A 30 V DC	–	–	–	–	–
Min. load	1 mA 100 mV DC (resistive load)	–	–	–	–	–
Output type	–	Open collector				
Rated load voltage	–	5 to 24 V DC				
Operating load voltage range	–	4.75 to 26.4 V DC				
Max. load current — 0.3 A (Y0 to Y7)	–	1 A	0.3 A (26.4 to 20.4 V DC) 30 mA (4.75 V DC)	0.3 A (20.4 to 26.4 V DC) 30 mA (4.75 V DC)	1 A	0.3 A (20.4 to 26.4 V DC) 30 mA (4.75 V DC)
Max. load current — 0.1 A (all)	–			0.1 A (20.4 to 26.4 V DC) 15 mA (4.75 V DC)		0.1 A (20.4 to 26.4 V DC) 15 mA (4.75 V DC)
Common restriction	5 A	5 A	3.2 A / common		5 A	3.2 A / common
Max. surge current	–	3 A	0.6 A		3 A	0.6 A
OFF state leakage current	–	1 µA or less			1 µA or less	
ON state voltage drop	–	0.5 V or less			0.5 V or less	
Output points per common	16 points / common	16 points / common	32 points / common		16 points / common	32 points / common
Operation mode indicator	16 points LED display	16 points LED display	32 points LED display		16 points LED display	32 points LED display
Connection method	Terminal block	Terminal block	40-pin MIL connectors		Terminal block	40-pin MIL connectors

■Output specifications

Item		Transistor output units		I/O mixed unit (output side)
		Source type (PNP open collector)		Source type (PNP open collector)
		32 points type	64 points type	32 points type
Insulation method		Photocoupler		
Output type		Open collector		
Rated load voltage		5 to 24 V DC		
Load voltage allowable range		4.75 to 26.4 V DC		
Max. load current	0.3 A (Y0 to Y7)	0.3 A (26.4 to 20.4 V DC) 30 mA (4.75 V DC)		0.3 A (20.4 to 26.4 V DC) 30 mA (4.75 V DC)
	0.1 A (other than that above)			0.1 A (20.4 to 26.4 V DC) 15 mA (4.75 V DC)
Common restriction		3.2 A/common		
Max. surge current		0.6 A		
OFF state leakage current		1 μA or less		

| Item		Transistor output units		I/O mixed unit (output side)
		Source type (PNP open collector)		Source type (PNP open collector)
		32 points type	64 points type	32 points type
ON state maximum voltage drop		0.5 V or less		
Repose time	OFF→ON	0.1 ms or less (at load current 2 mA or more)		
	ON→OFF	0.5 ms or less (at load current 2 mA or more)		
External power supply	Voltage	4.75 to 26.4 V DC		
	Current (at 24 V)	130 mA	90 mA/common	90 mA
Surge absorber		Zener diode		
Short circuit protection		–		
Output points per common		32 points/common		
Operating mode indicator		32 points LED display (lights when ON)	32 points LED display (lights when ON, selectable by switch)	
External connection method		Connector (MIL-compliant 40 pins)	Connector (MIL-compliant 40 pins, two use)	Connector (MIL-compliant 40 pins, one use)

■I/O circuit diagrams

● DC input unit [input circuit diagrams]
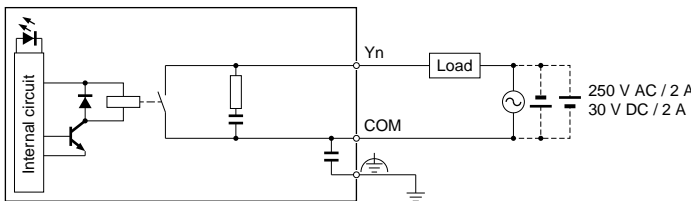
[16 points]
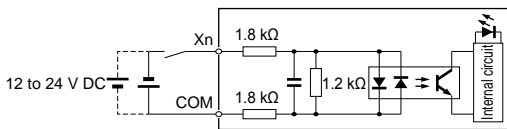
[32 points / 64 points]
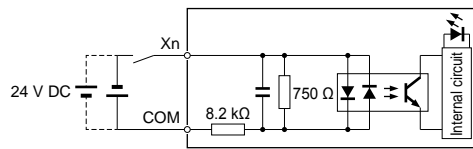
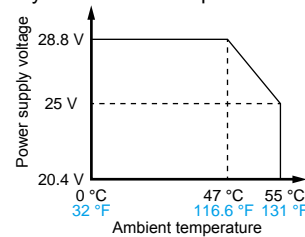Reduce simultaneous ON points according to the graph below.
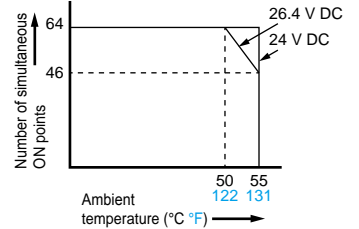
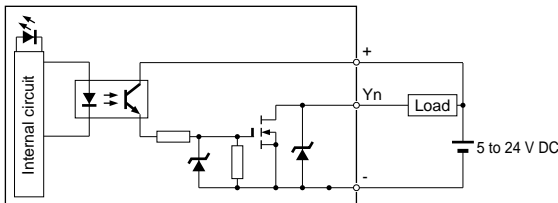● Relay output unit [output circuit diagram]
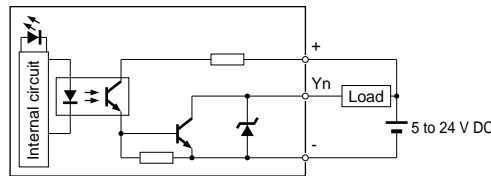

■Limitations on power supply voltage
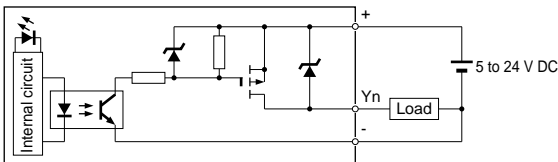Reduce power supply voltage according to the graph below by the ambient temperature.

● Transistor output unit [output circuit diagram]
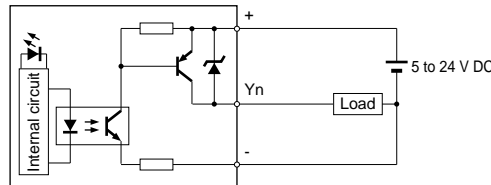
[Sink type, 16 points]
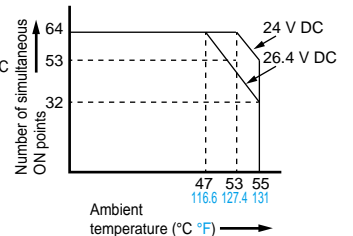

[Sink type, 32 points / 64 points]

[Source type, 16 points]
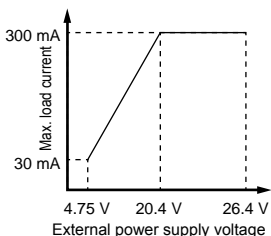

[Source type, 32 points / 64 points]
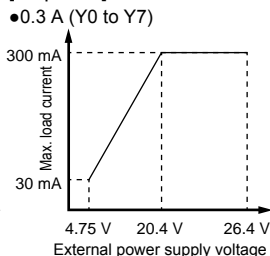

Limitations on simultaneous ON points [64 points]

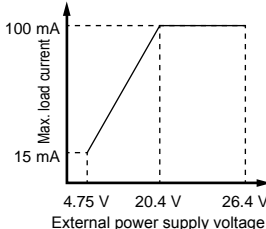Note: Reduce load current according to the graph below by the external power supply voltage.
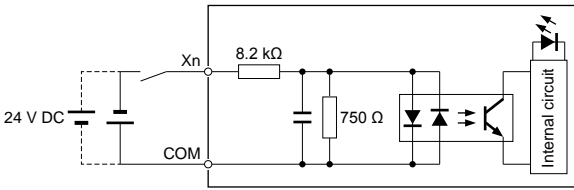
[32 points]

[64 points]

●0.3 A (Y0 to Y7)

●0.1 A (except Y0 to Y7)

■I/O circuit diagrams

● I/O mixed unit [I/O circuit diagram]

[Input circuit, sink type]

[Output circuit, sink type]
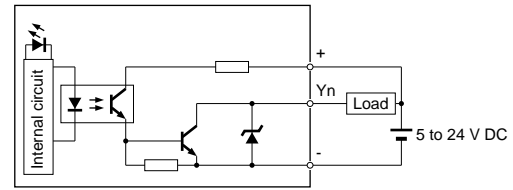
Limitations on simultaneous ON points
(common to input and output)

Note: Reduce load current according to the graph below by the external power supply voltage.

● 0.3 A (Y0 to Y7)

● 0.1 A (except Y0 to Y7)

[Input circuit, source type]

[Output circuit, source type]

Limitations on simultaneous ON points
(common to input and output)

Note: Reduce load current according to the graph below by the external power supply voltage.

● 0.3 A (Y0 to Y7)

● 0.1 A (except Y0 to Y7)

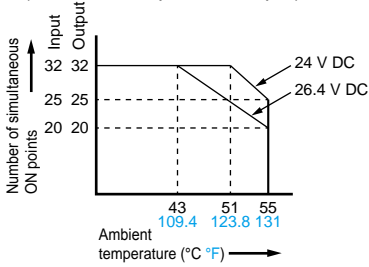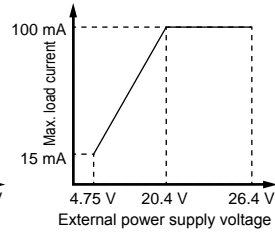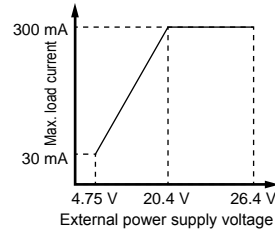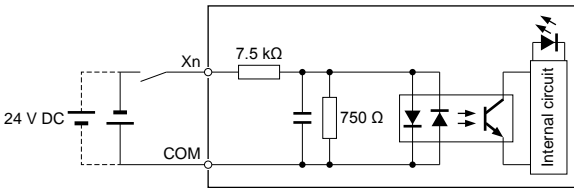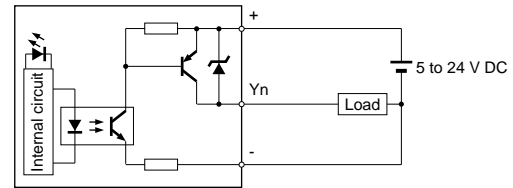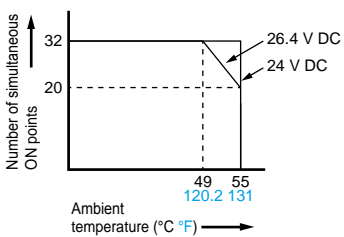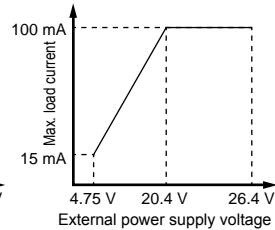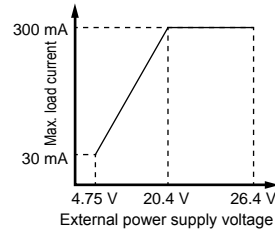# Analog input and output units

Channel insulation is switchable to support various devices

AFP7DA4H

AFP7AD4H

• 20 times faster conversion than in previous model

A conversion rate of 25 µs/channel is possible, 20 times faster than the previous model's 500 µs/channel conversion speed. The system's production efficiency can be improved due to precise control. High speed sampling can be achieved, independent of the PLC's scan time.
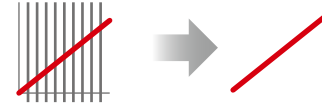
Dependent on scan of CPU

The scan gets delayed when the CPU slows down due to other processes and sampling becomes sporadic.

