# Panasonic
## ideas for life

**Programmable Controller**

# *FP-X*

Introducing a New Transistor Output Model
Pulse Output

# 4-Axis Integrated Control

Panasonic
FP-X C30TD

**2-Axis Linear Interpolation Simultaneously in 2 Pairs!**

14-point type  30-point type  60-point type

**FP-X Programmable Controller**
ARCT1B273E '06.8

**New**

Panasonic... the new name for **NAiS**

**Matsushita Electric Works, Ltd.**

# Programmable Controllers *FP-X*

## 4-axis pulse output in a compact body (C14 comes with 3 axes)
## Simultaneous 2-axis linear interpolation is possible in two pairs

Servomotor and stepping motor control in production equipment has become increasingly diversified while requiring a greater number of axes – for example, electronic control for replacing cams, XY table + Z-axis control for cell-production and LCD alignment, 3D bending process of corrugated paper boxes and heat exchanger pipes, high-density coil winding operations etc. With such applications in mind, FP-X is a compact general-purpose PLC suited for small-scale equipment controls with its 4-axis pulse output built into the compact body, enabling multi-axis control in a very small space at a fraction of the equipment cost.
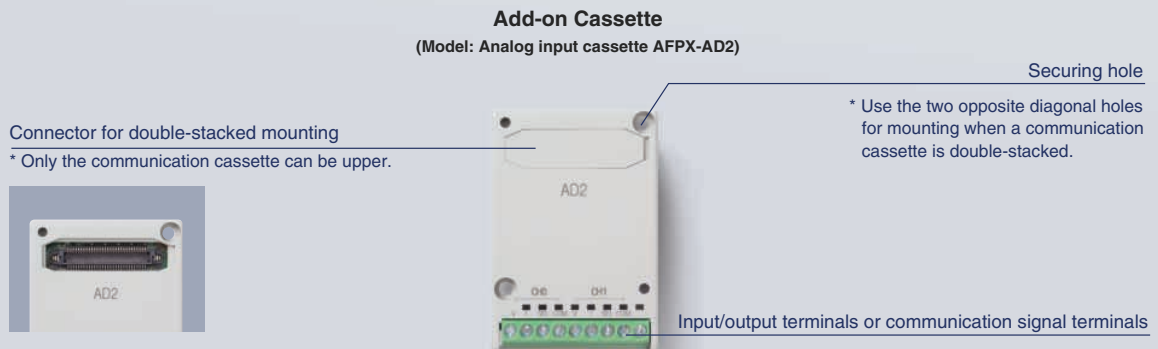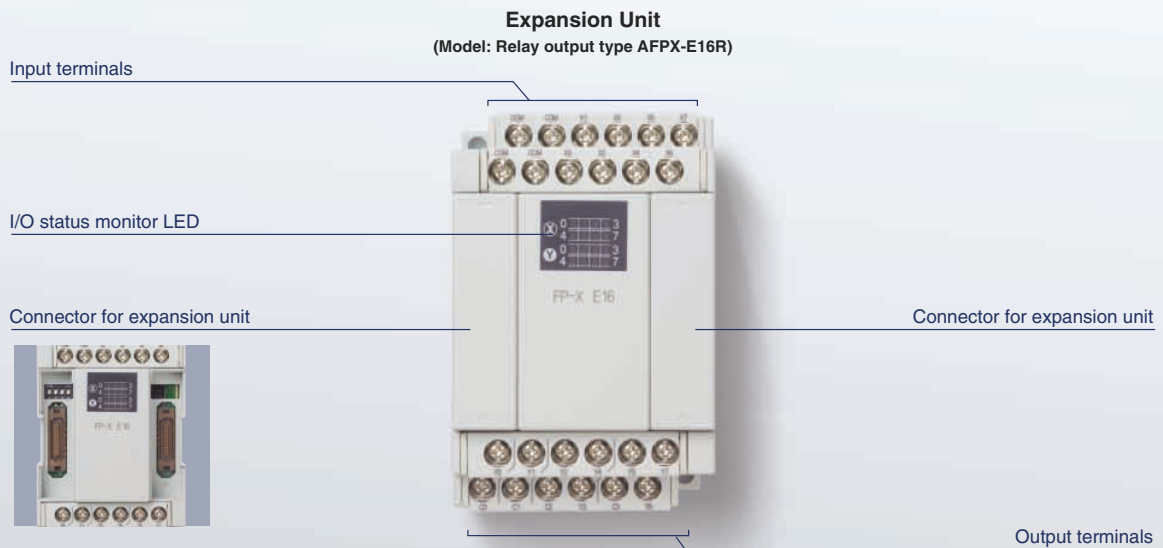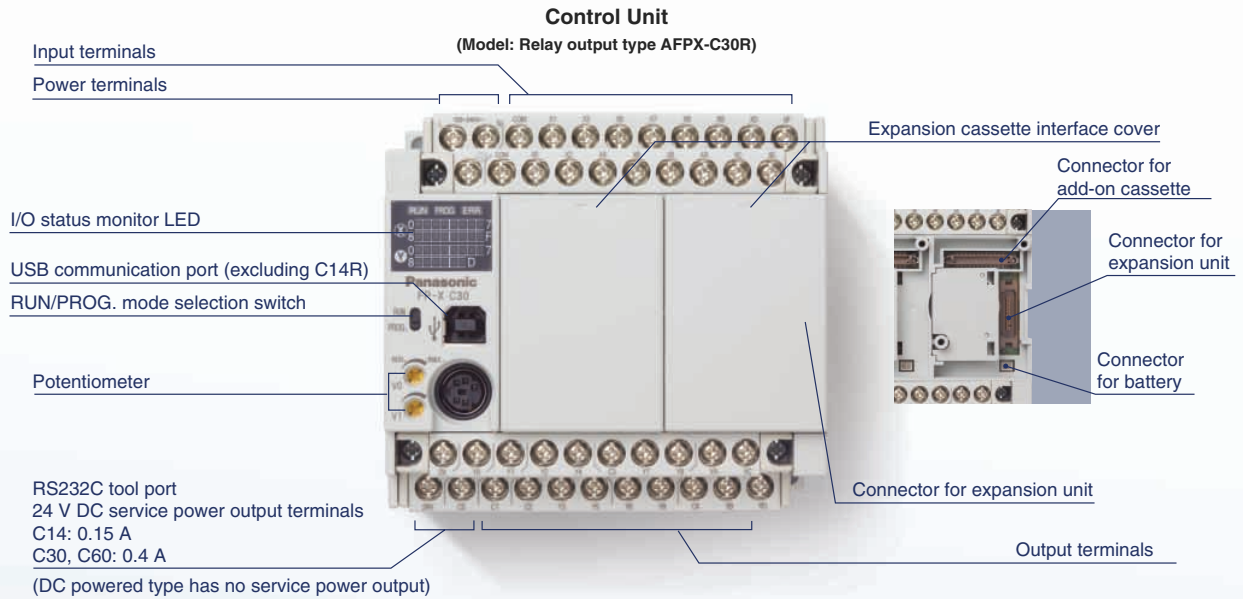
**AFPX-C30**
**(Add-on cassette attached)**

