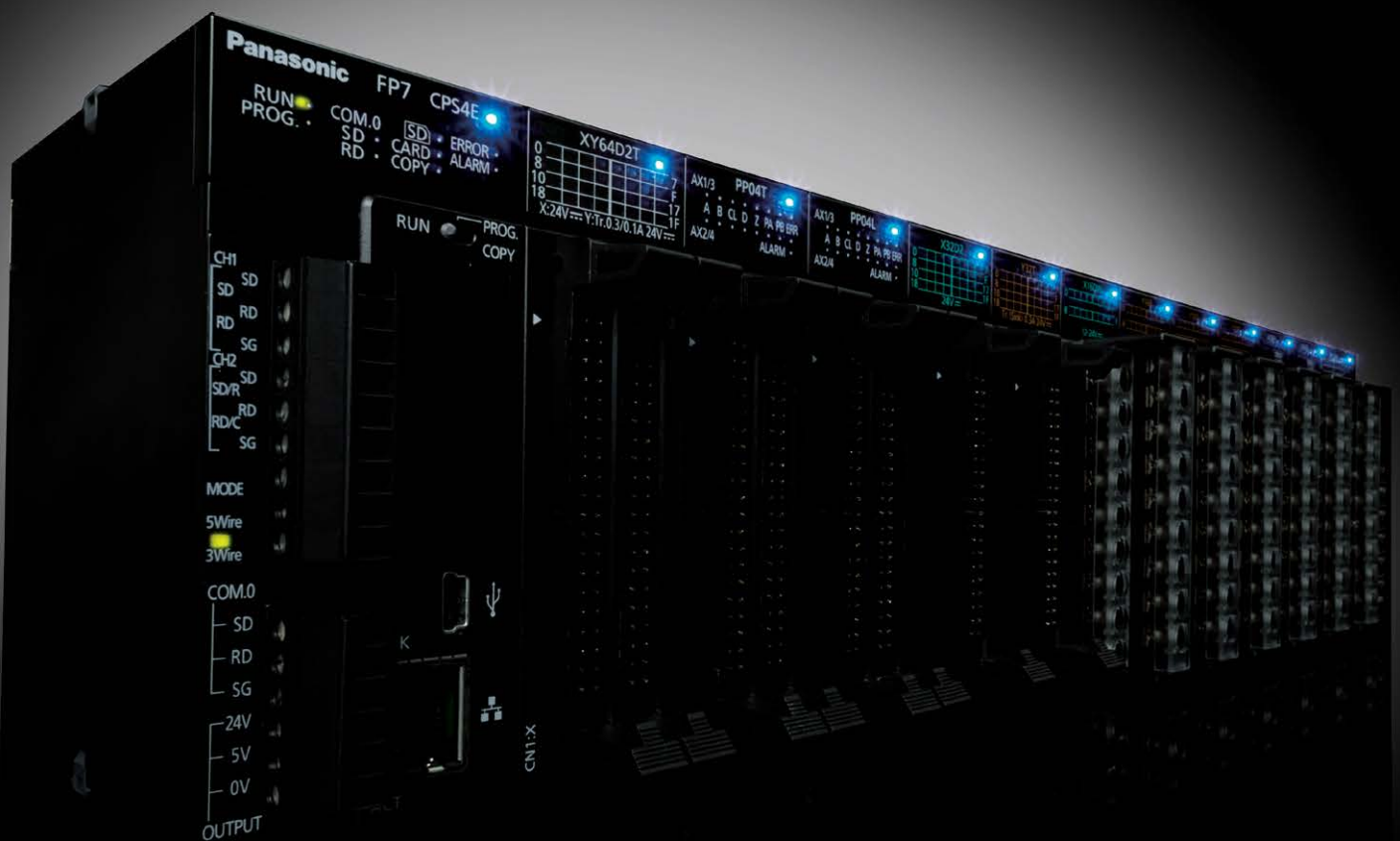# Panasonic

Programmable Controller

FP7 SERIES

CE
Conforming to
EMC Directive

Seven Steps
to Higher Efficiency

All about efficiencies for your manufacturing

Do you have concerns or problems on the manufacturing floor?

PLC programming should be faster.

We're spending a lot of time and effort during the debugging process due to inadequate tools for root cause analysis.

We spend a lot of time and money traveling to various manufacturing sites, just for gathering information on operating conditions.

I wish we had a more efficient way of localizing maintenance procedures.

Our production line is often delayed by slow recovery from various PLC problems.

Our program was duplicated by our competition due to poor security.

We don't have the budget to upgrade our PLC hardware.

Design process

Shorten
Save Time on Programming.
Programs can be created by using shared resources that are based on block programming.

▶ P.04

①

Speed
Save Time on Debugging.
Data collection for each scan speeds up the failure analysis process.

▶ P.05

②

Security
Save Time on Security Implementation.
Program level encryption ensures protection against copying program code. ▶ P.06

③

Seven Steps to Higher Efficiency

Supervise
Save Time on Operation Monitoring.
All data can be monitored from a remote location, eliminating the need for travel.

▶ P.07

④

Operation and Maintenance

⑤

Service
Save Time and Money on Maintenance.
Multilingual program comments facilitate the localization of maintenance procedures. Battery-free backup eliminates the need for battery replacement.

▶ P.08

Safety
Save Time on Recovery Efforts.
The built-in program backup allows users to immediately recover factory default conditions. All program changes are automatically logged for easy analysis. ▶ P.10

⑥

⑦

Total cost

Saving
Save on Space.
Small size without compromising on performance.

▶ P.12

| **Performance**	196 k steps, Operation speed of basic instruction: 11 ns, Max. I/O points: 8,192 points, 256 k words
Small size	Operates without AC power. Expandable communication functions thanks to the cassette system. Minimum configuration width: 83 mm 3.27 in
Cost	Top-level cost performance by stacking method.

① Shorten
Save Time on Programming.

Programs can be created by using shared resources that are based on block programming.
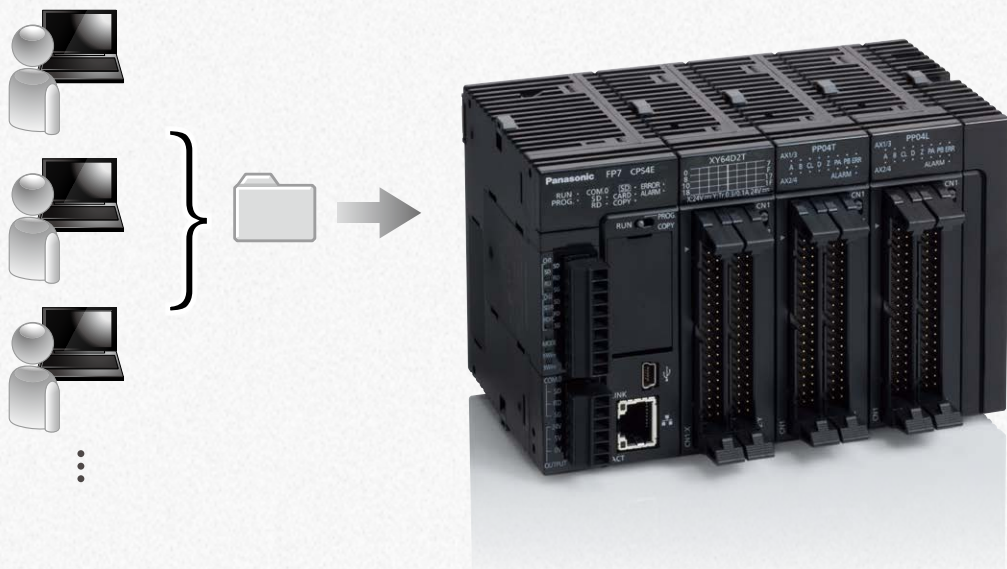
**Programming by blocks
Effective use of program assets**

• The use of local device that is available within program block is easy to divert programs made by other project.
• Streamline programming activities with shared resources.

Multiple programs can be configured within a single project.
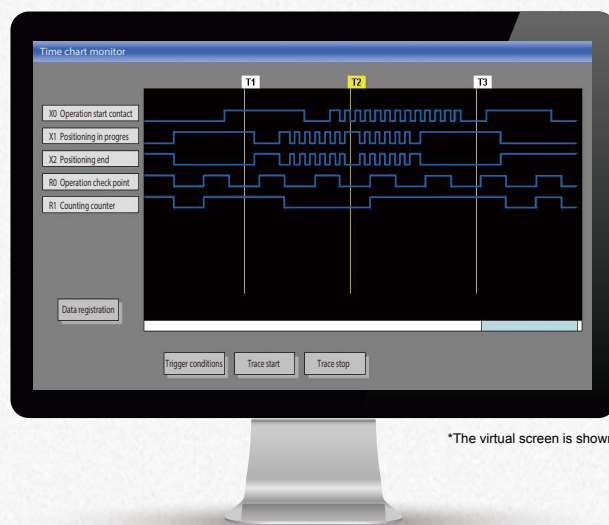Individual programs can be read from other projects.

Project tree

Ladder diagram edit display

②
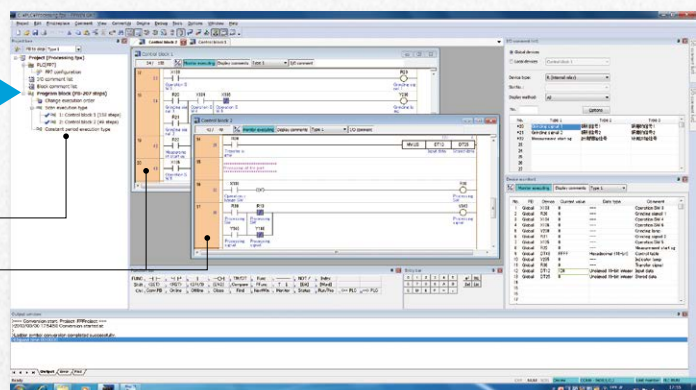
Speed
Save Time on Debugging.

Each contact's operation timing for each scan can be checked during debugging.

Time chart monitor

X0 Operation start contact
X1 Positioning in progres
X2 Positioning end
R0 Operation check point
R1 Counting counter

Data registration

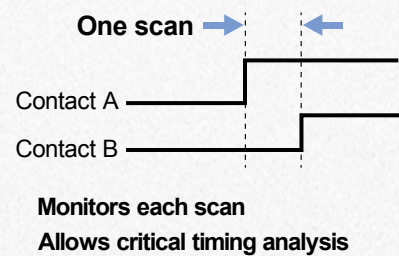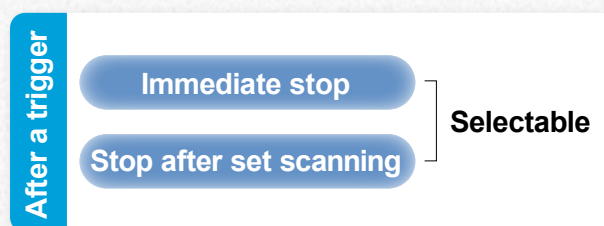Trigger conditions   Trace start   Trace stop

*The virtual screen is shown.