Occurrence of failure
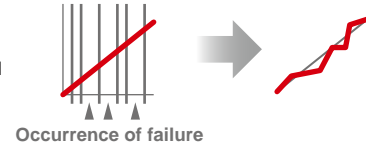
Sampling in the analog unit

Accurate sampling possible with fixed cycle.

• High-accuracy control

High-accuracy of ± 0.05 % (at 25 °C 77 °F) of full scale can be achieved. The high-resolution performance allows users to achieve reliable control.

• Noise-resistant with isolated channels

Channel insulation can be activated to guard against interference from other channels. No need to worry about the power supply system of the objects being measured.

■Control specifications

Item			AFP7AD4H
Number of input channels			4
Input range	Voltage		-10 to +10 V (resolution: 1/62,500) 0 to 10 V (resolution: 1/31,250) 0 to 5 V (resolution: 1/31,250) 1 to 5 V (resolution: 1/25,000)
	Current		0 to 20 mA (resolution: 1/31,250) 4 to 20 mA (resolution: 1/25,000)
Conversion speed	Voltage / current		25 µs/channel (at non-insulated channels) 5 ms/channel (at insulated channels)
Overall accuracy			± 0.05 % F.S. or less (at 25 °C 77 °F) ± 0.1 % F.S. or less (at 0 to 55 °C 32 to 131 °F)
Input	Voltage input		1 MΩ
	Current input		250 Ω
Max. input range			-15 to +15 V voltage input -2 to +30 mA current input
Insulation method	Between input terminals and internal circuit		Photocoupler and isolated DC/DC converter
	Between channels		PhotoMOS relay
Digital processing	Averaging	Number of times	Setting range: 2 to 60,000 times
		Time duration	Setting range: 1 to 1,500 ms (at non-insulated channels), 200 to 60,000 ms (at insulated channels)
		Moving	Range setting: 2 to 2,000 times
	Scale conversion setting		Any value within ±30,000
	Offset setting		Any value within ±3,000
	Gain setting		Any value within 9,000 to 11,000
Input range change method			Selectable per channel
Conversion execution / non-execution channel setting			Selectable per channel unit
Max. and min. value holding			Selectable for one channel
Comparison of upper and lower limit values			Selectaable per channel (hysteresis)
Broken wire detection			When less than 0.7 V / 2.8 mA (only when voltage input range 1 to 5 V or current input range 4 to 20 mA is set.)
Buffer function			3 trigger types: Soft trigger, External trigger and Input level

Item			AFP7AD4H
Trigger input section	Insulation method		Photocoupler
	Rated input voltage		24 V DC
	Rated input current		4.5 mA approx. (at 24 V DC)
	Input impedance		5.1 kΩ approx.
	Operating voltage range		21.6 to 26.4 V DC
	Min. ON voltage / Min. ON current		19.2 V / 3.5 mA
	Max. OFF voltage / Max. OFF current		5 V / 1.5 mA
	Response time	OFF→ON	0.2 ms or less
		ON→OFF	0.2 ms or less
	Input points per common		2 points/common
Connection method			Terminal block (M3 terminal screw)

■Analog output specifications

Item			AFP7DA4H
Number of output channels			4
Output range	Voltage		-10 to +10 V (resolution: 1/62,500) 0 to 10 V (resolution: 1/31,250) 0 to 5 V (resolution: 1/31,250) 1 to 5 V (resolution: 1/25,000)
	Current		0 to 20 mA (resolution: 1/31,250) 4 to 20 mA (resolution: 1/25,000)
Conversion speed	Voltage / current		25 µs/channel (at non-insulated channels) 5 ms/channel (at insulated channels)
Overall accuracy			± 0.1% F.S. or less (at 25 °C 77 °F) ± 0.3% F.S. or less (at 0 to 55 °C 32 to 131 °F)
Output impedance (voltage output)			0.5 Ω or less
Max. output current (voltage output)			10 mA
Permissible output load resistance (Current output)			500 Ω or less
Insulation method	Between the input terminals and internal circuit		Photocoupler and isolated DC/DC converter
	Between channels		Not insulated
Scale conversion setting			Any value within ±30,000
Offset and gain function	Offset setting		Any value within ±3,000
	Gain setting		Any value within 9,000 to 11,000
Output range change method			Selectable per channel
Conversion execution/non execution channel setting			Selectable for one channel
Upper and lower output limit clip function			Selectable per channel
Analog output holding (in PROG mode)			Present value/any value/not holding
Connection method			Terminal block (M3 terminal screws)

High-speed Counter Units

One of the fastest in industry added in lineup

- **Industry-leading class speed of 16 Mpps (for differential input and 2-phase, 4-multiple)**

  Accurate, real-time surveillance of inverter and motor rotation speed variation.

- **Supports 5 / 12 / 24 V DC and differential input.**

  Supports wide range of interface from 12 to 24 V DC, 5 V DC and differential input with one unit.

- **Powerful application support**

  Input pulse string frequency (period) can be measured inside the unit with built in periodical pulse counter function. Built-in ring counter function can easily detect index table position. Line speed adjustment and work length measurement are available with built-in clock that allows accurate time measurement.

- **Various functions can be used without a ladder program**

| Capture function of count value | Finite difference calculation of capture value | Interrupt using comparison match |
| Comparison match and band comparison | Measurement of frequency and number of revolution | Reset of Z number and preset |
| Reset and preset of external signal | Built-in clock selection | |

AFP7HSC2T   AFP7HSC4T

■Specifications

Item		Type / Model No.	2 ch type — AFP7HSC2T	4 ch type — AFP7HSC4T
Input	Insulation method		Photocoupler	
	Rated input voltage		12 to 24 V DC / 3.5 to 5 V DC	
	Input impedance	24 V DC / 5 V DC	3.0 kΩ approx. / 390 Ω approx.	
	Usage voltage range	24 V DC / 5 V DC	10.8 to 26.4 V DC / 3.5 to 5.25 V DC	
	Min. ON voltage / Min. ON current	24 V DC	10 V DC / 4 mA	
		5 V DC	3.0 V DC / 4 mA	
	Min. OFF voltage / Min. OFF current	24 V DC	2.0 V DC / 2 mA	
		5 V DC	1.0 V DC / 0.5 mA	
	Input time constant setting		None, 0.1 μs, 0.2 μs, 0.5 μs, 1.0 μs, 2.0 μs and 10.0 μs	
Count function	No. of counters		2 ch	4 ch
	Counter type		Linear counter / Ring counter	
	Counting range		Signed 32-bit (-2,147,483,648 to +2,147,483,647)	
	Max. input frequency		4 MHz / 8 MHz for individual input (phases A and B) (Duty ratio 50 ± 10 %) 4 MHz / 8 MHz for direction discrimination input (Duty ratio 50 ± 10 %) 4 MHz / 8 MHz /16 MHz for 2-phase input (Duty ratio 50 ± 10 %, Phase shifting below 5 %)	
	Input signal		Phases A, B and Z	
	External I/O		Control signal input: 4 points (2 points/ch) External output: 4 points (2 points/ch)	Control signal input: 8 points (2 points/ch) External output: 8 points (2 points/ch)
	Counter input type		Individual input: 1 multiple, 2-multiple Direction discrimination input: 1 multiple, 2-multiple 2-phase input: 1 multiple, 2-multiple, 4-multiple	
Measurement function	Frequency measurement function		Measures the intervals between the variations of count values, and calculates the frequency.	
Comparison function	Target value match function		Depending on the count direction, sets or resets the output when the counter value reaches the target value.	
External output	Comparison result output function		Outputs the result of comparison function.	
Other functions	Capture function		Acquires the current count value from the edges of input signals, and stores it in the capture 0 register or capture 1 register. The value of the specified capture register will be overwritten by a new value and the old value will be discarded every time a counter value is captured.	
	Interrupt input function		Available (2 points/ch, Max. 8 points/unit) (Note 1, 2)	

Notes: 1) The interrupt input function can be used for 8 points per unit and for a maximum of 8 units (max. 64 points) in the whole system. However, the entire scan time slows down as more interrupt programs are used. Minimize the use of interrupt programs.

2) The priority order for interrupt inputs is as follows; In a unit, from the smallest interrupt bit. In the whole system, from the smallest unit number. from the smallest unit number.
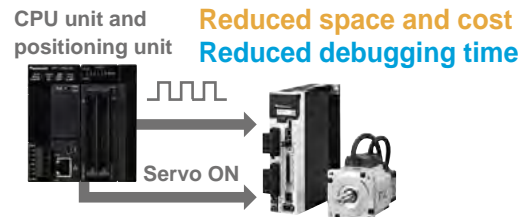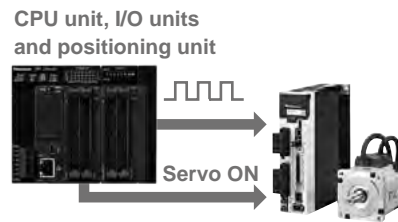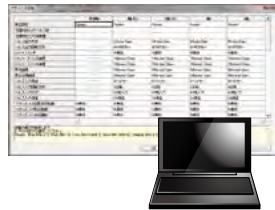
Positioning units
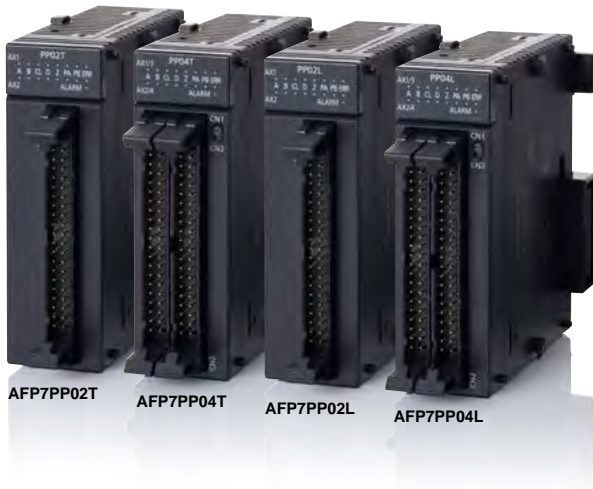
High-accuracy positioning control can be achieved at reduced cost.