**AFPX-C14**
**(Add-on cassette attached)**

# FP-X Name and Function of Each Part

## Control Unit
**(Model: Relay output type AFPX-C30R)**

Input terminals

Power terminals

Expansion cassette interface cover

Connector for add-on cassette

I/O status monitor LED

Connector for expansion unit

USB communication port (excluding C14R)

RUN/PROG. mode selection switch

Potentiometer

Connector for battery

RS232C tool port
24 V DC service power output terminals
C14: 0.15 A
C30, C60: 0.4 A
(DC powered type has no service power output)

Connector for expansion unit

Output terminals

## Expansion Unit
**(Model: Relay output type AFPX-E16R)**

Input terminals

I/O status monitor LED

Connector for expansion unit

Connector for expansion unit

Output terminals

## Add-on Cassette
**(Model: Analog input cassette AFPX-AD2)**

Securing hole

* Use the two opposite diagonal holes for mounting when a communication cassette is double-stacked.

Connector for double-stacked mounting

* Only the communication cassette can be upper.

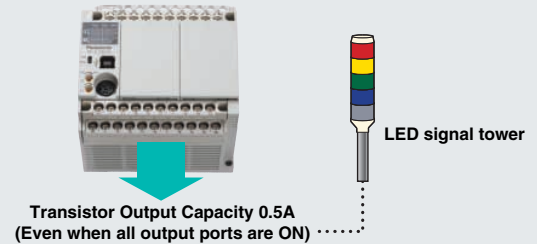Input/output terminals or communication signal terminals

5

# Usability

The enhanced functionality expands the ranges of applications,
while improving the ease of use.