Trigger of time chart monitor is enhanced
Data collection for each scan

- **Faster operation checks during equipment commissioning.**
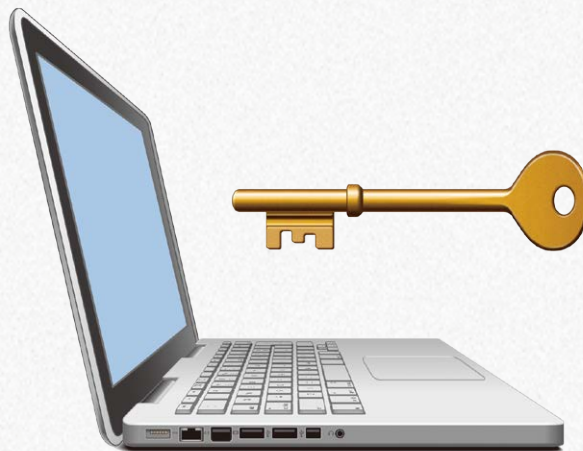- **Previously hidden timings are now visible during failure analysis.**

After a trigger

Immediate stop

Stop after set scanning

Selectable

One scan

Contact A

Contact B

Monitors each scan
Allows critical timing analysis

③

Security
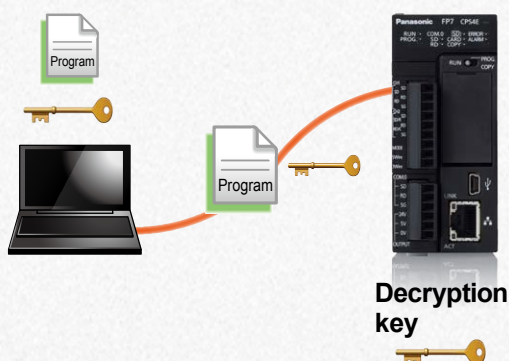# Save Time on Security Implementation.

Program level encryption ensures protection against copying program code.

Encrypted program 〉〉〉

> • **Programs cannot be decrypted.**
> • **Even if the program is copied, it will not operate.**

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

Any attempt to copy the installed equipment's program into a newly purchased FP7 will fail due to an unmatched decryption key, resulting in the equipment becoming inoperable.
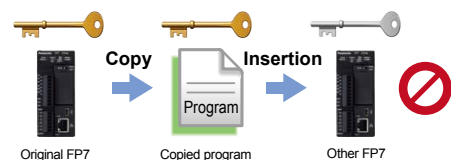
Supervise
Save Time on Operation Monitoring.

Remotely monitor PLC operations and access the data stored on the installed SD memory card.
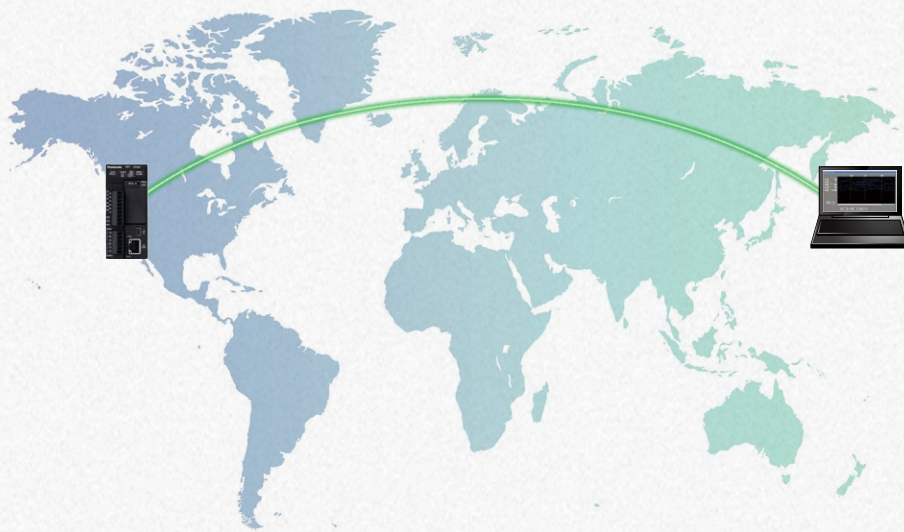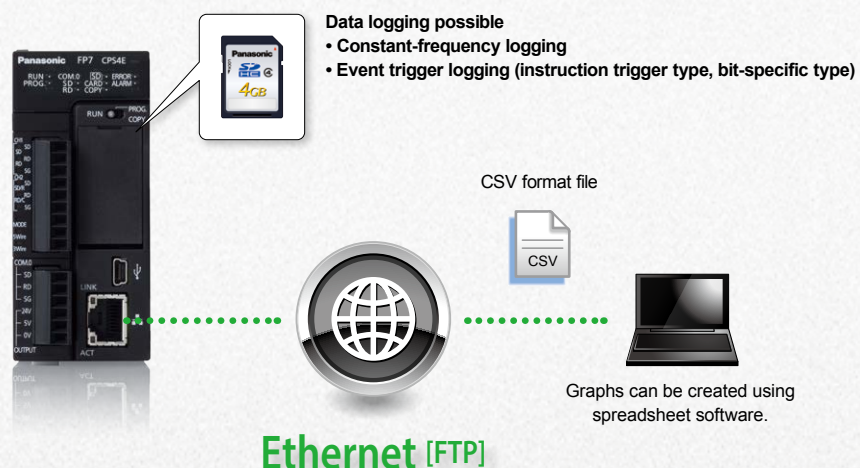
Logging function using SD memory card

Data of SD memory card transfer function

- 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)

CSV format file

Graphs can be created using spreadsheet software.

Ethernet [FTP]

Note: Recommended Internet environment is shown below.
  1. Install inside the firewall
  2. Install in a VPN environment

Service
Save Time and Money on Maintenance.

Multilingual program comments are supported to simplify maintenance when shipping equipment overseas.
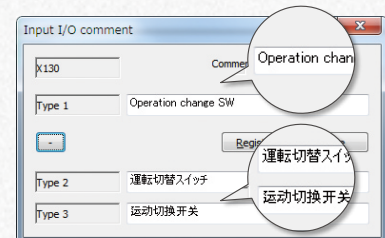

Localization of program comments ⟫ • **Effective for localization of maintenance**

| Displayed comments on ladder diagram can be switched. | Three comment types can be registered. |

**Comments can be imported and exported in CSV format for effortless post scripting.
All languages supported by Windows® are available.**

* Windows® is a trademark or registered trademark of Microsoft Corporation in the United States and other countries.

No need to replace a battery by data back up function without battery.

Data backup without battery ⟫

- **Simplified maintenance of equipment**
- **Total elimination of energy consumption during power ON / OFF**
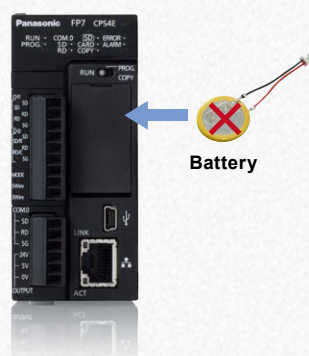
Battery

Item	Without battery	With battery
Program holding	○	○
Data register holding (Note 1)	○	○
Clock / calendar operation	△ (Note 2)	○

Notes: 1) Data register (DT) of up to 256 k words can be backed up.
2) 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 operation can be adjusted via Ethernet. Adjustment at power start up allows the battery-free system to be configured.

Set a maintenance schedule that is based off of an automatic measurement of contact switching cycles or overall ON time.

**Number of times a contact is ON and duration of ON time.
Hour meter operation.** ⟫

- **Possible to indicate timing of maintenance for peripheral equipment.**
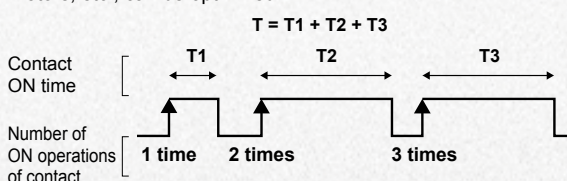- **Possible to indicate timing of maintenance for equipment itself.**

Input contact X
Automatically measures and logs the total ON times and number of ON operations of input connected equipment

Output contact Y
Automatically measures and logs the total ON times and number of ON operations of output connected equipment
The maintenance schedules for equipment such as relays, motors, etc., can be optimized

$$T = T1 + T2 + T3$$

Contact ON time

| | T1 | T2 | T3 |

Number of ON operations of contact

1 time   2 times   3 times

Monitor input and output contact states.

Power-on time ≒ Equipment operating time

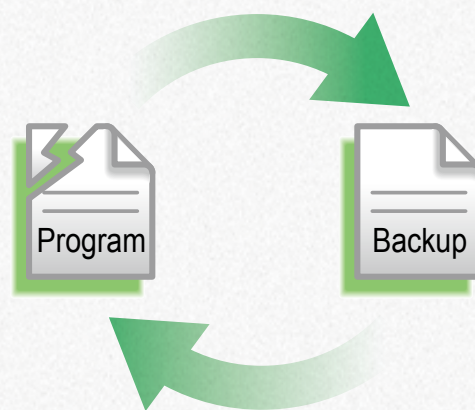### Records the PLC's time spent powered ON
Equipment operating time can be estimated. You can decide which equipment to give priority to reactivate if more than one item of equipment is idle.

6

Safety
Save Time on Recovery Efforts.

The built-in program backup allows users to immediately recover factory default conditions.
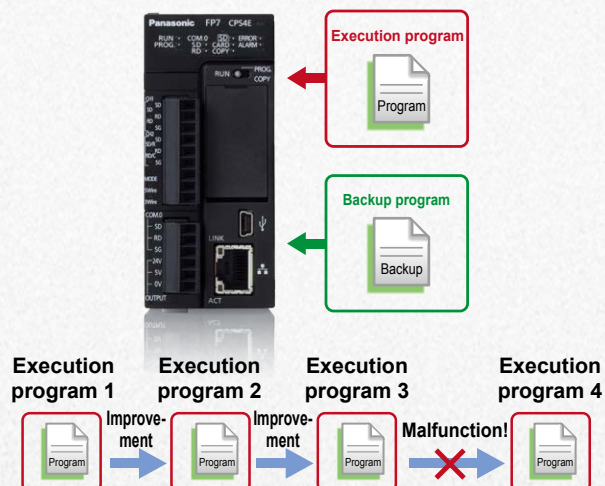
Program → Backup

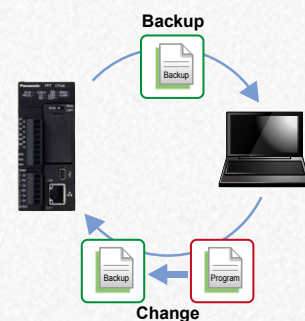**Function of backup program.** ≫

- **Production can resume in the event of fault.**
- **No need to search elsewhere for the original program.**

The CPU unit can store two programs. You can return to a backup program that has been previously saved without the use of an SD memory card if there has been a program failure.

Two program areas

Panasonic FP7 CPS4E

Execution program
Program

Backup program
Backup

Execution program 1
Program

Improve-ment →

Execution program 2
Program

Improve-ment →

Execution program 3
Program

Malfunction! ✕ →

Execution program 4
Program

Unclear which program to re-load if equipment malfunctions during program upgrade

Backup
Backup

Backup ← Program

Change

You can read a backup program from FPWIN GR7 and write it into the execution program to return to the factory default program.

*The backup program can be specified in advance.

Update program contents only after passing a functional check.

Function to test ROM operation
(Upgrading of program)

• New programs is possible to update after operation check when upgrading of PLC program with SD memory card.

Main unit's "Old Program"

❶ Execute "New Program" in SD memory card on FP7.

New

❷ Check operations under "New Program."

New

If equipment malfunctions in process 2 due to the main unit's program not having been updated, the operation can be returned to "Old Program."

❸ Update main unit's "Old Program" to "New Program."

New

Historical archiving of program changes

Automatic recorded history of change in program

• Access record can be used during debugging.
• Efficient to find out cause on accident figure.