- **Equipped with electronic cam and electronic gear functions**

  Virtual axes are supported and operable without connecting to external encoders.

- **Organized wiring to servo amplifier**

  A servo ON output terminal is provided that allows simple and neat wiring to the servo amplifier.

AFP7PP02T   AFP7PP04T   AFP7PP02L   AFP7PP04L

CPU unit, I/O units and positioning unit

Servo ON

CPU unit and positioning unit

Servo ON

Reduced space and cost
Reduced debugging time

- **Dedicated configuration tool "Control FPWIN GR7 / Pro7"**

  Parameter and positioning operation settings can be made easily. Test operation is also supported. Positioning operations can be checked even-while the CPU unit is in program mode.

■Performance specifications

| Item				Specifications			
				2 axes type		4 axes type	
Part No.				**AFP7PP02T**	**AFP7PP02L**	**AFP7PP04T**	**AFP7PP04L**
Output type				Transistor	Line driver	Transistor	Line driver
Max. operation speed				500 kpps			
Number of axes controlled				2 axes linear interpolation and 2 axes circular interpolation		2 axes linear interpolation, 2 axes circular interpolation, 3 axes linear interpolation and 3 axes spiral interpolation	
Acceleration & deceleration time				0 to 10,000 ms for automatic & manual operation (JOG operation & home return)			
Acceleration & deceleration method				Linear acceleration / deceleration, S-curve acceleration / deceleration for automatic & manual operation (JOG operation)			
Automatic operation	Position control	Position command method		Absolute / relative			
		Number of positioning tables per axis		Standard area: 600 points, expansion area: 25 points			
		Control method	Independent	For each axis; standard area: 600 points, expansion area: 25 points			
			2-axis interpolation / Linear	E point, P point and C point controls: master axis speed			
			2-axis interpolation / Circular	E point, P point and C point controls: center point or passing point			
			3-axis interpolation / Linear	E point, P point and C point controls			
			3-axis interpolation / Spiral	E point, P point and C point controls: center point or passing point			
		Startup time		Standard area: 3 ms or less, expansion area: 5 ms or less			
		Other function	Dwell time	0 to 32,767 ms (in increments of 1 ms)			
Manual operation	Home return	Acceleration & deceleration method		Linear acceleration / deceleration			
		Return methods		7 methods			
	Pulser operation	Speed command		Range operates in synchronization with pulser input			
Stop function				Deceleration stop, emergency stop, limit stop, error stop, system stop			
Synchronous operation function	Synchronous basic setting	Master axis		Existing axes, virtual axes or pulse input (1 to 4)			
		Slave axis		Max. 2 axes		Max. 4 axes	
	Electronic gear & clutch function			Yes			
	Electronic cam function	Cam curve		Select from 20 types			
		Resolution		1024, 2048, 4096, 8192, 16384, 32768			
		Number of cam patterns		4 to 16			
Other specifications		Output mode		1 pulse output (pulse + direction), 2 pulse outputs (CW / CCW)			
	High-speed counter function	Countable range		−1,073,741,823 to +1,073,741,823 pulse			
		Input mode		Two-phase input, incremental/decremental control input, individual input (with multiplier function mode)			
	Built-in servo ON output			Yes			

Pulse Output Units

Super high-speed positioning control achieved

• Startup speed is fastest in industry*

The pulse output request is received from the CPU unit and the startup speed up to output of the pulse is the industry's fastest at 1 μs. Tact time is reduced with repeat of short-distance positioning operations, etc.

Start time: 1 μs

Pulse output unit   **Index table**
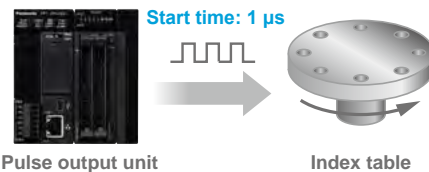
• Neater wiring to servo and amplifier

Equipped with a servo ON output terminal, wiring to the servo amplifier is neater.

• Replacement from FP2 series is easy

Usage is same as the previous FP2 positioning unit (multi-function type). Program transfer is easy.

* Based on our research as of October, 2013

AFP7PG02T   **AFP7PG04T**   **AFP7PG02L**   **AFP7PG04L**

■Performance specifications

Item		Specifications			
Part No.		**AFP7PG02T**	**AFP7PG04T**	**AFP7PG02L**	**AFP7PG04L**
Output type		Transistor		Line driver	
Occupied points		Each 32 points of I/O	Each 64 points of I/O	Each 32 points of I/O	Each 64 points of I/O
Number of axes controlled		2 axes, independent	4 axes, independent	2 axes, independent	4 axes, independent
Position command	Command units	Pulse (The program specifies whether increment or absolute is used.)			
	Max. pulse count	Signed 32 bits (+2,147,483,647 to -2,147,483,648 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 command	Acceleration/deceleration	Linear acceleration / deceleration, S acceleration / deceleration			
	"S" Acceleration/deceleration	Can select from sin curve, secondary curve, cycloid curve and third curve.			
	Acceleration/deceleration time	0 to 32,767 ms (can set in 1 ms)			
Home return	Home return speed	Speed setting possible (changes return speed and search speed)			
	Input signal	Home input, near home input, limit input (+), limit input (−)			
	Output signal	Deviation counter clear signal			
Operation mode		• E point control (linear and s acceleration/decelerations) • P point control (linear and s acceleration/decelerations) • Home return operation (home search) • JOG operation [Note 1] • JOG positioning operation • Pulser input function [Note 2] transfer multiplication ratio (× 1, × 2, × 5, × 10, × 50, × 100, × 500, × 1000) • Real-time frequency change • Infinity output			
Startup time		0.02 ms, 0.005 ms or 0.001 ms selecting possible [Note 3]			
Output interface	Output mode	1 pulse output (pulse and sign), 2 pulse output (CW and CCW)			
High-speed counter function [Note 2]	Countable range	Signed 32 bits (+2,147,483,647 to -2,147,483,648 pulse)			
	Input mode	Two-phase input, direction distinction input, individual input (with multiplier function mode)			
Other functions		• Startup using I/O contact • Built-in limit (+) and limit (−) • With servo ON output			
External power supply	Voltage	21.6 to 26.4 V DC			
	current	50 mA (at 24 V)	90 mA (at 24 V)	50 mA (at 24 V)	90 mA (at 24 V)

Notes: 1) When linear acceleration/deceleration operation is selected, it is possible to change the target speed during operation.
2) Since the pulsar input function and the high-speed counter function use the same pulse input terminal, both functions cannot be used at the same time.
3) Startup time can be changed using the common memory control code setting. The factory (default) setting is 0.02 ms. Startup time is defined as the time between startup and output of the first pulse.

Power supply units

Announce system errors using the built-in external alarm.

• **Equipped with system error alarm contact**

Output contact for system error external alarm is provided.

■Specifications

Item	Specifications	
Part No.	**AFP7PSA1**	**AFP7PSA2**
Rated input voltage	100 to 240 V AC	
Allowable input voltage range	85 to 264 V AC	
Input power supply frequency	47 to 63 Hz	
Inrush current	40 A or less (Note 2)	
Input current	0.75 A or less	1.25 A or less
Rated output current (at 24 V)	1.0 A	1.8 A
Alarm contact capacity	1 A (30 V DC)	
Remaining lifespan counter	Not available	Available (Note 1)

Notes: 1) Alarm by CPU unit
2) On cold starting

AFP7PSA1

AFP7PSA2

Serial Communication Unit

Lineup of serial communication unit that can be expanded with a serial communication cassette.

• **Two serial communication add-on cassettes can be installed**

A total of five types of cassettes can be freely combined in a combination of RS232C, RS422 or RS485. Up to 4 channels can be supported in one unit.

• **High expandability**

Serial Communication cassette can be added, max. 35 channels.

4 channels

CPU
Max. 3 ports

Supports max. 8 units and 32 ports!!

END

AFP7NSC
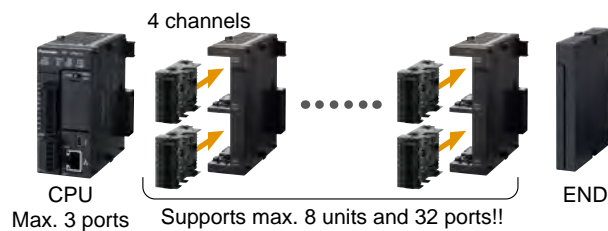
■Specifications

Item	Specifications
Number of communication cassette installations	Max. 2 cassettes
Number of installations to CPU unit	Max. 8 units

Note: Ethernet cassette is not supported.

PHLS (remote I/O) units

AFP7PHLSM

AFPRP2Y04R

AFPRP2X16D2

AFPRP1XY16D2T

AFPRP2X08D2E

AFPRP2Y16T

AFPRP2XY16D2T

AFPRP1X08D2

AFPRP1Y16T

AFPRP1X16D2

Speedy, resistant to noise

- **High speed communication**
  A 12 Mbps maximum transmission speed can be selected. Fast response at update cycle of 1,000 points / 2 ms can be achieved.

- **High resistance to noise**
  Data can be transferred accurately, even in inadequate wiring environments.

- **Various slave units**
  Compact slave units (60 × 70 × 40 mm 2.36 × 2.76 × 1.57 in) are smaller than common screw terminal types and are lined up to contribute to space savings. A wide variety of slave units are available.

  Note: Compact type **AFPRP2□** unit is not conforming to EMC Directive.