## ■ Securing 0.5A in every transistor output even when all output ports are ON.

The transistor output type is not limited by the control capacity of each common line. Every output port can secure 0.5A even when all output ports are ON for any basic unit C14, C30, C60 as well as the expansion units E16 and E30 (at 25° C) – Sufficient capacity for high-load switching such as LED type signal tower etc.
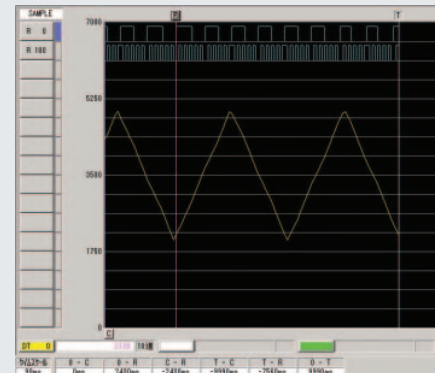
**LED signal tower**

**Transistor Output Capacity 0.5A
(Even when all output ports are ON)**

## ■ Equipped with a Sampling Trace Function – Smart Solution for Program Debugging

**(Available from Ver. 2.0 of the transistor type and relay output types)**

The sampling trace function enables the user to monitor a change of I/O condition or data register value in a very short time interval – an efficiency tool for debugging a ladder program.

The shortest sampling interval of the normal time-chart monitor is 10ms with the FPWIN GR or FPWIN PRO, but monitoring in much shorter intervals is often required during debugging operations. The sampling trace function enables data accumulation of any 16 contact data and 3 data register values once or several times within a scan time. Reading out these data through the FPWIN GR or FPWIN PRO enables the user to confirm an instantaneous change of status by time on the time-chart monitor.

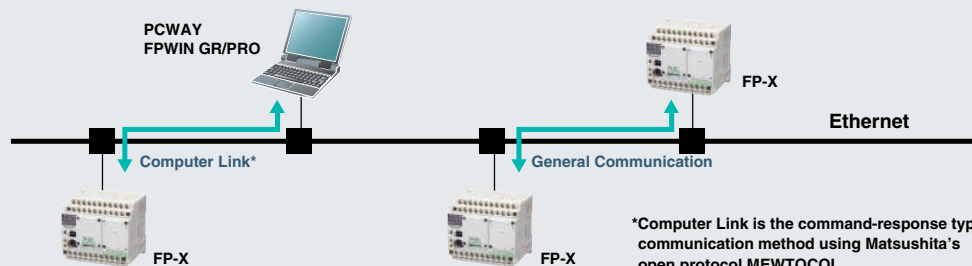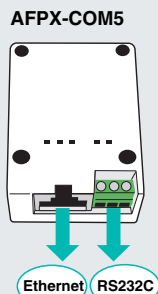**(Normal Time-Chart Monitor)**

**(Sampling Trace)**

**Invisible changes become visible!**

## ■ The communication cassette (Ethernet Type) will be April 2007.

Using this option, you can monitor the data in FP-X on the PCWAY through the existing Ethernet, or remotely upload/download a program.

| Interface | Ethernet (COM1) | 10BASE-T, 100BASE-TX, TCP/IP | |
| --- | --- | --- | --- |
| | RS232C (COM2) | 3-wire, Asynchronous, Max115.2kbps | |
| Ethernet Communication Mode (1:1 communication) | Computer Link | General communication (server) | General communication (client) |
| | PCWAY, FPWIN GR/PRO etc. | Wait for a connection by the partner<br>FP-X ← | Connect to the specified partner<br>→ FP-X |

**AFPX-COM5**

Ethernet   RS232C

PCWAY
FPWIN GR/PRO

FP-X

Ethernet

Computer Link*

General Communication

FP-X

FP-X

FP-X

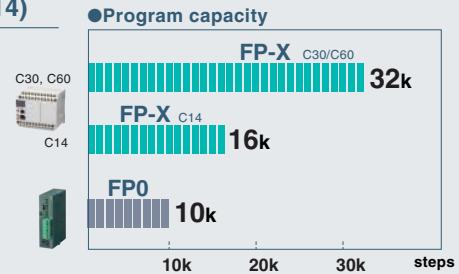*Computer Link is the command-response type communication method using Matsushita's open protocol MEWTOCOL.