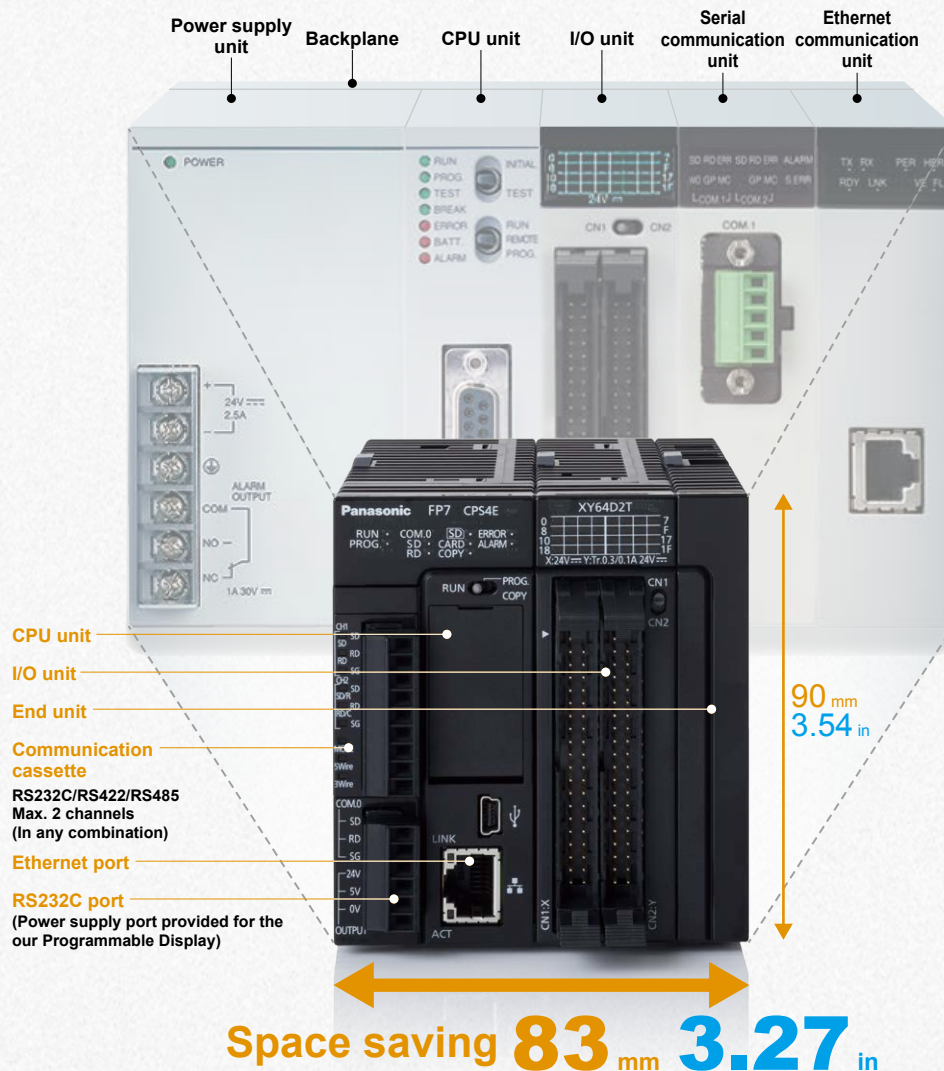| Date of occurrence	Time	Trigger
2012/11/21	14:05:35	Power: ON
2012/11/21	14:07:13	Open cover.
2012/11/21	14:20:25	Insert SD memory card.
2012/11/21	14:30:19	Close cover.
2012/11/21	14:31:00	Download program.
2012/11/21	14:33:10	Switch operation mode to RUN.
2012/11/21	14:35:12	Program edition during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

*Data logs are virtual.

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

7

Saving
Save on Space.

A high performance PLC with a small footprint.

Power supply unit
Backplane
CPU unit
I/O unit
Serial communication unit
Ethernet communication unit

CPU unit
I/O unit
End unit
Communication cassette
RS232C/RS422/RS485 Max. 2 channels (In any combination)
Ethernet port
RS232C port
(Power supply port provided for the our Programmable Display)

90 mm
3.54 in

Space saving 83 mm 3.27 in

Without the requirement of a power supply unit or backplane, you can reduce the cost of your PLC configuration.

Direct connection to DC power
Expansion units are clipped together without use of backplane.

≫

• **With power supply unit as option, cost is reduced.**
• **Smaller footprint.**

No power supply unit

A 24 V DC power can be directly connected from the control panel.

* Add a power supply unit if AC power is required.

No backplane

Lower the cost of expansion units with the integrated cassette system.

Enhancing features by using cassette.

≫

• **Reduced Costs.**
• **Smaller footprint.**

Communication cassette allows enhanced functions

RS232C   ×1 channel
or
RS422/RS485   ×1 channel

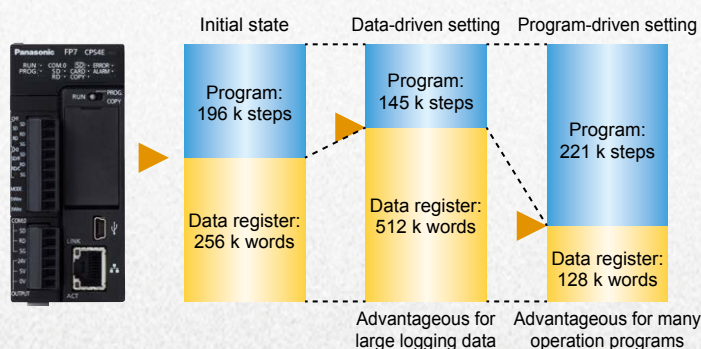RS232C   ×2 channels
or
RS422/RS485   ×2 channels

RS232C, RS485 each 1 channel

No communication unit
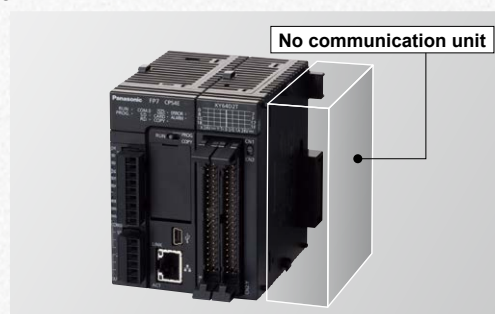
Capacity of program & data register are configurable.

Shareable program capacity and data register numbers

≫

• **Both expandable when more capacity needed**
• **No need repurchase upgrade models.**

Initial state

Program: 196 k steps

Data register: 256 k words

Data-driven setting

Program: 145 k steps

Data register: 512 k words

Advantageous for large logging data

Program-driven setting

Program: 221 k steps

Data register: 128 k words

Advantageous for many operation programs
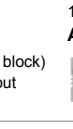
Reference value: for 196 k steps type CPU unit (Note)

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.

FP7 Series Line up

CPU units ►P.15

Standard model

AFP7CPS4E

AFP7CPS3E — On sale soon

AFP7CPS3 — On sale soon

End unit

*Included with CPU unit

Add-on cassettes ►P.16

Communication cassettes

| RS232C 1 channel AFP7CCS1 | RS232C 2 channels AFP7CCS2 | RS422 / RS485 1 channel AFP7CCM1 | RS422 / RS485 2 channels AFP7CCM2 |

Communication cassette

RS232C 1 channel and RS485 1 channel
AFP7CCS1M1

Power supply units ►P.23

AC Power supply units

AC Power supply unit
AFP7PSA1

AC Power supply unit (High capacity type)
AFP7PSA2

Input and Output units ►P.18

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

Output units

Terminal block 16 points, Transistor output (Source)
AFP7Y16P

MIL connector 32 points, Transistor output (Source) — On sale soon
AFP7Y32P

MIL connector 64 points, Transistor output (Source) — On sale soon
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) — On sale soon
AFP7XY64D2P

Analog Input and Output units ►P.17

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

Positioning units ►P.22

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

PHLS (Remote I/O) units ►P.20

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

CPU Units

AFP7CPS4E

On sale soon
AFP7CPS3E

On sale soon
AFP7CPS3

Compact size and with room for expansion functions

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

2. Up to 16 various units can be connected.
A single CPU unit is capable of connecting up to 16 various units.

3. High-capacity SD (SDHC) memory cards are supported.
Up to 32 GB SD (SDHC) memory cards are supported.

4. High performance (Scan of 1 ms minimum processing time and minimum 20 μs or less in 60 k steps)
The processing speed is less susceptible to frequent Ethernet communication.

■GENERAL SPECIFICATIONS

Item	Specifications
Allowed momentary power off time	CPU unit (when directly connected to 24 V DC) 4 ms (at 20.4 V), 7 ms (at 24 V), 10 ms (at 28.8 V) 10 ms [when AC power supply unit (**AFP7PSA1** / **AFP7PSA2**) is used]

■CONTROL SPECIFICATIONS

Item	AFP7CPS4E
Programming method	Relay symbol method
Control method	Cyclic operation method
Program memory	Built-in flash ROM (No backup battery required)
Program capacity	196 k steps (196,000)
Operation speed	Basic instruction: From min. 11 ns/step
External input (X)	8,192 points (Note 1)
External output (Y)	8,192 points (Note 1)
Internal relay (R)	32,768 points
System relay (SR)	Internal operation status of various relays is shown
Link relay (L)	16,384 points
Timer (T)	4,096 points: Timer capable of counting (units: 10 μs, 1 ms, 10 ms, 100 ms or 1 sec.) × 4,294,967,295
Counter (C)	1,024 points, Counter capable of counting 1 to 4,294,967,295
Data register (DT)	256 k words
Link data register (LD)	16,384 words
System data register (SD)	Internal operation status of various registers is shown
Index register (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 program	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)
Clock / calendar (Note 2)	Year (last two digits), month, day, hour (24-hour display), minute, second and day of week
Battery backup	For Clock / calendar
Battery life (Value applies when no power is supplied at all.)	3.3 years or more [actual usage value: 20 years approx. (at 25 °C 77 °F)]
Safety function	Password / Read disable setting / Encryption (every PB)
Self-diagnosis function	Watchdog timer and program syntax check
Comment storage	Available (3 MB) (No backup battery required)
PLC link function	Max. 16 units, Link relay: 1,024 points, Link register: 128 words (Data transfer and remote programming are not supported) (Link area allocation is switchable between the first and the second half)
Program edition during RUN	Available

Notes: 1) Hardware configuration governs the actually usable number of I/O points. When I/O points are not actually used, usable as internal relays
2) 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

■COMMUNICATION SPECIFICATIONS FOR COM PORT

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	Half-duplex system
Synchronous method	Start-stop synchronization system
Transmission format	Stop bit: 1 bit / 2 bits
	Parity: Invalid / Valid (Odd / Even)
	Data length: 7 bits / 8 bits
	Start code: with STX / without STX
	End code: CR / CR + LF / Null / ETX
Data transmission order	Transmit from bit 0 in character units.
Connection	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 COMMUNICATION PORT SPECIFICATIONS

Item	Specifications
Communication interface	Ethernet 100BASE-TX / 10BASE-TX
Communication speed	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)

■USB PORT SPECIFICATIONS

Item	Specifications
Standard	USB2.0 Fullspeed 12 Mbps (USB miniB type)
Communication function	Computer link (Slave)

Add-on Cassettes (Communication Cassettes)

AFP7CCM2

AFP7CCS1M1

AFP7CCS1

AFP7CCS2

AFP7CCM1

For operation display panels, connections with PCs and bidirectional data exchanges

1. Serial communication functions can be added to the CPU unit.
CPU unit functions can be expanded by selectively using 5 types of cassettes. Those include RS232C dedicated cassettes, cassettes to support either RS422 or RS485, and cassettes that support any combination of RS232C and RS485.