■Communication specifications (common)

Item	Specifications
Communication method	Two-wire system half duplex
Insulation method	Pulse transformer insulation
Communication speed	6 Mbps / 12 Mbps
Synchronous method	Bit synchronization
Error check	CRC-12
Communication distance	Total length 200 m 656 ft (at 6 Mbps) / 100 m 328 ft (at 12 Mbps) (Note)
Connection method	Multi-drop method
Impedance	100 Ω
Terminator	Mounted on unit
External interface	Master unit: terminal block (2 channels) Slave unit (standard type): screw-type terminal block Slave unit (compact type): connector-type terminal block

Note: Performance when the recommended cable is used Use of the recommended cable is necessary to achieve the maximum transmission distance and number of slave units.

■Input side specifications

Item		Specifications	
		Standard type	Compact type
Insulation method		Photocoupler	Non-isolated
Rated input voltage		24 V DC	
Rated input current		3 mA approx.	4.3 mA approx.
Input impedance		7.5 kΩ approx.	5.6 kΩ approx.
Min. ON voltage / Min. ON current		15 V / 2 mA	17 V / 2 mA
Max. OFF voltage / Max. OFF current		5 V / 0.5 mA	
Response time	OFF→ON	1 ms or less	
	ON→OFF	1 ms or less	

- **Recommended cable for conforming to EMC Directive**
  Please note that standard type **AFPRP1□** conforms to EMC Directive when used with recommended cable as below (except for **AFPRP2□**).
  ZHY221PS made by Shinko Seisen Industry Co., Ltd.

  Characteristics
  - AWG22 to AWG26, twisted pair cable
  - Characteristics impedance: 100 Ω
  - Insulation: crosslinked polyethylene foam

Note: If the recommended cable is not used, it may not be possible to reach the maximum transfer distance or performance with the maximum number of slaves. Please configure the wiring collinearly on all system.

■Output side specifications (except relay)

Item		Specifications	
		Standard type	Compact type (except relay)
Insulation method		Photocoupler	Non-isolated
Output type		Sink type (Open collector output)	
Rated load voltage		20.4 to 28.8 V DC	
Max. control capacity		0.1 A/point	
Max. surge current		0.5 A	
OFF state leakage current		0.1 mA or less	
ON state maximum voltage drop		0.5 V or less	
Repose time	OFF→ON	0.05 ms or less	
	ON→OFF	0.5 ms or less	
Surge absorber		Zener diode	
Short circuit protection		None	

■Output side specifications (relay)

Item		Specifications
		Compact type (relay)
Insulation method		Relay insulation
Rated control capacity		1 A 250 V AC (2 A/common) 1 A 30 V DC (2 A/common)
Min. load		0.1 mA 100 mV (resistive load)
Repose time	OFF→ON	10 ms or less
	ON→OFF	5 ms or less
Life time	Mechanical life	2×10^7 operations or more
	Electrical life	1×10^5 operations or more (switching frequency: 20 times/minute)
Surge absorber		None
Short circuit protection		None

■I/O circuit diagrams

● Standard type (screw-type terminal block)
[Input type]
AFPRP1X08D2 / AFPRP1X16D2

● Compact type (connector type terminal block)
[Input type]
AFPRP2X16D2

[Output type]
AFPRP1Y16T

Note: Attach diodes to absorb counter electromotive force from inductive load.

[Output type]
AFPRP2Y16T

Note: Attach diodes to absorb counter electromotive force from inductive load.
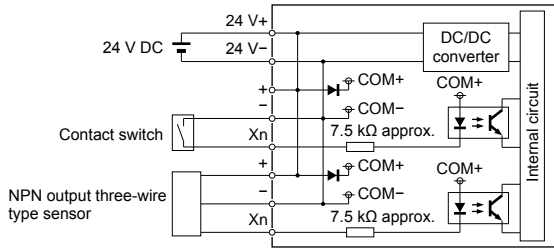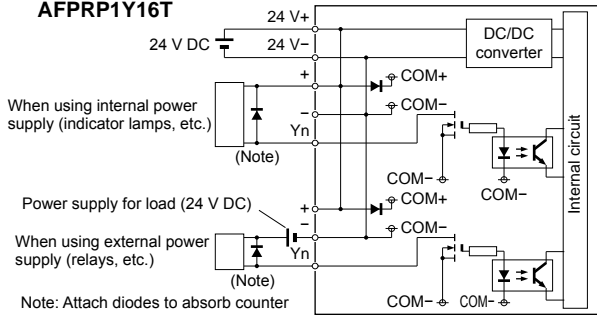
[I/O mixed type]
AFPRP1XY16D2T

Note: Attach diodes to absorb counter electromotive force from inductive load.
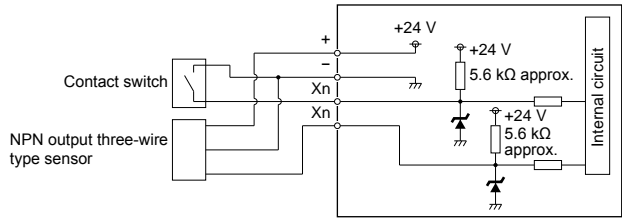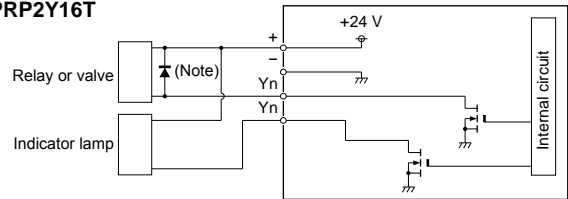
[I/O mixed type]
AFPRP2XY16D2T

Note: Attach diodes to absorb counter electromotive force from inductive load.

● Compact type (relay output)
AFPRP2Y04R   [When connecting to separated common terminal]

Note: Attach surge absorber (AC load) at both ends of an AC inductive load.
Attach diodes (DC load) at both ends of a DC inductive load.

[When connecting to shared common terminal]

Note: Attach surge absorber (AC load) at both ends of an AC inductive load.
Attach diodes (DC load) at both ends of a DC inductive load.

● Compact type (e-CON)
AFPRP2X08D2E
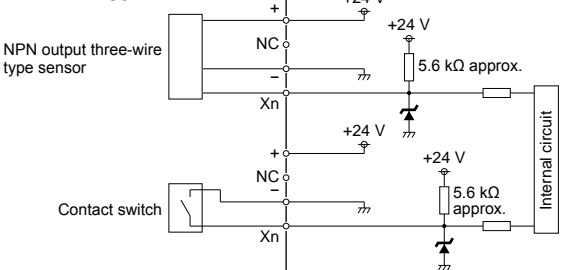
General specifications on each units

■Common general specifications

Item	Specifications
Ambient temperature	0 to +55 °C +32 to +131 °F, at storage: -40 to +70 °C -40 to +158 °F
Ambient humidity	10 to 95 % RH (at 25 °C 77 °F, no condensation), at storage: 10 to 95 % RH (at 25 °C 77 °F, no condensation)
Breakdown voltage	500 V AC for 1 minute (Note 2) (Note 3)
Insulation resistance	100 MΩ or more (at 500 V DC)
Vibration resistance	5 to 8.4 Hz, single amplitude of 3.5 mm 0.138 in, 1 sweep/min. (IEC61131-2); 8.4 to 150 Hz, constant acceleration of 9.8 m/s², 1 sweep/min. (IEC61131-2), 10 times each in X, Y, and Z directions
Shock resistance	147 m/s² or more , 3 times each in X, Y, and Z directions (IEC61131-2)
Noise immunity	1,000 V [p-p] with pulse width 50 ns and 1 µs (using a noise simulator)
Operating condition	Free from corrosive gasses and excessive dust

Note: 1) Please refer to the unit's specification sheet for details of breakdown voltage and insulation resistance.
2) Relay output of input and output unit: 2,300 V AC for 1 minute
3) Between analog input channels of analog input unit: 200 V AC for 1 minute
Between channels of output unit: non insulation

■Individual general specifications

Item	CPU units			Communication cassettes						Function cassettes		
	AFP7CPS41E(S)	AFP7CPS31E(S)	AFP7CPS31(S)	AFP7CCS1	AFP7CCS2	AFP7CCM1	AFP7CCM2	AFP7CCS1M1	AFP7CCET1	AFP7FCAD2	AFP7FCA21	AFP7FCTC2
Rated voltage range	20.4 to 28.8 V DC			–	–	–	–	–	–	–	–	–
Current consumption	200 mA or less			35 mA or less (Note 1)	60 mA or less (Note 1)	60 mA or less (Note 1)	90 mA or less (Note 1)	70 mA or less (Note 1)	35 mA or less (Note 1)	40 mA or less (Note 1)	75 mA or less (Note 1)	45 mA or less (Note 1)
Net weight	220 g approx. (with terminal block and end unit)			25 g approx. (with terminal block)					20 g approx.	25 g approx. (with terminal block)		

Item	Input and output units											
	AFP7X16DW	AFP7X32D2	AFP7X64D2	AFP7Y16R	AFP7Y16T	AFP7Y32T	AFP7Y64T	AFP7Y16P	AFP7Y32P	AFP7Y64P	AFP7XY64D2T	AFP7XY64D2P
Rated voltage range	–	–	–	–	–	–	–	–	–	–	–	–
Current consumption	25 mA or less	30 mA or less	35 mA or less	180 mA or less	35 mA or less	50 mA or less	75 mA or less	35 mA or less	50 mA or less	75 mA or less	55 mA or less	55 mA or less
Net weight	125 g approx.	95 g approx.	110 g approx.	180 g approx.	125 g approx.	95 g approx.	115 g approx.	125 g approx.	95 g approx.	115 g approx.	115 g approx.	115 g approx.

Item	Analog input and output units		High-speed counter units		Positioning units				Pulse output units			
	AFP7AD4H	AFP7DA4H	AFP7HSC2T	AFP7HSC4T	AFP7PP02T	AFP7PP04T	AFP7PP02L	AFP7PP04L	AFP7PG02T	AFP7PG04T	AFP7PG02L	AFP7PG04L
Rated voltage range	–	–	–	–	–	–	–	–	–	–	–	–
Current consumption	100 mA or less	250 mA or less	65 mA or less	65 mA or less	120 mA or less	120 mA or less	120 mA or less	120 mA or less	65 mA or less	65 mA or less	65 mA or less	65 mA or less
Net weight	130 g approx.	130 g approx.	130 g approx.	130 g approx.	145 g approx.	145 g approx.	145 g approx.	145 g approx.	130 g approx.	150 g approx.	130 g approx.	150 g approx.