7

# High capacity/High speed

The high-level basic performance provides sufficient room for future equipment expansion as well as a rich variation.

## ■ Abundant program capacity - **32** ksteps (16 ksteps for C14)

The program capacity of 32 ksteps, exceeding the capacity of most compact PLCs, can flexibly handle a wide variety of applications requiring future equipment expansion. An adequate comment area has of course been reserved. Free comment entry makes the program easy to understand during verification.
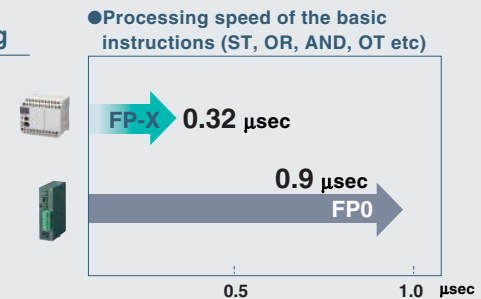
● Separate memory areas reserved for program memory and comments do not cause a reduction of program capacity when comments are entered.

● 100,000 I/O comment items, 5,000 lines of line-space comments, 5,000 lines of remark comments - All comments are stored in the FP-X simultaneously with the program.

● Program capacity

C30, C60

C14

FP-X C30/C60 **32k**

FP-X C14 **16k**

FP0 **10k**

10k 20k 30k **steps**

## ■ Ultra high-speed scan at **0.32** μsec for instruction processing

High-speed processing is often required for small-scale equipment control such as serial data communication, network construction or PID temperature control. High-speed scanning at 0.32 μsec/step (basic instruction) easily meets such requirements.

(Ex.) In the case of a 5-kstep program consisting of 35% basic instructions and 65% applied instructions,
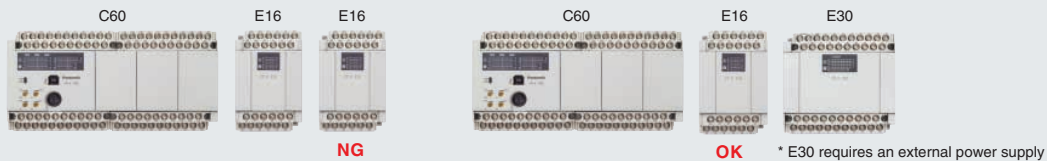
→ Scan time: **1.9 ms** (measured time)

● Processing speed of the basic instructions (ST, OR, AND, OT etc)

FP-X **0.32** μsec

**0.9** μsec
FP0

0.5 1.0 μsec

## ■ Abundant number of I/O points - Maximum **300**
### (Up to 382 points possible by using FP0 expansion units and add-on cassettes)

When the user cannot predict the number of I/O points required in the future for his machine or equipment, he is uncertain in selecting a PLC model. FP-X solves user concerns with a maximum of 300 I/O channels. The number can even be increased up to 382 points by using the add-on cassettes and FP0 expansion units.
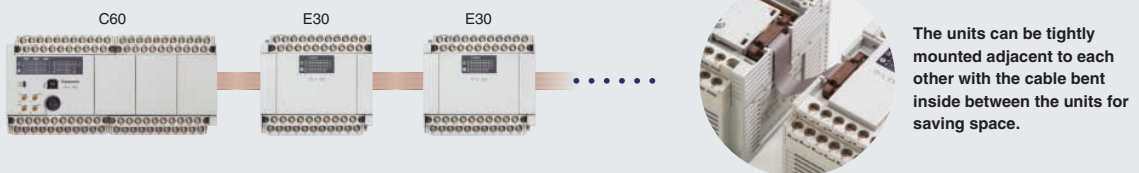
● Expansion units (E16R, E30R, EFP0) can be connected up to eight units.

C60　　E30　　E30　　　　E30

･･･････　Max. **300** channels

**Max. 8 units**

● Two or more E16 can't be connected serially.　　● E16 can be sandwiched with E30*

C60　E16　E16

**NG**

C60　E16　E30

**OK**　* E30 requires an external power supply

● Connection by using the cable included in each expansion unit.