2. Protocol supports MODBUS-RTU.
Even when communicating with MODBUS-RTU, communication between equipment is easily achieved by the communication instructions.

■SPECIFICATIONS

Item	AFP7CCS1	AFP7CCS2 (Note 6)	AFP7CCM1 (Note 5)	AFP7CCM2 (Note 5)	AFP7CCS1M1	
Interface	RS232C 1 channel	RS232C 2 channels	RS422 / RS485 1 channel	RS422 / 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)		RS232C Max. 15 m 49 ft (Note 1)	RS485 Max. 1,200 m 3,937 ft (Note 2 and 3)
Transmission speed	300,600,1200,2400,4800,9600,19200,38400,57600,115200, 230400 bits/sec.					
Communication method	Half-duplex system					
Synchronous method	Start-stop synchronization system					
Transmission format	Stop bit: 1 bit / 2 bits					
	Parity: Invalid / Valid (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.					
Number of connected units (Note 2, 3 and 4)	–	–	For general-purpose communication: Max. 99 units (Note 7)	–	For general-purpose communication: Max. 99 units	
			For computer link: Max. 99 units (Note 7)		For computer link: Max. 99 units	
			For PLC link: Max. 16 units (Note 7)		For PLC link: Max. 16 units	
			For MODBUS-RTU: Max. 99 units (Note 7)		For MODBUS-RTU: Max. 99 units	

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.

For transmission speed: 230.4 kbps   For transmission speed: 115.2 kbps

For transmission speed: 57.6 kbps

Number of station units

99

70

40

20

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

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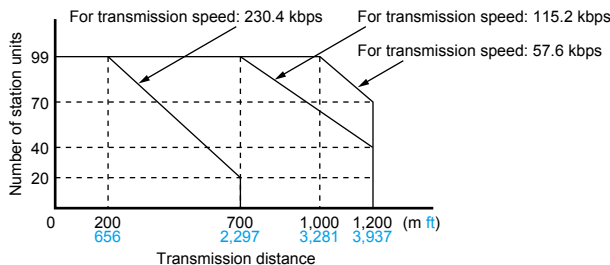
When using a transmission speed of 38.4 kbits/sec. or less, you can set up a maximum of 1,200 m 3,937 ft and 99 units.
For RS422 setting, you can set up a maximum transmission distance of 400 m 1,312 ft.

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

Analog Input and Output Units

AFP7DA4H

AFP7AD4H

Channels insulated range to support various types of equipment

1. 20 times faster conversion than the 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.

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

3. Noise-resistant with isolated channels
Channels insulated range is included to guard against interference from other channels. You can use it without worrying about the power supply system of the objects being measured.
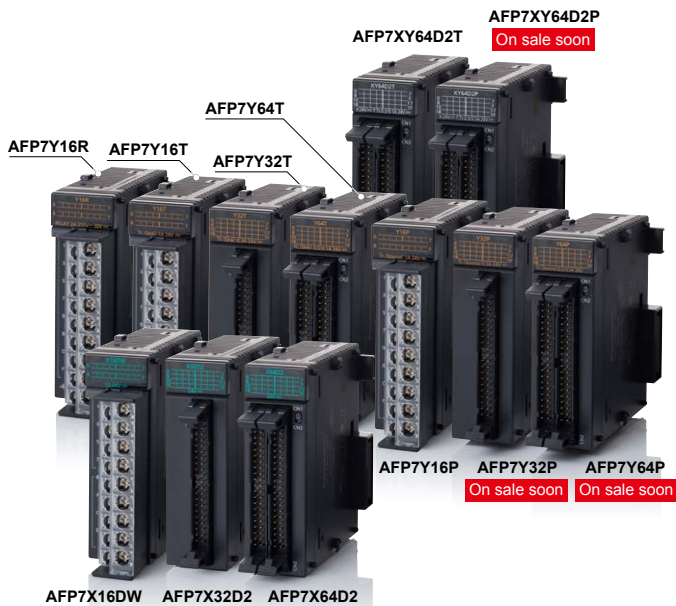
■ANALOG INPUT SPECIFICATIONS (AFP7AD4H)

Item			Specifications
Number of input channels			4 channels
Input range (resolution max. 16 bits)	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 not 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 impedance	Voltage input		1 MΩ
	Current input		250 Ω
Absolute maximum input			-15 to +15 V Voltage input -2 to +30 mA Current input
Insulation method	Between the input terminal and internal circuits		Photocoupler Insulation type DC/DC converter
	Between channels		PhotoMOS relay
Digital processing	Averaging	Number of times	Range setting: 2 to 60,000 times
		Time	Time setting: 1 to 1,500 ms (at not 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 for each channel
Conversion execution / non-execution channel setting			Selectable for one channel unit
Maximum and minimum value holding			Settable for each channel
Comparison of upper and lower limit values			Settable for each channel (hysteresis)
Broken wire sensing			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
Trigger input section	Insulation method		Optical coupler insulation
	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
External connection method			Terminal block (M3 terminal screw)

■ANALOG OUTPUT SPECIFICATIONS (AFP7DA4H)

Item		Specifications
Number of output channels		4 channels
Output range (resolution max. 16 bits)	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
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
Maximum output current (Voltage output)		10 mA
Allowable output load resistance (Current output)		500 Ω or less
Insulation method	Between the input terminal and internal circuits	Photocoupler Insulation type 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 for each channel
Conversion execution / non-execution channel setting		Selectable for one channel unit
Upper and lower output limit clip function		Settable for each channel
Analog output holding (at PROG mode)		Present value holding / Any value holding / Not holding
External connection method		Terminal block (M3 terminal screw)

Input and Output Units

AFP7XY64D2T
AFP7XY64D2P — On sale soon
AFP7Y64T
AFP7Y16R AFP7Y16T
AFP7Y32T
AFP7Y16P AFP7Y32P — On sale soon AFP7Y64P — On sale soon
AFP7X16DW AFP7X32D2 AFP7X64D2

I/O points can be installed as necessary efficiently.

1. Input / output mixed units are available.
Input / output mixed units are available in addition to dedicated input or output units. 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.

2. The 64 points 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.

3. Input time constants are settable.
Response speed can be selected from 0.1 ms, 0.5 ms, 1.0 ms, 5.0 ms, 10.0 ms, 20.0 ms or 70.0 ms depending on the output equipment to be used.

■INPUT 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 insulation			
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 (Note)	0.2 ms or less (Note)		0.2 ms or less (Note)
	ON→OFF	0.2 ms or less (Note)	0.2 ms or less (Note)		0.2 ms or less (Note)
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)
External connection method		Terminal block (M3 screw)	Connector (MIL-compliant 40 pins)	Connector (MIL-compliant 40 pins, two use)	Connector (MIL-compliant 40 pins)

Note: Changeable by settable input time constant

■OUTPUT SPECIFICATIONS

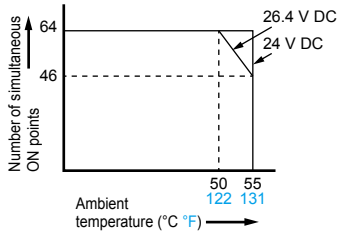| Item		Relay output unit	Transistor output units					I/O mixed unit (output side)
		16 points type	Sink type (NPN open collector)			Source type (PNP open collector)	Sink type (NPN open collector)	
			16 points type	32 points type	64 points type	16 points type	32 points type	
Insulation method		Relay insulation	Photocoupler insulation			Photocoupler insulation		
Rated control 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					
Load voltage allowable 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)	0.3A (20.4 to 26.4 V DC) 30 mA (4.75 V DC)	1 A	0.3A (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)		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 maximum voltage drop		–	0.5 V or less			0.5 V or less		
Repose time	OFF→ON	10 ms approx.	0.05 ms or less (at load current 0.5 mA or more)	0.1 ms or less (at load current 1 mA or more)	0.1 ms or less (at load current 2 mA or more)	0.05 ms or less (at load current 0.5 mA or more)	0.1 ms or less (at load current 2 mA or more)	
	ON→OFF	8 ms approx.	0.3 ms or less (at load current 0.5 mA or more)	0.3 ms or less (at load current 1 mA or more)	0.3 ms or less (at load current 1 mA or more)	0.3 ms or less (at load current 0.5 mA or more)	0.3 ms or less (at load current 2 mA or more)	
Life time	Mechanical life	2 × 10⁷ operations or more	–	–	–	–	–	
	Electrical life	1 × 10⁵ operations or more	–	–	–	–	–	
External power supply	Voltage	–	4.75 to 26.4 V DC			4.75 to 26.4 V DC		
	Current (at 24 V)	–	70 mA	110 mA	70 mA/common	70 mA	70 mA	
Surge absorber		Snubber circuit (leakage current: 0.2 mA or less)	Zener diode			Zener diode		
Relay socket		–	–	–	–	–	–	
Short circuit protection		–	–	–		–		
Output points per common		16 points/common	16 points/common	32 points/common		16 points/common	32 points/common	
Operating mode indicator		16 points LED display (lights when ON)	16 points LED display (lights when ON)	32 points LED display (lights when ON)	32 points LED display (lights when ON, selectable by switch)	16 points LED display (lights when ON)	32 points LED display (lights when ON, selectable by switch)	
External connection method		Terminal block (M3 screw)	Terminal block (M3 screw)	Connector (MIL-compliant 40 pins)	Connector (MIL-compliant 40 pins, two use)	Terminal block (M3 screw)	Connector (MIL-compliant 40 pins)	

■ I/O CIRCUIT DIAGRAMS

● DC input unit [Input circuit diagrams]

[16 points]
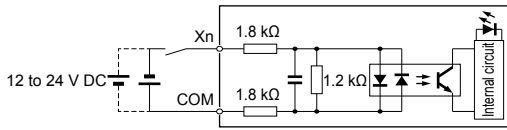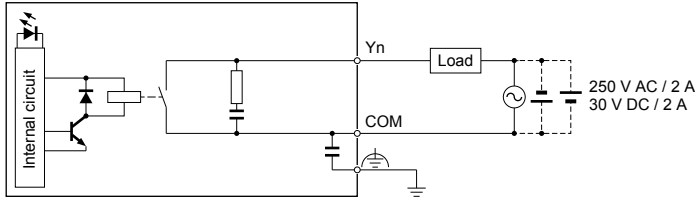
[32 points / 64 points]
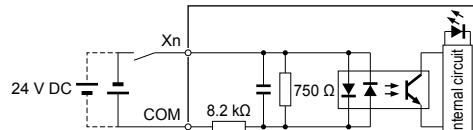
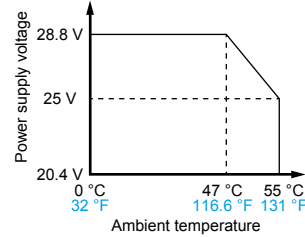Reduce simultaneous ON points according to the graph below.

● Relay output unit [Output circuit diagram]
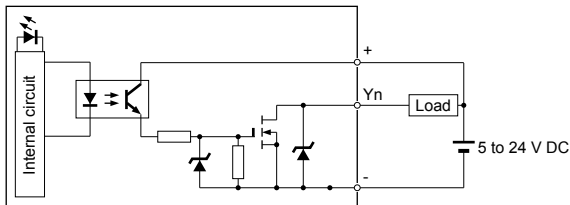

250 V AC / 2 A
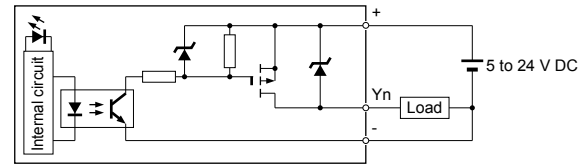30 V DC / 2 A

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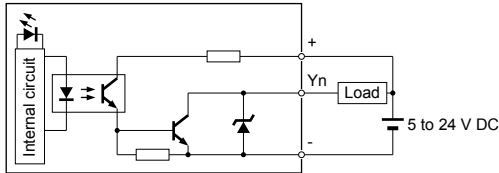Reduce power supply voltage according to the graph below by the ambient temperature.