Item	Serial communication unit	Power supply units	
	AFP7NSC	AFP7PSA1	AFP7PSA2
Rated voltage range	–	100 to 240 V AC	
Current consumption	35 mA or less	750 mA or less	1,250 mA or less
Net weight	110 g approx.	240 g approx.	290 g approx.

Item	PHLS (remote I/O) units									
	AFP7PHLSM	AFPRP1X08D2	AFPRP1X16D2	AFPRP1Y16T	AFPRP1XY16D2T	AFPRP2X08D2E	AFPRP2X16D2	AFPRP2Y16T	AFPRP2XY16D2T	AFPRP2Y04R
Rated voltage range	–	20.4 to 28.8 V DC								
Current consumption	85 mA or less	100 mA or less	150 mA or less	75 mA or less	120 mA or less	100 mA or less	170 mA or less	40 mA or less	110 mA or less	85 mA or less
Net weight	110 g approx.	140 g approx.	210 g approx.	210 g approx.	210 g approx.	75 g approx.	75 g approx.	75 g approx.	75 g approx.	75 g approx.

Note: 1) This value is the increase in CPU current consumption.

Product types

■CPU units

Product name		Standard program capacity	Max. program capacity	Operation speed	Ethernet function	Encryption function	Part No.
FP7 CPU units	Standard model	196 k steps	234 k steps	From 11 ns	Built-in	–	AFP7CPS41E
		120 k steps	120 k steps	From 11 ns	Built-in	–	AFP7CPS31E
		120 k steps	120 k steps	From 11 ns	–	–	AFP7CPS31
	Security enhanced type	196 k steps	234 k steps	From 11 ns	Built-in	Built-in	AFP7CPS41ES
		120 k steps	120 k steps	From 11 ns	Built-in	Built-in	AFP7CPS31ES
		120 k steps	120 k steps	From 11 ns	–	Built-in	AFP7CPS31S

Note: 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.

■Add-on cassettes

Product name	Specifications	Part No.
FP7 communication cassettes	RS232C, 1 channel (insulated)	AFP7CCS1
	RS232C, 2 channels (insulated)	AFP7CCS2
	RS422 or RS485, 1 channel (insulated)	AFP7CCM1
	RS422 or RS485, 2 channels (insulated)	AFP7CCM2
	RS232C, 1 channel (insulated) and RS485, 1 channel (insulated)	AFP7CCS1M1
	Ethernet 100Base-TX / 10Base-T	AFP7CCET1
FP7 function cassettes	Analog input, 2 channels, voltage / current	AFP7FCAD2
	Analog input and output, input: 2 channels, output: 1 channel	AFP7FCA21
	Thermocouple input, 2 channels K / J	AFP7FCTC2

■Power supply units

Product name	Input specifications	Output specifications	Other functions	Part No.
FP7 power supply units	100 to 240 V AC	24 V DC, 1.0 A	System error alarm output contact	AFP7PSA1
	100 to 240 V AC	24 V DC, 1.8 A	System error alarm output contact and remaining lifespan counter	AFP7PSA2

■Input and output units

Product name	Type	Number of points	Connection method	Specifications	Part No.
FP7 input units	DC input	16 points	Terminal block	12 to 24 V DC, common polarity: +/- common, input time constant setting	AFP7X16DW
		32 points	MIL connector	24 V DC, common polarity: +/- common, input time constant setting	AFP7X32D2
		64 points	MIL connector	24 V DC, common polarity: +/- common, input time constant setting	AFP7X64D2
FP7 output units	Relay output	16 points	Terminal block	2 A/point, 5 A/common, 16 points/common (without relay socket)	AFP7Y16R
	Transistor output, sink (NPN)	16 points	Terminal block	Load current: 1.0 A, 5 A/common, 16 points/common	AFP7Y16T
		32 points	MIL connector	Load current: 0.3 A, 3.2 A/common, 32 points/common	AFP7Y32T
		64 points	MIL connector	Load current: 0.3 A / 0.1 A, mixed 3.2 A /common, 32 points/common	AFP7Y64T
	Transistor output, source (PNP)	16 points	Terminal block	Load current: 1.0 A, 5 A/common, 16 points/common	AFP7Y16P
		32 points	MIL connector	Load current: 0.3 A, 3.2 A/common, 32 points/common	AFP7Y32P
		64 points	MIL connector	Load current: 0.3 A / 0.1 A, mixed 3.2 A /common, 32 points/common	AFP7Y64P
FP7 input and output mixed units	DC input transistor output, sink (NPN)	Input: 32 points Output: 32 points	MIL connector	Input: 24 V DC, 32 points/common Output: load current: 0.3 A / 0.1 A, mixed 3.2 A/common, 32 points/common	AFP7XY64D2T
	DC input transistor output, source (PNP)	Input: 32 points Output: 32 points	MIL connector	Input: 24 V DC, 32 points/common Output: load current: 0.3 A / 0.1 A, mixed 3.2 A/common, 32 points/common	AFP7XY64D2P

■Analog input and output units

Product name	Specifications	Number of channels	Part No.
FP7 analog input unit (High-speed and high-accuracy type)	Voltage / current, conversion rate: 25 µs/channel, resolution: max. 16 bits, accuracy: ±0.05 % F.S. or less (at 25 °C 77 °F) / ±0.1 % F.S. or less (0 to 55 °C 32 to 131 °F)	4 channels	AFP7AD4H
FP7 analog output unit (High-speed and high-accuracy type)	Voltage / current, conversion rate: 25 µs/channel, resolution: max. 16 bits, accuracy: ±0.05 % F.S. or less (at 25 °C 77 °F) / ±0.1 % F.S. or less (0 to 55 °C 32 to 131 °F)	4 channels	AFP7DA4H

■High-speed counter units

Product name	Specifications				Part No.
	Input time constant	Number of counters	Counter type	Input type	
FP7 high-speed counter units	Selection type	2 channels	Liner counter / ring counter	Individual input: 1 multiple, 2-multiple Direction discrimination input: 1 multiple, 2-multiple 2-phase input: 1 multiple, 2-multiple, 4-multiple	AFP7HSC2T
	Selection type	4 channels	Liner counter / ring counter	Individual input: 1 multiple, 2-multiple Direction discrimination input: 1 multiple, 2-multiple 2-phase input: 1 multiple, 2-multiple, 4-multiple	AFP7HSC4T

Positioning units

Product name	Specifications				Part No.
	Output type	Number of axes controlled	Operation speed	Functions	
FP7 positioning units	Transistor	2 axes	1 pps to 500 kpps	Electronic cam and electronic gear functions, linear interpolation, circular interpolation	**AFP7PP02T**
	Transistor	4 axes	1 pps to 500 kpps	Electronic cam and electronic gear functions, linear interpolation, circular interpolation	**AFP7PP04T**
	Line driver	2 axes	1 pps to 4 Mpps	Electronic cam and electronic gear functions, linear interpolation, circular interpolation	**AFP7PP02L**
	Line driver	4 axes	1 pps to 4 Mpps	Electronic cam and electronic gear functions, linear interpolation, circular interpolation	**AFP7PP04L**

Pulse output units

Product name	Specifications			Part No.
	Output type	Number of axes controlled	Operation speed	
FP7 pulse output units	Transistor	2 axes	1 pps to 500 kpps	**AFP7PG02T**
	Transistor	4 axes	1 pps to 500 kpps	**AFP7PG04T**
	Line driver	2 axes	1 pps to 4 Mpps	**AFP7PG02L**
	Line driver	4 axes	1 pps to 4 Mpps	**AFP7PG04L**

Serial communication unit

Product name	Number of communication cassette	Number of installations of CPU unit	Part No.
FP7 serial communication unit	Max. 2 cassettes	Max. 8 units	**AFP7NSC**

PHLS (remote I/O) master unit

Product name	Max. points	Communication speed	Total distance	Max. number of connections	Part No.
FP7 PHLS master unit	1,008 points	6 Mbps / 12 Mbps	200 m 656 ft (at 6 Mbps) / 100 m 328 ft (at 12 Mbps)	63 slaves	**AFP7PHLSM**

PHLS (remote I/O) slave units

Product name	Shape	Connection method	Type	Number of points	Specifications	Part No.
FP7 PHLS slave units	Standard type	Screw-type terminal block	DC input	8 points	24 V DC, common polarity: +, 8 points/common	**AFPRP1X08D2**
	Standard type	Screw-type terminal block	DC input	16 points	24 V DC, common polarity: +, 16 points/common	**AFPRP1X16D2**
	Standard type	Screw-type terminal block	Transistor output (sink)	16 points	Load current: 0.1 A, common polarity: -, 0.4 A/common, 16 points/common	**AFPRP1Y16T**
	Standard type	Screw-type terminal block	DC input transistor output (sink)	Input: 8 points Output: 8 points	Input: 24 V DC, common polarity: +, 8 points/common Output: load current: 0.1 A, common polarity: -, 0.4 A/common, 8 points/common * Input / output common is shared.	**AFPRP1XY16D2T**
	Compact type	e-CON	DC input	8 points	24 V DC, common polarity: +, 8 points/common	**AFPRP2X08D2E**
	Compact type	Connector-type terminal block	DC input	16 points	24 V DC, common polarity: +, 16 points/common	**AFPRP2X16D2**
	Compact type	Connector-type terminal block	Transistor output (sink)	16 points	Load current: 0.1 A, common polarity: -, 0.8 A/common, 16 points/common	**AFPRP2Y16T**
	Compact type	Connector-type terminal block	Transistor output (sink)	Input: 8 points Output: 8 points	Input: 24 V DC, common polarity: +, 8 points/common Output: load current: 0.1 A, common polarity: -, 0.8 A/common, 8 points/common * Input / output common is shared.	**AFPRP2XY16D2T**
	Compact type	Connector-type terminal block	Relay output	4 points	1 A/point, 2 A/common, 2 points/common	**AFPRP2Y04R**

Option

Product name	Specifications	Part No.
FP-X backup battery	Battery for back up of clock / calendar operation	**AFPX-BATT**