C60　E30　E30

･･･････

The units can be tightly mounted adjacent to each other with the cable bent inside between the units for saving space.
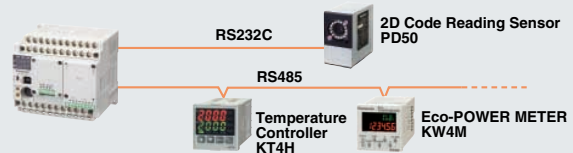
# Network

Different types of equipment need to be linked – FP-X flexibly meet such requirements.

## ■ MEWTOCOL Master Function Has Been Added

By using the newly added MEWTOCOL master function for automatically generating MEWTOCOL (Matsushita Open Protocol) commands, serial communication with MEWTOCOL compatible units such as PD50, KT4H, KW4H etc becomes substantially easier.

RS232C — 2D Code Reading Sensor PD50

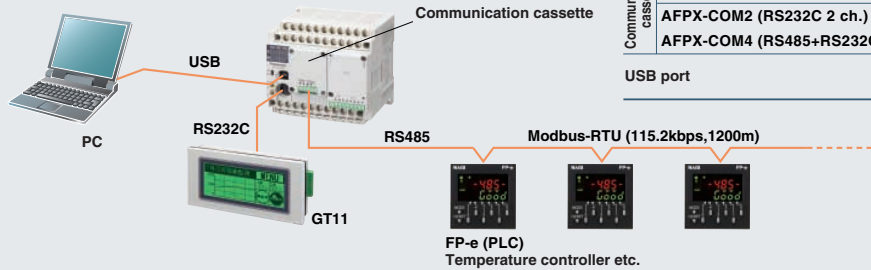RS485 — Temperature Controller KT4H — Eco-POWER METER KW4M

### ■ Up to 3 serial communication ports can be used at once.

The use of a communication cassette provides up to 3 serial communication ports.
Usable interfaces include RS232C, RS485, RS422, and USB.
*The RS232C tool port can be used as a general-purpose serial communication port.

Communication cassette

USB

RS232C

RS485 — Modbus-RTU (115.2kbps,1200m)

PC

GT11

FP-e (PLC) Temperature controller etc.

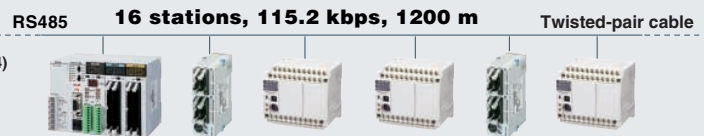| Communication Port | | |
|---|---|---|
| RS232C tool port | | Always used |
| Communication cassette | AFPX-COM1 (RS232C 1 ch.) | Always used (Port No. COM1) |
| | AFPX-COM3 (RS485/422 selectable 1 ch.) | |
| | AFPX-COM2 (RS232C 2 ch.) | 1st ch. |
| | AFPX-COM4 (RS485+RS232C) | 2nd ch. | Switch-selectable (Port No. COM2) |
| USB port | | Default setting: USB port use |

### ■ PLC Link

The MEWNET-W0 allows program-free links of up to 16 PLC units such as FP2/2SH or FPΣ. The distributed control system allows efficient model selection.

●Simple setting of the number of linked units, linked relays, and starting area address of the own station by using FPWIN GR/Pro allows sharing of contact information and data without programming.
●The transfer rate of 115.2 kbps, the highest rate for a compact model.
●A transfer distance of 1200 m, the longest distance for a compact model.
●FP-X and FPΣ allow a change of the station number by programming (SYS instruction).

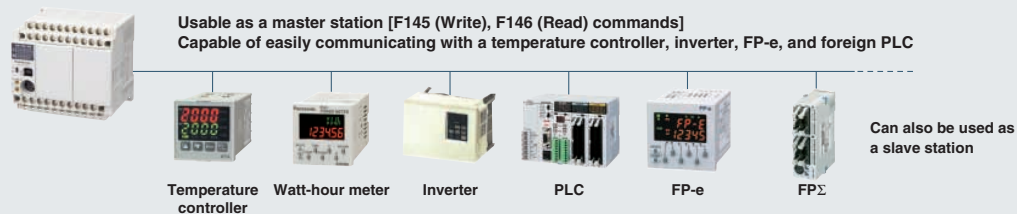| Item | Specifications |
|---|---|
| Number of stations | 16 stations |
| Transmission speed | 115.2 kbps |
| Transmission distance | 1200 m |
| Shared data | 128 words (data register), 64 words (contacts) |
| Communication method | Floating master |