● Transistor output unit [Output circuit diagram]

[Sink type, 16 points]

[Source type, 16 points]

[Sink type, 32 points / 64 points]

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

[32 points]
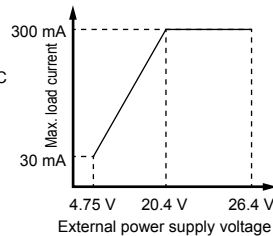
[64 points]

●0.3 A (Y0 to Y7)

●0.1 A (except Y0 to Y7)

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

[Input circuit]

[Output circuit]

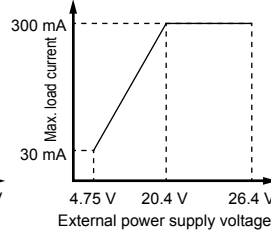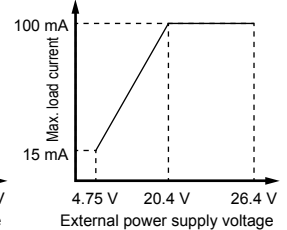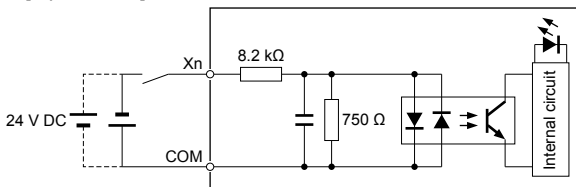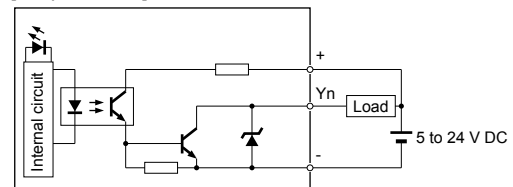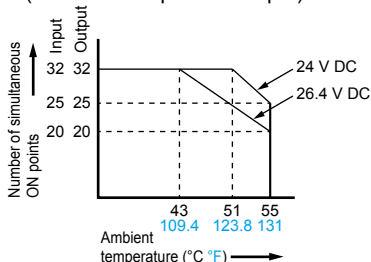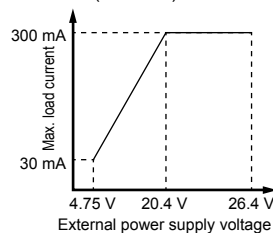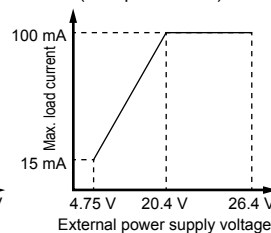Limitations on simultaneous ON points (common to input and output)

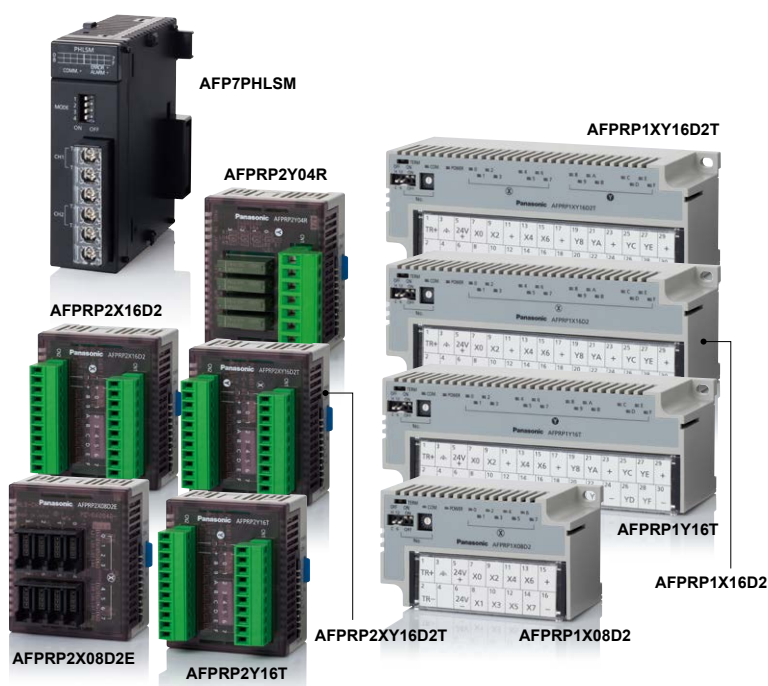Note: Reduce load current according to the graph below by the external power supply voltage.

● 0.3 A (Y0 to Y7)

● 0.1 A (except Y0 to Y7)

PHLS (Remote I/O) Units

AFP7PHLSM

AFPRP2Y04R

AFPRP1XY16D2T

AFPRP2X16D2

AFPRP2XY16D2T

AFPRP2X08D2E

AFPRP2Y16T

AFPRP1Y16T

AFPRP1X16D2

AFPRP1X08D2

Fast, Noise-Resistant Remote I/O Line Up

1. 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.

2. Immunity to high noise levels
Data can be transferred accurately, even in inadequate wiring environments.

3. Various types of compact 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.

■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 insulation	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	

■OUTPUT SIDE SPECIFICATIONS (Except relay)

Item		Specifications	
		Standard type	Compact type (except relay)
Insulation method		Photocoupler insulation	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

[Output type]
AFPRP1Y16T

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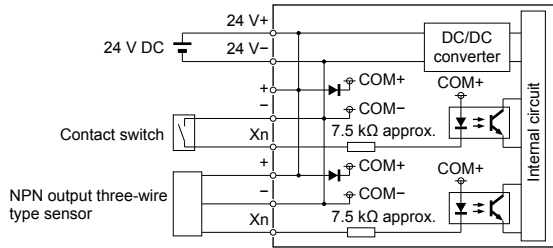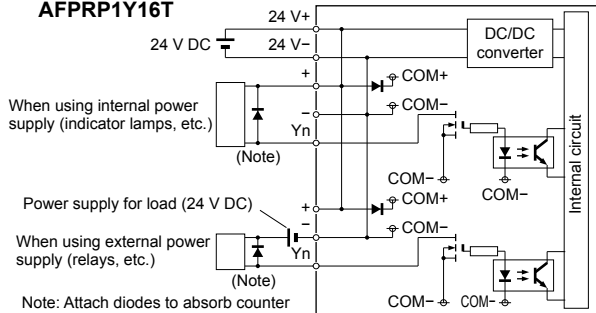
[I/O mixed type]
AFPRP1XY16D2T

Note: Attach diodes to absorb counter electromotive force from inductive load.
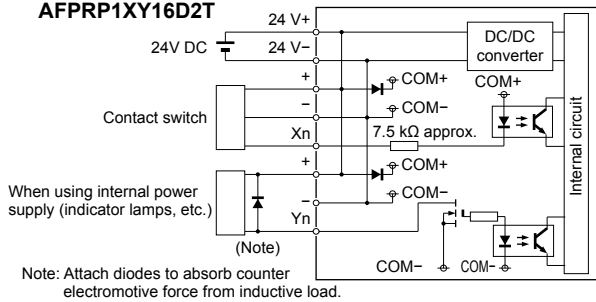
● Compact type (Relay output)
AFPRP2Y04R [When connecting to separated common terminal]

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.
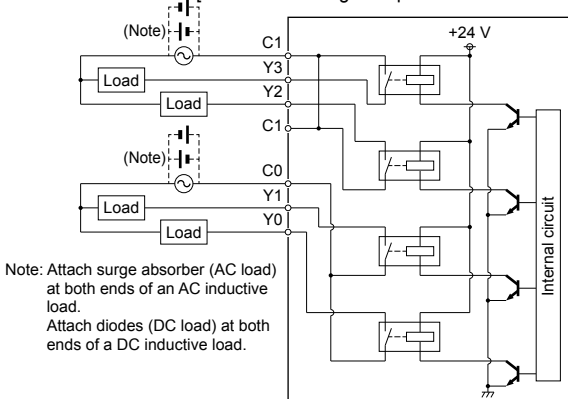
● Compact type (e-CON)
AFPRP2X08D2E
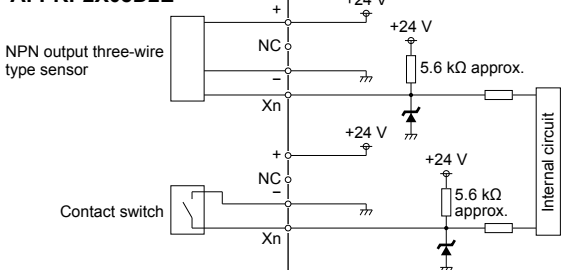
● Compact type (Connector type terminal block)
[Input type]
AFPRP2X16D2
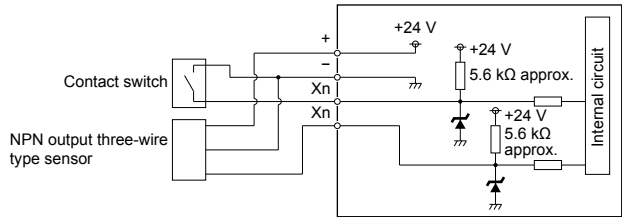
[Output type]
AFPRP2Y16T
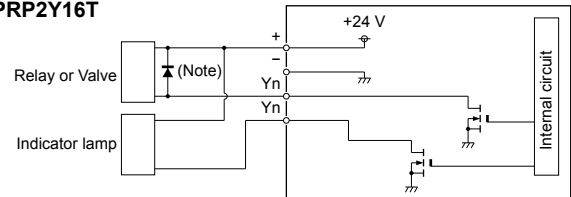
Note: Attach diodes to absorb counter electromotive force from inductive load.

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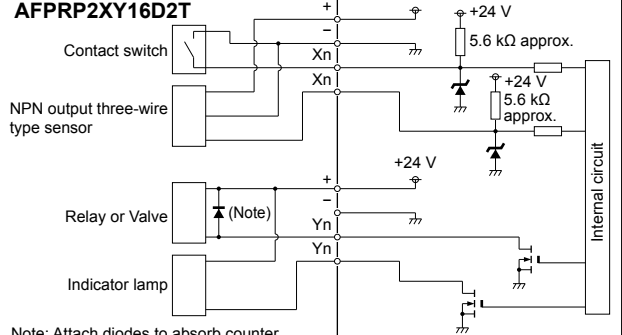
Note: Attach diodes to absorb counter electromotive force from inductive load.

[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.

Positioning Units

High-accuracy positioning control can be achieved at reduced cost.

AFP7PP02T   AFP7PP04T   AFP7PP02L   AFP7PP04L

1. Equipped with electronic cam and electronic gear functions
Ladder program is capable of controlling electronic cams and gears. Virtual axes are supported and operable without connecting to external encoders.

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

3. Dedicated configuration tool
Start positioning dedicated configuration tool using **Control FPWIN GR7**. 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.