Programming tool

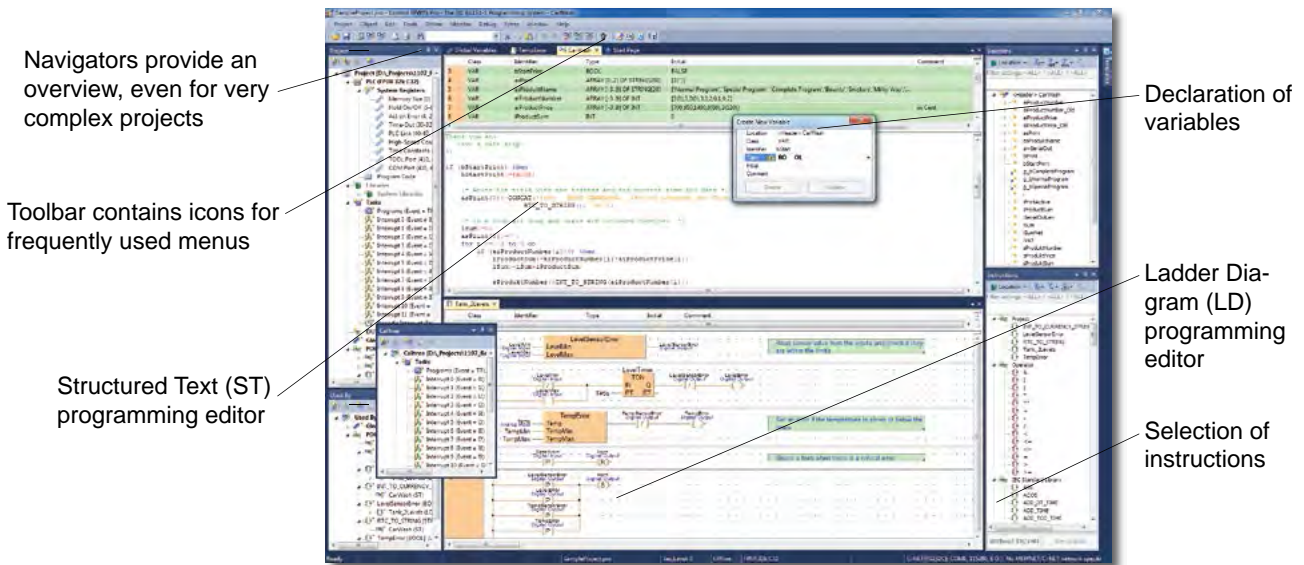| Product name		Type	Specifications	Part No.
Programming software for Windows® **Control FPWIN GR7**	Japanese version	Supports only CPU without encryption function	Windows®8 (32 bits / 64 bits) / Windows®7 (32 bits / 64 bits) / Vista / XP SP3	**AFPSGR7JP**
	Security enhanced type	Supports both CPU with / 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 Pro 7**	Multilingual	Supports only CPU without encryption function	Windows®8 (32 bits / 64 bits) / Windows®7 (32 bits / 64 bits) / Vista / XP SP3 Conforming to IEC61131-3	**AFPSPR7**
	Security enhanced type	Supports both CPU with / without encryption function		**AFPSPR7S**
	Multilingual for version upgrade	Supports only CPU without encryption function		**AFPSPR7R**
	Security enhanced type	Supports both CPU with / without encryption function		**AFPSPR7SR**

Notes: 1) Windows® 8, 7, Vista and XP are a trademark or registered trademark of Microsoft Corporation in the United States and other countries.
2) When exporting to China, CPU without encryption function is required.
3) Multilingual: English, German, French, Italian, Spanish, Japanese, Korean and Chinese are supported.

Programming software

Control FPWIN Pro 7

Control FPWIN Pro is the Panasonic programming software developed according to the international standard IEC 61131-3 (for Windows® XP / Vista / 7). Contol FPWIN Pro is the universal software for all Panasonic PLC's

- Programs written in Control FPWIN Pro 6 or earlier versions will run with Control FPWIN Pro 7
- Programs are compatible across FP series PLCs, e.g. FP0R will run with minor adjustments on FP∑ (Sigma) and FP7 PLCs
- FP7 PLCs and Control FPWIN Pro 7 offer the same flexible choice of editors and allow you to select the programming language you are most familiar with.

Navigators provide an overview, even for very complex projects

Toolbar contains icons for frequently used menus

Structured Text (ST) programming editor

Declaration of variables

Ladder Diagram (LD) programming editor

Selection of instructions

Control FPWIN Pro highlights

- One software for all FP-series PLCs
- 5 programming languages: IL (Instruction List), LD (Ladder Diagram), FBD (Function Block Diagram), SFC (Sequential Function Chart), ST (Structured Text)
- 8 languages are fully supported: English, German, French, Italian, Spanish, Japanese, Korean, Chinese
- Well-structured through program organization units, task and project management
- Remote programming, service and diagnostics via modem or Ethernet
- Extensive comments and online documentation created hand in hand with the program
- Min. program size through optimized compiler
- Powerful debugging and monitoring tools provide information on the current status of the PLC.
- Comprehensive printed documentation and support for function blocks and libraries help to get your hardware running in record time while maintaining rigorous quality standards.
- Reuse of functions and function blocks saves time.

Control FPWIN Pro and its comprehensive, powerful libraries

The PLC programming software Control FPWIN Pro has been evolving for over 15 years.
As expected, the latest version of the software includes even more function blocks to help you efficiently program your PLC.

The innovations of this version include simplified handling of analog units, serial communication, the integrated clock and GT programmable displays. The online help was also improved in several key areas:

• Tables for slot number and corresponding address ranges are provided for analog expansion units.
• Explanations for DIP switch settings
• A/D value assignment tables
• Wiring instructions

Additional function blocks for simplifying work with analog values, e.g.:
• Scaling
• Averaging
• Assigning addresses for expansion units

The new function blocks for serial communication cover 90 % of all practical applications, except for telecontrol.
Moreover, diverse tasks for GT series programmable displays are now easy to manage, e.g. changing screens, adjusting brightness, or controlling control bits and words. Working with times and dates as well as calculations involving times and dates are now extensively supported.

The editors, such as the global variable list editor, offer quick info about PLC addresses, which makes adjusting addresses in the variable declarations as easy as pie.
You can drag & drop variables, function blocks, etc. from the navigation and selection panes into the program editors.
You can copy & paste example programs in the online help into your editor and modify them as necessary.

Programming software

Control FPWIN GR7

Control FPWIN GR7 is the software that helps to reduce programmers workload.

Configuration, editing programming, searching, monitoring, debugging, security, etc.

PLC programming demands a lot of time and effort. Many programmers get hung up on trying out different configurations, consulting the manual, and re-writing repetitive code blocks.

The **FPWIN GR7** programming software is designed to eliminate these inefficiencies and minimize programming complexity.

Project tree

Program block

I/O comment
Three types of comments can be entered in a column.

Task bar
The display can be scrolled as needed
Effective use of screen

Output window
Display history (output and errors), search results, etc.

Function bar

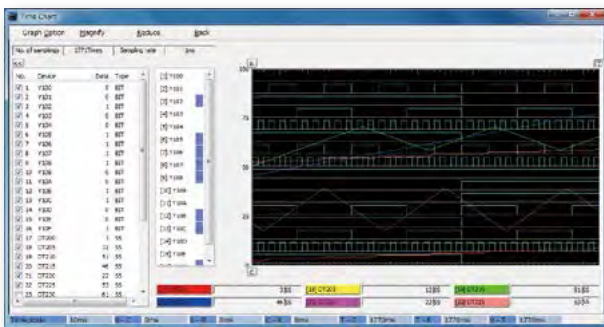**Device monitor**

Control FPWIN GR7 highlights

No programming is required in initial setting of each unit

Analog dedicated setting screen

Positioning dedicated setting screen
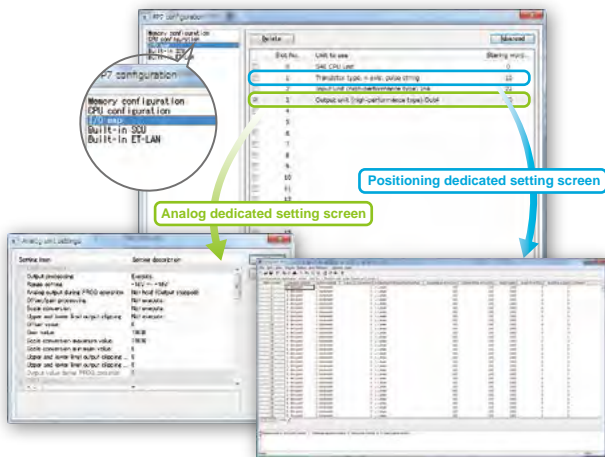
"Instruction NAVI" helps to input programming

Auto-complete function displays possible instructions when the first few letters are entered.

Following the "Instruction NAVI" makes the system easy to operate

Comments on instructions

Configuration ➤ **Instructions editing** ➤ **Monitor** ➤ **Security**
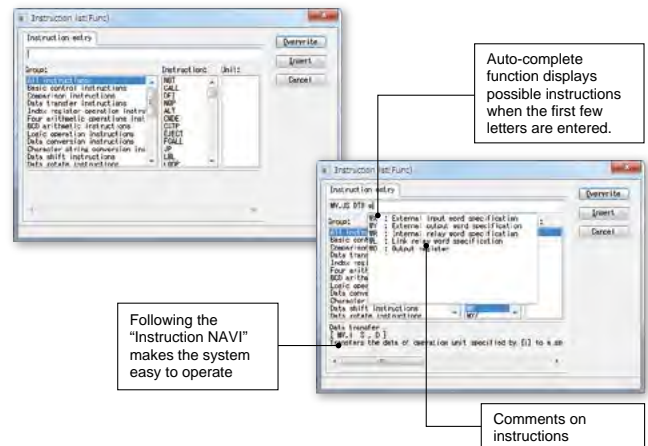
During debugging, data collection and confirmation by 1 scan is available

Secured, prevents program copy

Security enhanced type only

Program

Program

Decryption key

[Decryption key]

Activation is possible only if the decryption key on the FP7 matches that of the program. (Copied programs will not be activated on other FP7.)