FP-X requires a communication cassette (AFPX-COM3 or AFPX-COM4)
FP2/2SH requires a multi-communication unit (AFP2465, AFP2805)
FPΣ requires a communication cassette (AFPG803, AFPG806)

RS485

**16 stations, 115.2 kbps, 1200 m**

Twisted-pair cable

### ■ Modbus* Compatibility

Compatible with both the master and slave of the Modbus* RTU, the world's de-facto standard
Great performance is expected for air-conditioning, temperature controls etc.
* Protocol developed by the Modicon Inc. of the United States

Usable as a master station [F145 (Write), F146 (Read) commands]
Capable of easily communicating with a temperature controller, inverter, FP-e, and foreign PLC

Temperature controller | Watt-hour meter | Inverter | PLC | FP-e | FPΣ

Can also be used as a slave station

**Another available application**

When 17 or more FP-X units need to be linked, the use of a Modbus instead of a MEWNET-W0 can accommodate up to 99 FP-X units. Because each FP-X can be a master or slave, a multi-master link can be constructed by passing a token from a user program.

Token passing (by user program)

Master/slave | Master/slave | Master/slave | Master/slave

Multi-master link of up to 99 units is possible.

# Programming

Note: Product names and company names in this chart are trademarks or registered trademarks of the respective companies.
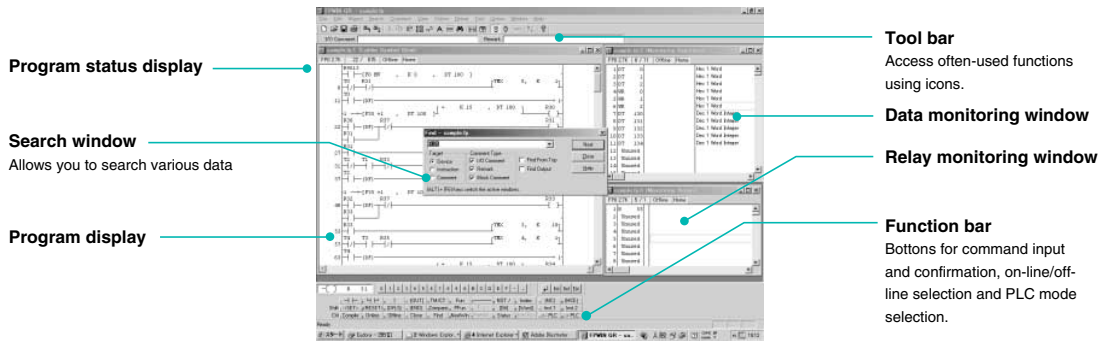
## Control FPWIN GR for Windows

**The ladder programming software for FP series – highly operational software tool for maximizing convenience in the field.**
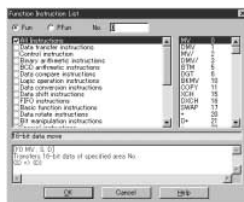
### ■ Features

1. Easy field operations not requiring the use of a mouse for data entry, search, writing, monitoring and timer changes, all carried out only from the keyboard.
2. Allows standard operations in Windows, such as Copy & Paste, etc.
3. All FP series PLCs are supported. The software assets produced by using Ver. 4 or Ver. 3 of NPST-GR are usable.
4. Easy programming with wizard functions.
5. Communication with OPC Server, CommX, GTWIN, PCWAY simultaneously through the same port.

### ■ Operational Environment

| OS | Windows95 (OSR2 or higher)/98/Me/ NT (Ver. 4.0 or later)/2000/XP |
|---|---|
| Hard disk capacity | At least 40 MB |
| CPU | Pentium 100 MHz or higher |
| Onboard memory | At least 64 MB (depends on OS) |
| Screen resolution | At least 1024 × 768 |
| Display colors | High color (16-bit or higher) |
| Applicable PLC | FP-X/FP-e/FP0/FPΣ/FP2/FP2SH |
| Compatible FP-X version | Relay output type: Ver.2.50 and after Transistor output type: Ver.2.70 and after |

**Program status display**

**Search window**
Allows you to search various data

**Program display**

**Tool bar**
Access often-used functions using icons.

**Data monitoring window**

**Relay monitoring window**

**Function bar**
Bottons for command input and confirmation, on-line/off-line selection and PLC mode selection.
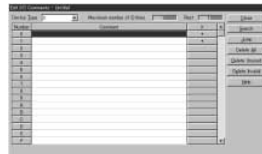
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**Function instruction list**

Classified by type, function instructions can be selected from the displayed list.
(Simple help included.)