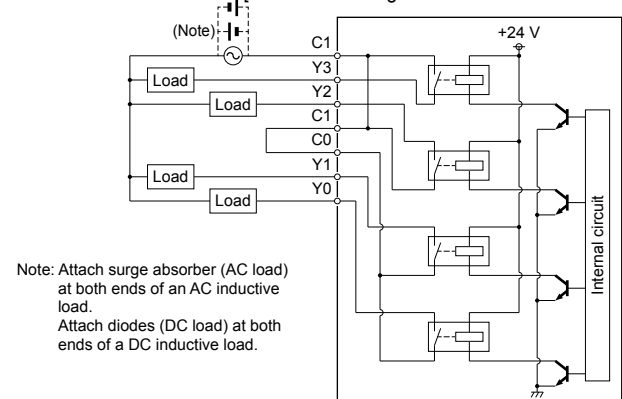## ■PERFORMANCE SPECIFICATIONS

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	4 Mpps	500 kpps	4 Mpps
Number of axes controlled			2 axes		4 axes	
Interpolation control			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	
Position command units			pulse µm (The minimum command unit can be selected from 0.1 µm or 1 µm.) inch (The minimum command unit can be selected from 0.00001 inch or 0.0001 inch.) degree (The minimum command unit can be selected from 0.1 degree or 1 degree.)			
Position command range			pulse: −1,073,741,823 to +1,073,741,823 pulse µm (0.1 µm): −107,374,182.3 to +107,374,182.3 µm µm (1 µm): −1,073,741,823 to +1,073,741,823 µm inch (0.00001 inch): −10,737.41823 to +10,737.41823 inch inch (0.0001 inch): −107,374.1823 to +107,374.1823 inch degree (0.1 degree): −107,374,182.3 to +107,374,182.3 degree degree (1 degree): −1,073,741,823 to +1,073,741,823 degree			
Speed command range			pulse: 1 to 32,767,000 pps µm: 1 to 32,767,000 µm/sec. inch: 0.001 to 32,767.000 inch/sec. degree: 0.001 to 32,767.000 rev/sec. *Specify an output speed that is below the maximum operating speed.			
Automatic operation	Position control	Position command method	Absolute (Absolute position designation), Increment (Relative position designation)			
		Acceleration / deceleration method	Linear acceleration / deceleration, S-curve acceleration / deceleration			
		Acceleration time	0 to 10,000 ms (in increments of 1 ms)			
		Deceleration time	0 to 10,000 ms (in increments of 1 ms)			
		Number of positioning tables	For each axis; Standard area: 600 points, Expansion area: 25 points			
		Control method — Independent	PTP control (E point control, C point control), CP control (P point control), Speed control (J point control)			
		Control method — 2-axis interpolation — Linear interpolation	E point, P point and C point controls: Specify synthesis speed or major axis speed			
		Control method — 2-axis interpolation — Circular interpolation	E point, P point and C point controls: Specify center point or passing point			
		Control method — 3-axis interpolation — Linear interpolation	E point, P point and C point controls: Specify synthesis speed or major axis speed			
		Control method — 3-axis interpolation — Spiral interpolation	E point, P point and C point controls: Specify 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	JOG operation	Acceleration / deceleration method	Linear acceleration / deceleration, S-curve acceleration / deceleration			
		Acceleration time	0 to 10,000 ms (in increments of 1 ms)			
		Deceleration time	0 to 10,000 ms (in increments of 1 ms)			
	Home return	Acceleration / deceleration method	Linear acceleration / deceleration			
		Acceleration time	0 to 10,000 ms (in increments of 1 ms)			
		Deceleration time	0 to 10,000 ms (in increments of 1 ms)			
		Return method	DOG method (3 types), Limit method (2 types), Data set method, Z-phase method			
	Pulser operation	Speed command range	Operates in synchronization with pulser input.			

Item			Specifications			
			2 axes type		4 axes type	
Part No.			AFP7PP02T	AFP7PP02L	AFP7PP04T	AFP7PP04L
Stop function	Deceleration stop	Deceleration time	Deceleration time of running operation			
	Emergency stop	Deceleration time	0 to 10,000 ms (in increments of 1 ms)			
	Limit stop	Deceleration time	0 to 10,000 ms (in increments of 1 ms)			
	Error stop	Deceleration time	0 to 10,000 ms (in increments of 1 ms)			
	System stop	Deceleration time	Immediate stop (0 ms), all axes stop			
Synchronous operation function	Synchronous basic setting	Master axis	Selectable from existence axes, virtual axes or pulse input (1 to 4).			
		Slave axis	Max. 2 axes		Max. 4 axes	
	Electronic gear function	Operation setting	Gear ratio setting			
		Operation method	Direct method, Acceleration / deceleration method			
	Electronic clutch function	Clutch ON trigger	Contact input			
		Clutch method	Direct method, Linear slip method			
	Electronic cam function	Cam curve	Select from 20 types Multiple curves can be specified within a phase (0 to 100%).			
		Resolution	1024, 2048, 4096, 8192, 16384, 32768			
		Number of cam patterns	4 to 16 (Depends on resolution)			
Other specifications	Output mode		1 pulse output (pulse + sign), 2-pulse output (cw/ccw)			
	High-speed counter function (Note)	Countable range	−1,073,741,823 to +1,073,741,823 pulse			
		Input mode	Phase difference input, Direction distinction input, Individual input (transfer multiple available for each)			
	Built-in servo ON output					

Note: Pulser input and high-speed counter functions cannot be used simultaneously, as the same pulse input terminal is used.

Power Supply Units

Announce system errors using the built-in external alarm.

1. Equipped with system error alarm contact
Output contact for system error external alarm is provided. If a power supply unit is used concurrently, no additional units are required.

AFP7PSA1

AFP7PSA2

■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 counting function	Not available	Available (Note 1)

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

Unit General Specifications

■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, 3)
Insulation resistance	100 MΩ or more (at 500 V DC)
Vibration resistance	5 to 8.4 Hz, single amplitude of 3.5 mm 0.14 in, 1 sweep/min. (IEC61131-2); 8.4 to 150 Hz, constant acceleration of 9.8 m/s², 1 sweep/min. (IEC61131-2); for 10 min. 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

Notes: 1) Please refer to the unit's specification sheet for details of breakdown voltage and insulation resistance.
2) For output type input and output units, the breakdown voltage is 2,300 V AC, 1 minute.
3) For between analog input channels of analog input unit, the breakdown voltage is 200 V AC, 1 minute. The between channels of analog output unit is non-isolation.

■INDIVIDUAL GENERAL SPECIFICATIONS

Item	CPU unit	Communication cassettes					Power supply units	
	AFP7CPS4E	AFP7CCS1	AFP7CCS2	AFP7CCM1	AFP7CCM2	AFP7CCS1M1	AFP7PSA1	AFP7PSA2
Rated voltage range	20.4 to 28.8 V DC	–	–	–	–	–	100 to 240 V AC	100 to 240 V AC
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)	35 mA or less (Note 1)	750 mA or less	1,250 mA or less
Net weight	220 g approx. (with terminal block and end unit)	25 g approx. (with terminal block)					240 g approx.	290 g approx.

Item	Input and output units								
	AFP7X16DW	AFP7X32D2	AFP7X64D2	AFP7Y16R	AFP7Y16T	AFP7Y32T	AFP7Y64T	AFP7Y16P	AFP7XY64D2T
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	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.	115 g approx.

Item	Analog input and output units		Positioning units			
	AFP7AD4H	AFP7DA4H	AFP7PP02T	AFP7PP04T	AFP7PP02L	AFP7PP04L
Rated voltage range	–	–	–	–	–	–
Current consumption	100 mA or less	250 mA or less	120 mA or less	120 mA or less	120 mA or less	120 mA or less
Net weight	130 g approx.	130 g approx.	145 g approx.	145 g approx.	145 g approx.	145 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: Increased CPU unit current consumption

For Programmable Controller

Programming Software

Control FPWIN GR7

Save Time on Programming
with User-Friendly Software

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 comments
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

Configuration	Instructions editing	Search	Monitor	Debug	Security

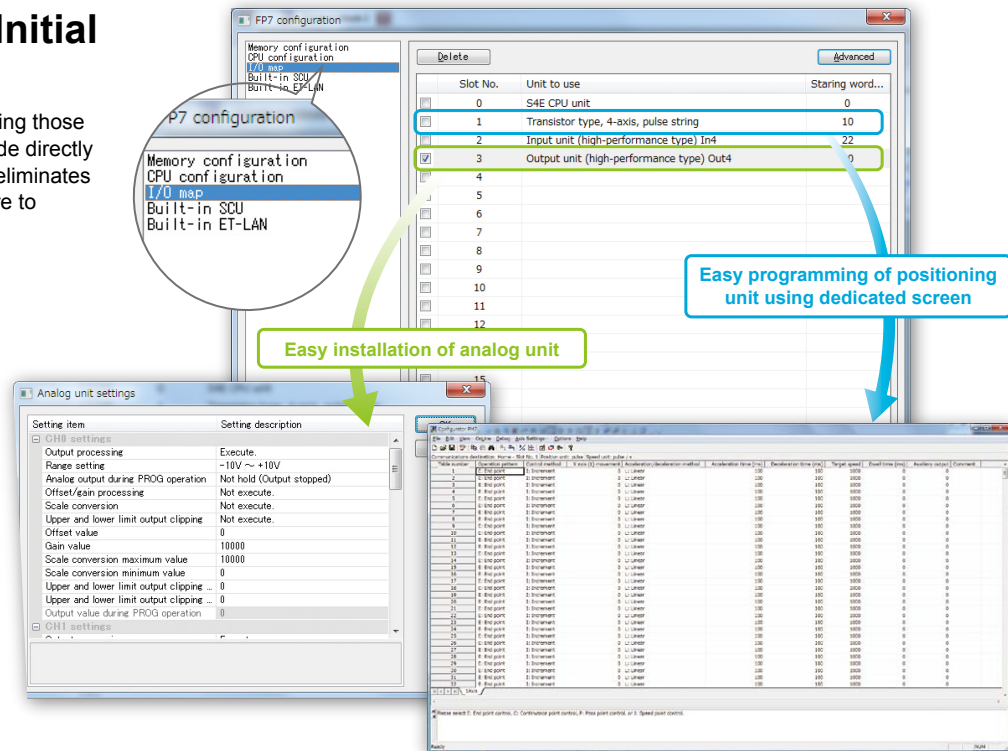### Save Time on Initial Configuration

Configuration settings, including those for installed units, can be made directly from the same screen. This eliminates the need to use other software to accomplish this task.

P7 configuration

Memory configuration
CPU configuration
I/O map
Built-in SCU
Built-in ET-LAN

Easy installation of analog unit

Easy programming of positioning unit using dedicated screen

Configuration	Instructions editing	Search	Monitor	Debug	Security

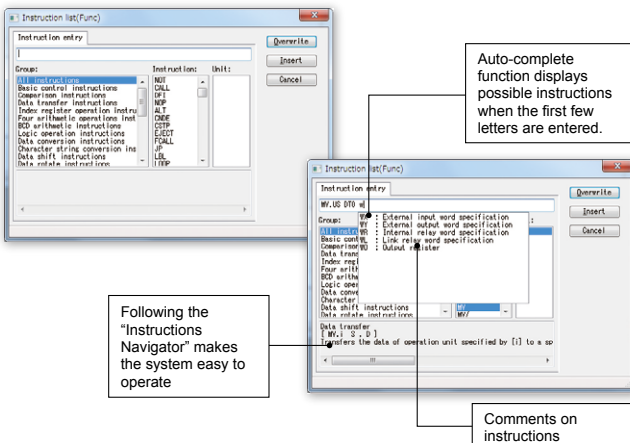### Save Time and Effort by using the "Instructions Navigator".

Enter high level instructions by simply selecting the correct order as dictated by the Instructions Navigator. The help dialog also supports the selection of high level instructions.