Copy   Insertion

Program

Original FP7   Copied program   Other FP7
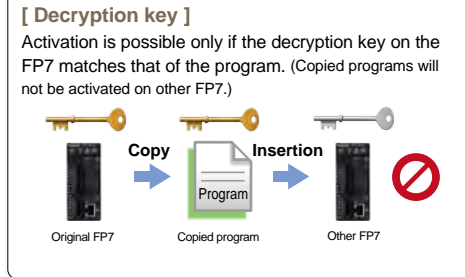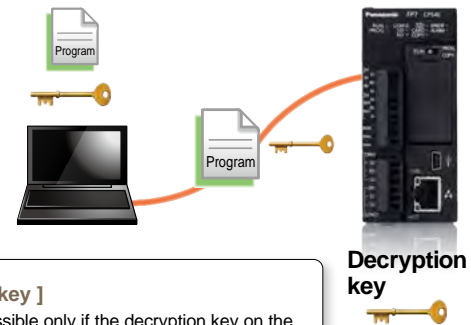
GT series Lineup

List of related products　Programmable display GT series

Product name	Description						Part No.
	LCD	Screen size	Power supply	Communication port	Color of front panel	SD memory card slot	
Tough GT03M-E	TFT monochrome LCD	3.5 inch	24 V DC	RS232C	Silver	Not available	AIG03MQ03DE
				RS422 / RS485			AIG03MQ05DE
Tough GT03T-E	TFT color LCD			RS232C	Silver	Available	AIG03TQ13DE
				RS422 / RS485			AIG03TQ15DE
Tough GT32M-E	TFT monochrome LCD	5.7 inch		RS232C	Silver	Available	AIG32MQ03DE
				RS422 / RS485			AIG32MQ05DE
Tough GT32T-E	TFT color LCD			RS232C	Silver	Available	AIG32TQ03DE
				RS422 / RS485			AIG32TQ05DE
GT02L	STN monochrome LCD (white backlight)	3.7 inch	5 V DC	RS232C	Black	Not available	AIG02LQ02D
				RS422 / RS485			AIG02LQ04D
GT02M	STN monochrome LCD (white/pink/red backlight)	3.8 inch	5 V DC	RS232C	Pure black	Not available	AIG02MQ02D
					Hairline silver		AIG02MQ03D
				RS422 / RS485	Pure black		AIG02MQ04D
					Hairline silver		AIG02MQ05D
			24 V DC	RS232C	Pure black		AIG02MQ12D
					Hairline silver		AIG02MQ13D
				RS422 / RS485	Pure black		AIG02MQ14D
					Hairline silver		AIG02MQ15D
				RS232C	Pure black	Available	AIG02MQ22D
					Hairline silver		AIG02MQ23D
				RS422 / RS485	Pure black		AIG02MQ24D
					Hairline silver		AIG02MQ25D
GT02G	STN monochrome LCD (green/orange/red backlight)	3.8 inch	5 V DC	RS232C	Pure black	Not available	AIG02GQ02D
					Hairline silver		AIG02GQ03D
				RS422 / RS485	Pure black		AIG02GQ04D
					Hairline silver		AIG02GQ05D
			24 V DC	RS232C	Pure black		AIG02GQ12D
					Hairline silver		AIG02GQ13D
				RS422 / RS485	Pure black		AIG02GQ14D
					Hairline silver		AIG02GQ15D
				RS232C	Pure black	Available	AIG02GQ22D
					Hairline silver		AIG02GQ23D
				RS422 / RS485	Pure black		AIG02GQ24D
					Hairline silver		AIG02GQ25D
GT05M	STN monochrome LCD (white/pink/red backlight)	3.5 inch	24 V DC	RS232C	Pure black	Available	AIG05MQ02D
					Hairline silver		AIG05MQ03D
				RS422 / RS485	Pure black	Available	AIG05MQ04D
					Hairline silver		AIG05MQ05D
GT05G	STN monochrome LCD (green/orange/red backlight)	3.5 inch	24 V DC	RS232C	Pure black	Available	AIG05GQ02D
					Hairline silver		AIG05GQ03D
				RS422 / RS485	Pure black	Available	AIG05GQ04D
					Hairline silver		AIG05GQ05D
GT05S	TFT color LCD	3.5 inch	24 V DC	RS232C	Pure black	Available	AIG05SQ02D
					Hairline silver		AIG05SQ03D
				RS422 / RS485	Pure black	Available	AIG05SQ04D
					Hairline silver		AIG05SQ05D
GT12M	STN monochrome LCD (white/pink/red backlight)	4.6 inch	24 V DC	RS232C	Pure black	Not available	AIG12MQ02D
					Hairline silver		AIG12MQ03D
				RS422 / RS485	Pure black	Not available	AIG12MQ04D
					Hairline silver		AIG12MQ05D
				RS232C	Pure black	Available	AIG12MQ12D
					Hairline silver		AIG12MQ13D
				RS422 / RS485	Pure black	Available	AIG12MQ14D
					Hairline silver		AIG12MQ15D
GT12G	STN monochrome LCD (green/orange/red backlight)	4.6 inch	24 V DC	RS232C	Pure black	Not available	AIG12GQ02D
					Hairline silver		AIG12GQ03D
				RS422 / RS485	Pure black	Not available	AIG12GQ04D
					Hairline silver		AIG12GQ05D
				RS232C	Pure black	Available	AIG12GQ12D
					Hairline silver		AIG12GQ13D
				RS422 / RS485	Pure black	Available	AIG12GQ14D
					Hairline silver		AIG12GQ15D
GT32M	STN monochrome LCD	5.7 inch	24 V DC	RS232C	Pure black	Available	AIG32MQ02D
					Hairline silver		AIG32MQ03D
				RS422 / RS485	Pure black	Available	AIG32MQ04D
					Hairline silver		AIG32MQ05D
GT32T0	TFT color LCD	5.5 inch	24 V DC	RS232C	Pure black	Available	AIG32TQ02D
					Hairline silver		AIG32TQ03D
				RS422 / RS485	Pure black	Available	AIG32TQ04D
					Hairline silver		AIG32TQ05D
GT32T1	TFT color LCD	5.5 inch	24 V DC	RS232C	Pure black	Available	AIG32TQ12D
					Hairline silver		AIG32TQ13D
				RS422 / RS485	Pure black	Available	AIG32TQ14D
					Hairline silver		AIG32TQ15D
Terminal GTWIN Ver.2	Japanese version	**Terminal GTWIN** CD-ROM					AIGT8000V2
	English version	**Terminal GTWIN** CD-ROM					AIGT8001V2
Terminal GTWIN Ver.2 Upgrade*1	Japanese version	**Terminal GTWIN** CD-ROM					AIGT8000V2R
	English version	**Terminal GTWIN** CD-ROM					AIGT8001V2R

*1 This upgrades **Terminal GTWIN Ver. 1** to **Ver. 2**.

Dimensions (unit: mm in)

CPU units

AFP7CPS41E **AFP7CPS41ES** **AFP7CPS31E** **AFP7CPS31ES** **AFP7CPS31** **AFP7CPS31S**

40 1.575   14.5 0.571   (10) 0.394   80 3.150   4 0.157

90 3.543
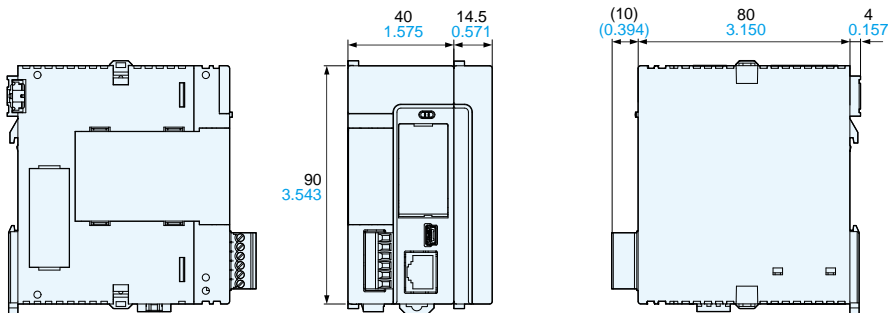
*CPU unit + End unit
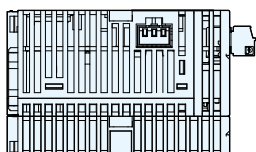
*AFP7CPS31 and AFP7CPS31S do not have an Ethernet port.

Add-on cassettes

AFP7CCS1 **AFP7CCS2** **AFP7CCM1** **AFP7CCM2**
AFP7CCS1M1 **AFP7FCA21** **AFP7FCAD2** **AFP7FCTC2**

AFP7CCET1

58.3 2.295   (10) 0.394   17 0.669   36.4 1.433

58.3 2.295   17 0.669   36.4 1.433

Power supply units

AFP7PSA1

50 1.969   (12.8) 0.504   80 3.150   4 0.157   90 3.543

AFP7PSA2

70 2.756   (12.8) 0.504   80 3.150   4 0.157   90 3.543
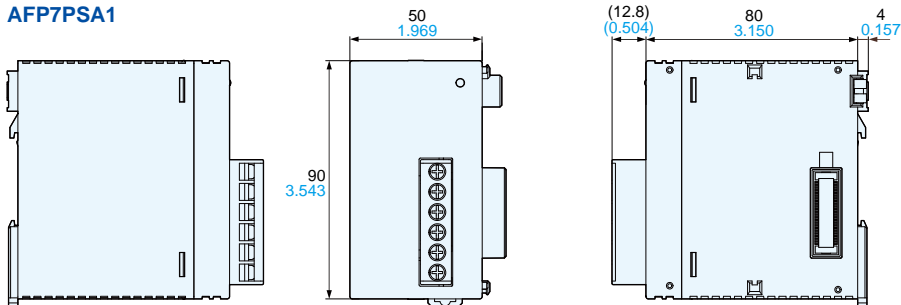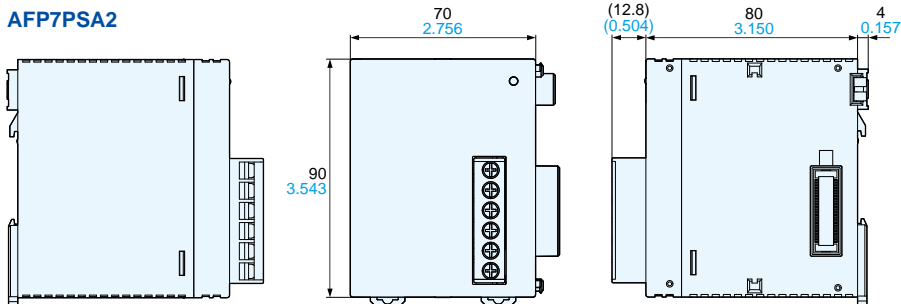
Input and output units / Analog input and output units