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

Following the "Instructions Navigator" makes the system easy to operate

Comments on instructions

Save Time on Comment Entry

Three comment screens can be displayed at the same time, allowing the operator to edit comments while referring to comments in another portion of the program. You can also export I/O comments in CSV format for editing and then import them, resulting in a much shorter comment editing time.

■ **Simultaneous display of three I/O comment screens facilitates comparison, search and copying.**

R (internal relay) X (external input) Y (external output)
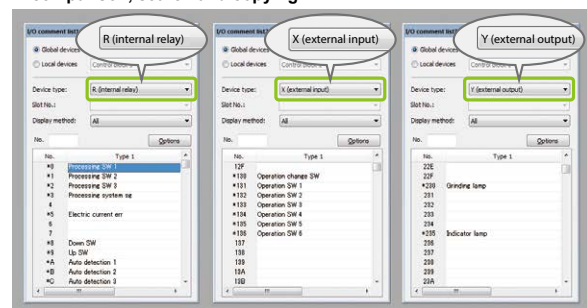
■ **I/O comments can be copied and pasted into a spreadsheet.**

Ctrl + C   Ctrl + V

■ **Text editing on a PC**

Import & Export   CSV

For Programmable Controller

Programming Software

Control FPWIN GR7

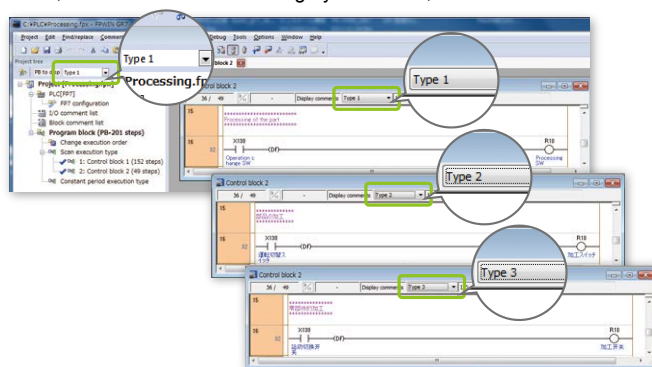| Configuration | **Instructions editing** | Search | Monitor | Debug | Security |

Save Time When Cross-Checking Instructions

Comments are directly switchable on the main screen. Various tasks, such as comment rewriting by end users, can be streamlined.
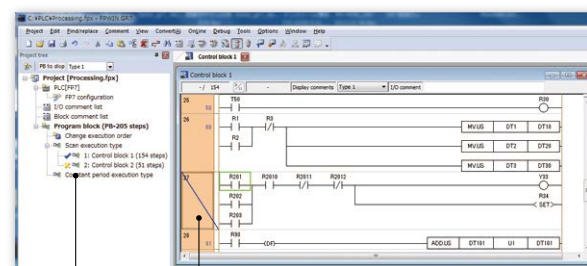

Save Time Needed for Program Execution Verification

Programs can be disabled by program blocks or line-by-line. Possible to attend or delete programs because test programs can be enabled only when it is necessary.

Disable by block units.　Disable line-by-line.

Save Time Needed to Copy Programs from Legacy Models

Possible to convert existing program that are created by **Control FPWIN GR** for use in **Control FPWIN GR7** only drag and drop.
(*Some instructions, such as dedicated instructions, are not supported for conversion.)

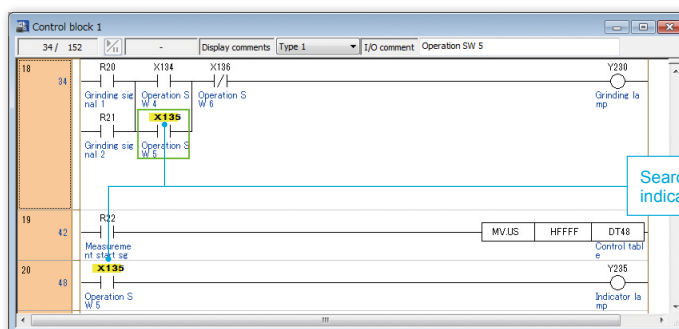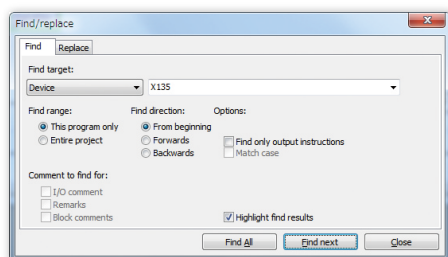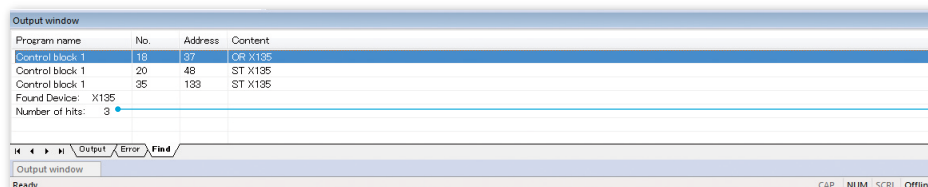| Configuration | Instructions editing | **Search** | Monitor | Debug | Security |

Save Search Time

Specific devices, instructions and comments are easy to find.

Search results are indicated in color.

The "Search" tab in the output window gives a list of results.
Double-click the tab to jump to the search results.

Control FPWIN GR7

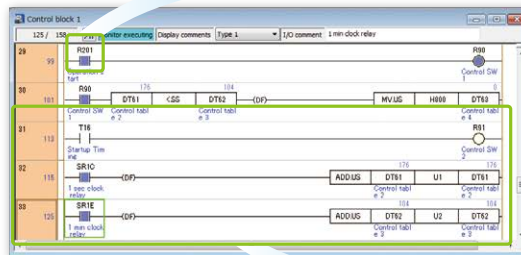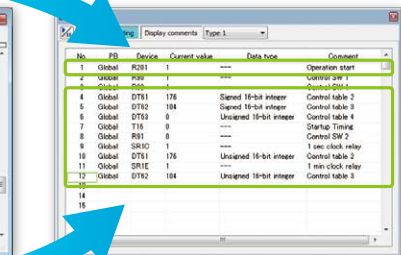| Configuration | Instructions editing | Search | **Monitor** | Debug | Security |

Save Time When Monitoring Operations

Multipoint monitoring devices can be registered easily. It allows you to speed up the monitoring process.

Drag and drop for a single point.

Copy and paste for a specified range.

Save Time When Setting Communication Parameters

In serial communication, the name and COM number of destination to connect are displayed. This reduces the risk of errors when selecting a destination.
Ethernet communication allows port numbers and IP addresses to be set and registered, making subsequent selection easy.

■ Communication configuration

■ Ethernet setting

Register settings using unique names.

| Configuration | Instructions editing | Search | Monitor | **Debug** | Security |

Save Time When Matching Programs

Programs stored in the CPU unit and on the PC can be cross-checked to identify any non-matching portions. This feature is useful for program search and for finding where modifications are needed.
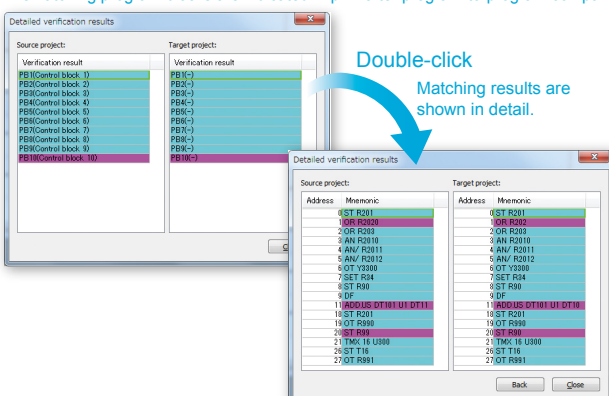
Application example 1
If you want to confirm that programs on the CPU unit and the PC are identical, you can make an instant check.

Application example 2
Content edited by other designers can be checked.

Mismatching program blocks are indicated in pink after program-to-program comparison.

Double-click

Matching results are shown in detail.

Save Time When Checking Operation Integrity

Inputs and outputs can be turned ON / OFF forcibly. This allows equipment wiring and operation checks to be carried out during equipment startup.
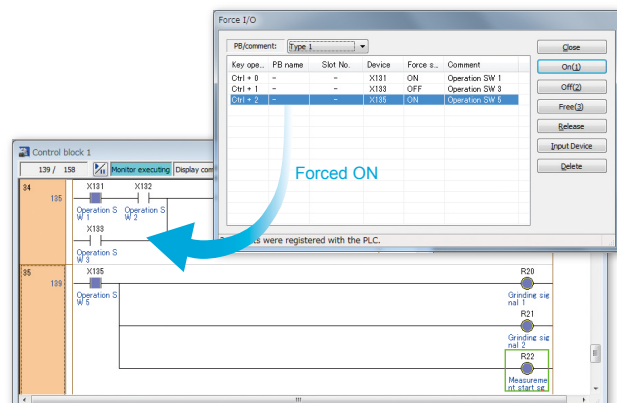
Forced ON

For Programmable Controller

Programming Software

Control FPWIN GR7

Configuration	Instructions editing	Search	Monitor	Debug	**Security**

Save Time When Setting up Program Security

Access rights to the CPU unit can be made more stringent for settings, to prevent easy access to editing, or program outflow.

16 separate rights may be set.

Select administrator or user.

Details can be set.

Special Feature! | Security is enhanced with the project's own password protection, program encryption, etc. Please refer to page 6 for details.

New functions available soon

Simulation	Streamlined equipment start up and debugging operation.

Product Types

■ CPU units

Product name		Power supply voltage	Operation speed	Max. program capacity	Ethernet function	Part No.
FP7 CPU units	196 k steps standard model	24 V DC	From 11 ns	196 k steps	Built-in	**AFP7CPS4E**
	120 k steps standard model	24 V DC	From 11 ns	120 k steps	Built-in	**AFP7CPS3E** On sale soon
	120 k steps standard model	24 V DC	From 11 ns	120 k steps	–	**AFP7CPS3** On sale soon

Note: One End unit is attached to the CPU unit.