AFP7X16DW **AFP7Y16R** **AFP7Y16T** **AFP7Y16P** **AFP7AD4H** **AFP7DA4H**

28 1.102   (18) 0.709   80 3.150   4 0.157   90 3.543
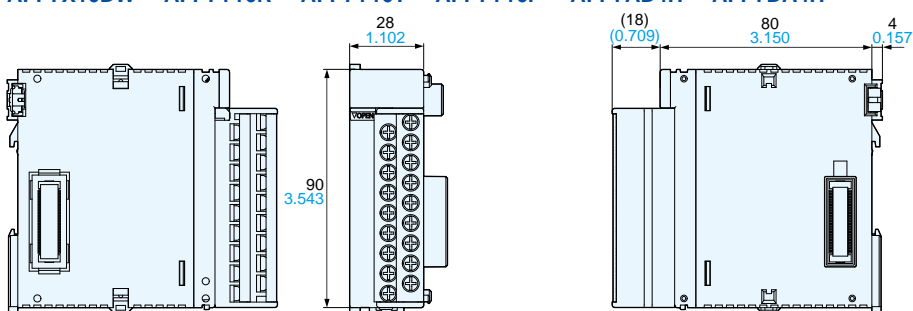
Dimensions (unit: mm in)

■ Input and output units / Positioning units / High-speed counter unit / Pulse output units

AFP7X32D2   AFP7Y32T   AFP7Y32P   AFP7PP02T   AFP7PP02L   AFP7HSC2T   AFP7PG02T   AFP7PG02L
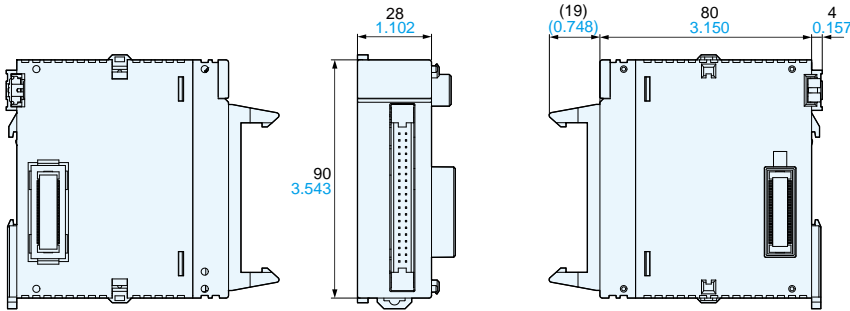
28
1.102

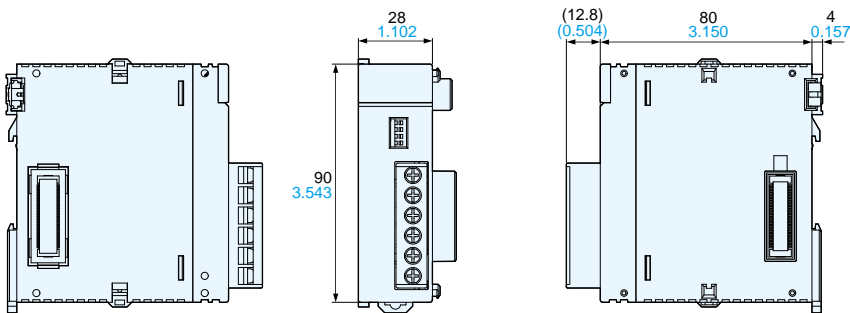90
3.543

(19)
(0.748)

80
3.150

4
0.157

■ Input and output units / Positioning units / High-speed counter unit / Pulse output units

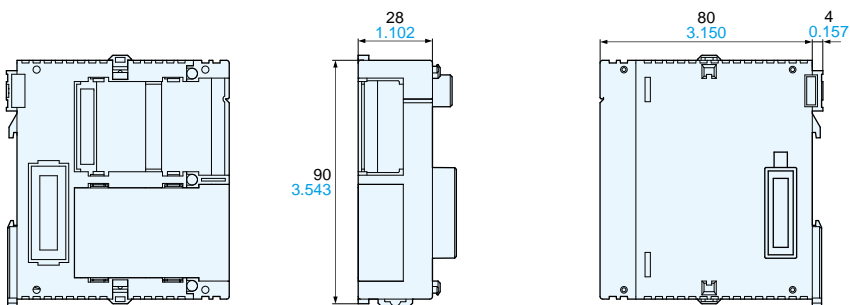**AFP7X64D2   AFP7Y64T   AFP7Y64P   AFP7XY64D2T   AFP7XY64D2P   AFP7PP04T   AFP7PP04L   AFP7HSC4T
AFP7PG04T   AFP7PG04L**

28
1.102

90
3.543

(19)
(0.748)

80
3.150

4
0.157

■ PHLS master unit

AFP7PHLSM

28
1.102

90
3.543

(12.8)
(0.504)

80
3.150

4
0.157
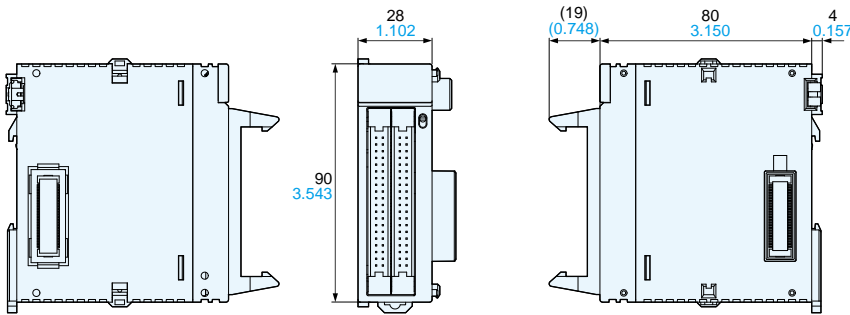
■ Serial communication unit

AFP7NSC

28
1.102

90
3.543

80
3.150

4
0.157

■PHLS slave units (standard type)

AFPRP1X16D2　AFPRP1Y16T　AFPRP1XY16D2T

138
5.433

50
1.969

41
1.614

4.5
0.177

6
0.236

128
5.039

50
1.969
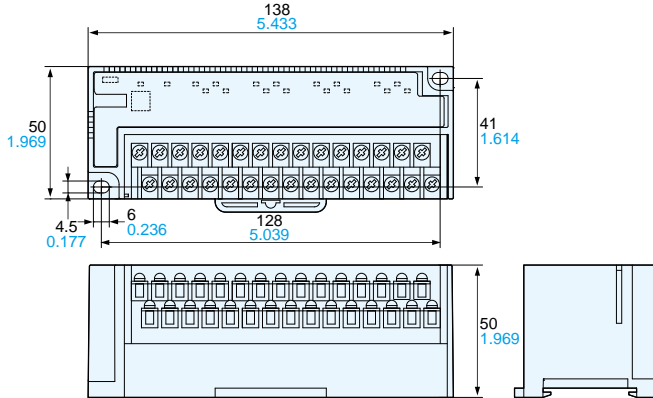
■PHLS slave unit (standard type)

AFPRP1X08D2

85
3.346

50
1.969

41
1.614

4.5
0.177

6
0.236

75
2.953

50
1.969
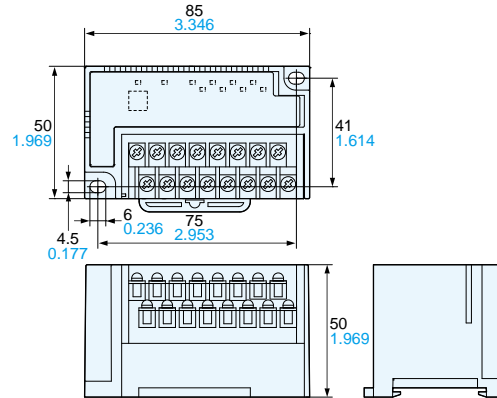
■PHLS slave unit (e-CON)

AFPRP2X08D2E

59.5
2.343

(9)
(0.354)

31.5
1.240

49.5
1.949

(10)
(0.394)
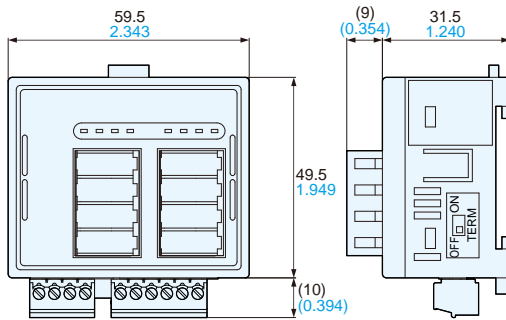
■PHLS slave unit (connector type and relay output)

AFPRP2Y04R

59.5
2.343

(18)
(0.709)

31.5
1.240

49.5
1.949

(10)
(0.394)

(9)
(0.354)
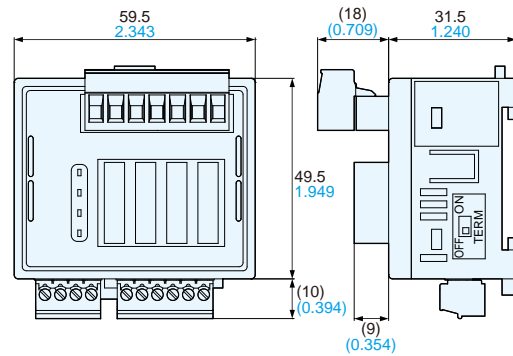
■PHLS slave units (connector type)

AFPRP2X16D2　AFPRP2Y16T　AFPRP2XY16D2T

59.5
2.343

(15)
(0.591)

31.5
1.240

49.5
1.949

(10)
(0.394)
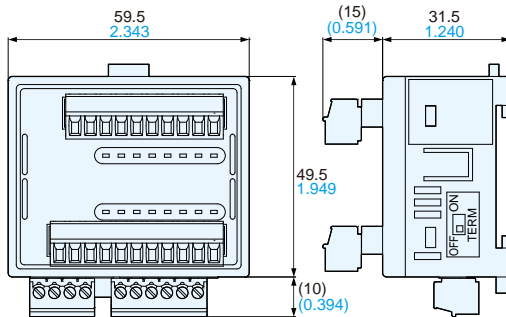
FP7:
Panasonic know-how inside!

Panasonic has a large number of factories worldwide. All our industry PLCs contain the experience and expertise of our machine and production engineers.

FP7: Very fast & flexible

One of the fastest PLCs in the world: 11 ns per program step! Program capacity of up to 220,000 steps, data memory of up to 500,000 words, and up to 32 GB expandable memory using SDHC card.

FP7: very small & powerful

FP7: connects worlds

Programming, monitoring, remote control and communication with other automation devices is possible all over the world.

FP7: green & clean

Panasonic specifies 14 forbidden and hazardous substances, which are not used in our products. We permit less than one-tenth of the level allowed by the RoHS guideline for the 6 most important hazardous substances and we have forbidden the use of another 8 hazardous substances in our products that are not even covered by the RoHS guideline.

Panasonic®