■ Communication 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**

■ 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 count function	**AFP7PSA2**

Product Types

■ 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 DC, Common polarity: +/- common, Input time constant setting	**AFP7X32D2**
		64 points	MIL connector	24 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	On sale soon	**AFP7Y32P**
		64 points	MIL connector	On sale soon	**AFP7Y64P**
FP7 Input and Output 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	On sale soon	**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)	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)	4 channels	**AFP7DA4H**

■ Positioning units

Product name	Specifications				Part No.
	Output type	Number of axes controlled	Speed command	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**

■ 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	Specifications	Part No.
Control FPWIN GR7 English version	Windows®7 (32 bits / 64 bits) / Vista / XP SP3	**AFPSGR7EN**

Note: Windows®7, Vista and XP are a trademark or registered trademark of Microsoft Corporation in the United States and other countries.
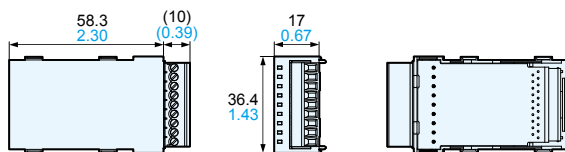
Dimensions (unit: mm in)
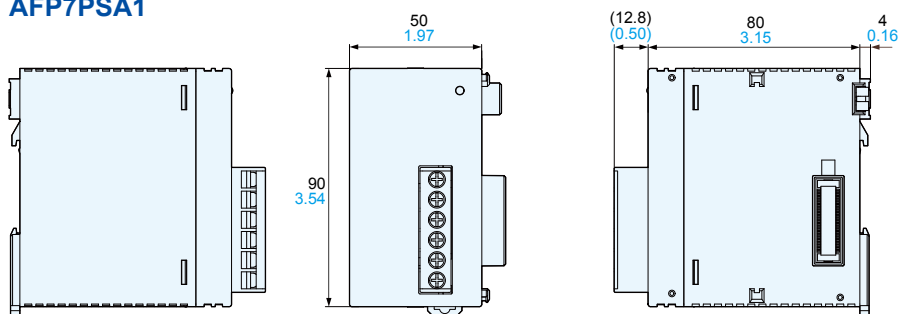
■ CPU units

AFP7CPS4E   AFP7CPS3E   AFP7CPS3

40 1.57 14.5 0.57

90 3.54

(10) 0.39   80 3.15   4 0.16

LAN port
(AFP7CPS4E)
(AFP7CPS3E)

*CPU unit + End unit
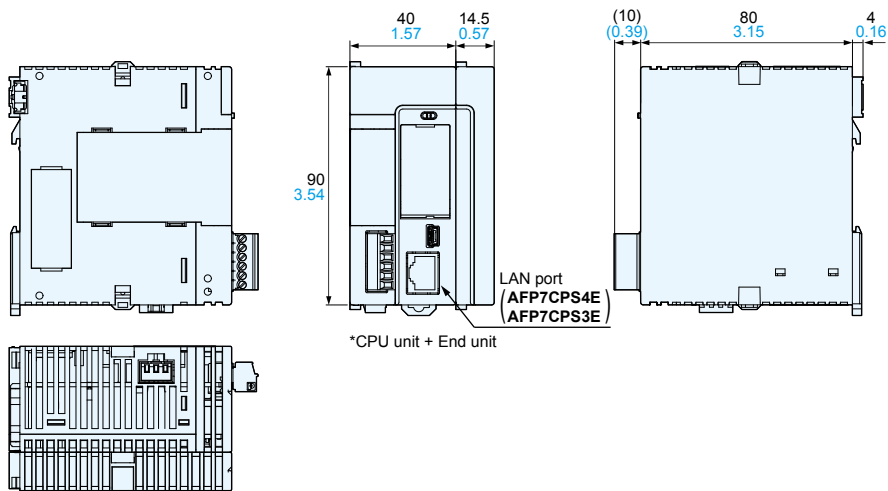
■ Communication cassettes

AFP7CCS1   AFP7CCS2   AFP7CCM1   AFP7CCM2   AFP7CCS1M1

58.3 2.30   (10) 0.39

17 0.67

36.4 1.43

■ Power supply units

AFP7PSA1

50 1.97

90 3.54

(12.8) 0.50   80 3.15   4 0.16

AFP7PSA2

70 2.76

90 3.54

(12.8) 0.50   80 3.15   4 0.16
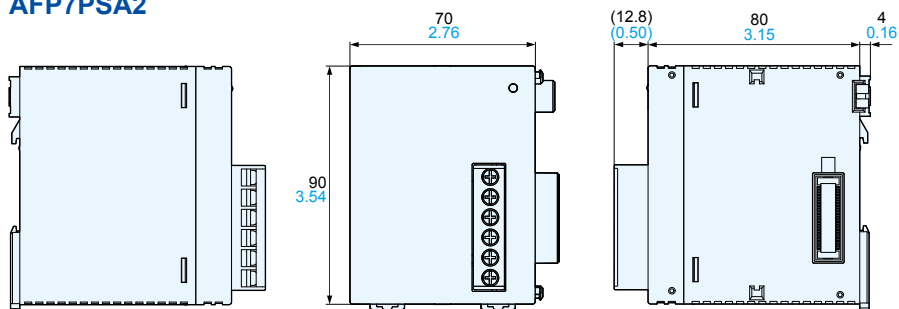
Input and Output units / Analog Input and Output units

AFP7X16DW   **AFP7Y16R**   **AFP7Y16T**   **AFP7Y16P**   **AFP7AD4H**   **AFP7DA4H**
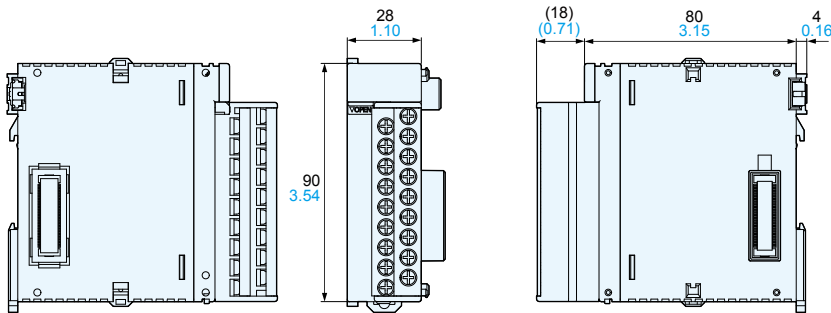
Input and Output units / Positioning units

AFP7X32D2   **AFP7Y32T**   **AFP7Y32P**   **AFP7PP02T**   **AFP7PP02L**
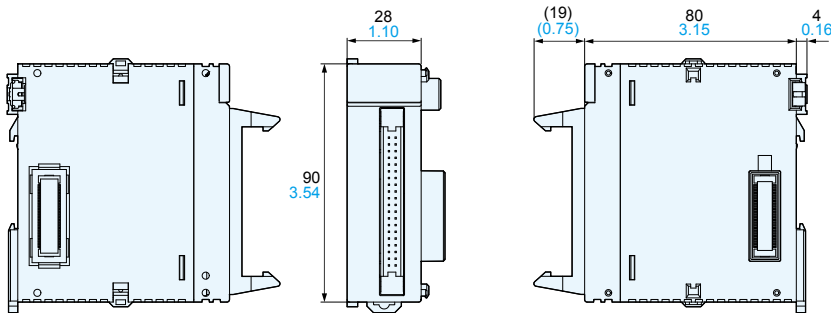
Input and Output units / Positioning units

AFP7X64D2   **AFP7Y64T**   **AFP7Y64P**   **AFP7XY64D2T**   **AFP7XY64D2P**   **AFP7PP04T**   **AFP7PP04L**
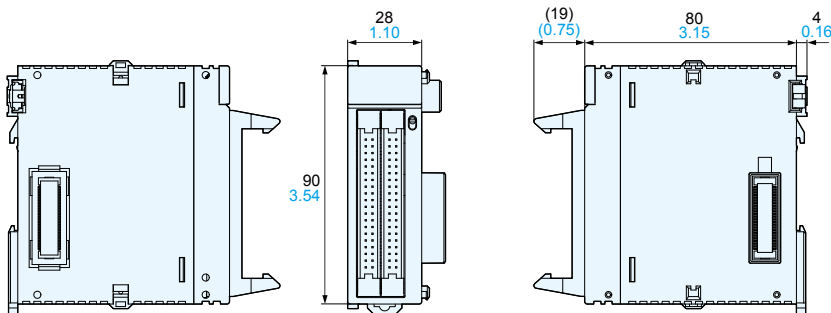
PHLS Master unit

AFP7PHLSM
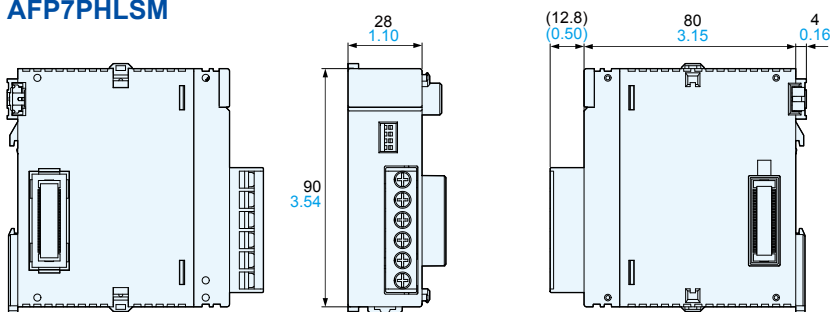
■ PHLS Slave units (Standard type)

AFPRP1X16D2
AFPRP1Y16T
AFPRP1XY16D2T

138
5.43

50
1.97

41
1.61

6
0.24

4.5
0.18

128
5.04

50
1.97
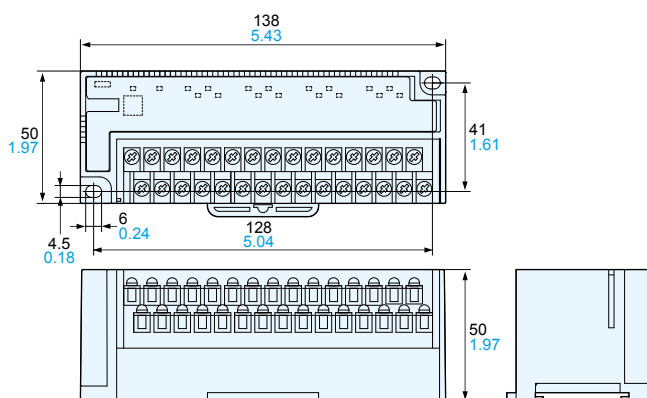
■ PHLS Slave unit (Standard type)

AFPRP1X08D2

85
3.35

50
1.97

41
1.61

6
0.24

4.5
0.18

75
2.95

50
1.97
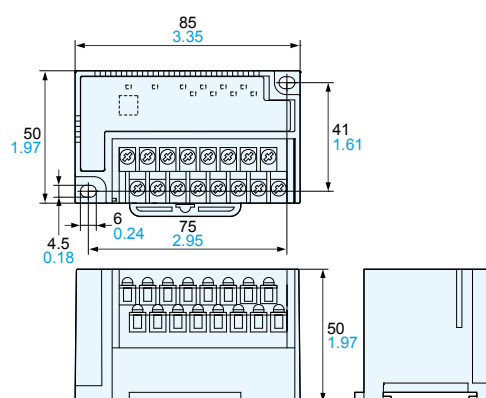
■ PHLS Slave unit (e-CON)

AFPRP2X08D2E

59.5
2.34

(9)
(0.35)

31.5
1.24

49.5
1.95

(10)
(0.39)
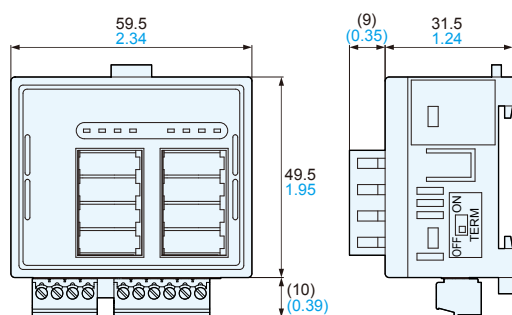
■ PHLS Slave unit (Connector type and Relay output)

AFPRP2Y04R

59.5
2.34

(18)
(0.71)

31.5
1.24

49.5
1.95

(10)
(0.39)

(9)
(0.35)
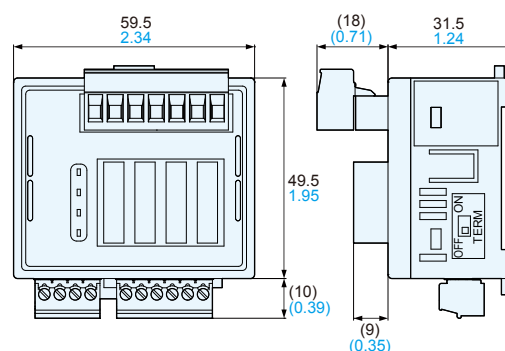
■ PHLS Slave units (Connector type)

AFPRP2X16D2
AFPRP2Y16T
AFPRP2XY16D2T

59.5
2.34

(15)
(0.59)

31.5
1.24

49.5
1.95

(10)
(0.39)

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