**I/O comment edit function**

Successive I/O comments can be input for each device type. Data from Excel and other applications can be copied and pasted via the clipboard.
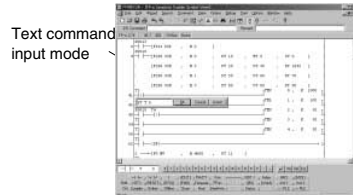
**Status display**

Displays information concerning PLC usage situation and settings, and detailed information when an error occurs.

### ■ Accompanying Tools

● **Data Editor**
This software for the PC is for reading and writing data stored in the memory of FP Series main unit or on an IC card. If a large data table is required in a PLC, the data can be created and edited on a PC and then dowmload to the PLC.

● **Modem connection**
Communication via modem is easy with FP Series units in isolated locations.

● **Wizard function**
A Wizard function included in FPWIN GR since versions 2.2 can automatically generate ladder programs by simply entering and selecting required items in the dedicated screen. It can be used to assist in positioning, PID instruction input, and FP-e screen display instruction input.

● **Personal preference settings**
It is possible to switch among preference settings for FPWIN GR, Data Editor and Text Compiler that are set up for different individuals.

**Text Compiler**

This software is for importing and exporting programs created in text format to and from FPWIN GR. Programs created on the PLC of another company can be edited as text and then be transferred to the FP Series without difficulty.

**Text command input mode**

Text command input mode

A ladder diagram is displayed as a mnemonic code is entered from the keyboard.

13

# Part Number List

## FP-X Control Unit

| Product name | Power supply | Specifications | Part number |
|---|---|---|---|
| FP-X C14R Control unit | 100 to 240V AC | 8-point input of 24 V DC, 6-point output of 2 A relay<br>Program capacity 16 ksteps, 2-point potentiometer | AFPX-C14R |
| FP-X C30R Control unit | 100 to 240V AC | 16-point input of 24 V DC, 14-point output of 2 A relay<br>Program capacity 32 ksteps, 2-point potentiometer, USB port | AFPX-C30R |
| FP-X C60R Control unit | 100 to 240V AC | 32-point input of 24 V DC, 28-point output of 2 A relay<br>Program capacity 32 ksteps, 4-point potentiometer, USB port | AFPX-C60R |
| FP-X C14TD Control unit | 24V DC | 8-point of 24 V DC, 6-point output of 0.5 A transistor (NPN)<br>Program capacity 16 ksteps, 2-point potentiometer | AFPX-C14TD |
| FP-X C14T Control unit | 100 to 240V AC | 8-point of 24 V DC, 6-point output of 0.5 A transistor (NPN)<br>Program capacity 16 ksteps, 2-point potentiometer | AFPX-C14T |
| FP-X C14PD Control unit | 24V DC | 8-point of 24 V DC, 6-point output of 0.5 A transistor (PNP)<br>Program capacity 16 ksteps, 2-point potentiometer | AFPX-C14PD |
| FP-X C14P Control unit | 100 to 240V AC | 8-point of 24 V DC, 6-point output of 0.5 A transistor (PNP)<br>Program capacity 16 ksteps, 2-point potentiometer | AFPX-C14P |
| FP-X C30TD Control unit | 24V DC | 16-point of 24 V DC, 14-point output of 0.5 A transistor (NPN)<br>Program capacity 32 ksteps, 2-point potentiometer, USB port | AFPX-C30TD |
| FP-X C30T Control unit | 100 to 240V AC | 16-point of 24 V DC, 14-point output of 0.5 A transistor (NPN)<br>Program capacity 32 ksteps, 4-point potentiometer, USB port | AFPX-C30T |
| FP-X C30PD Control unit | 24V DC | 16-point of 24 V DC, 14-point output of 0.5 A transistor (PNP)<br>Program capacity 32 ksteps, 2-point potentiometer, USB port | AFPX-C30PD |
| FP-X C30P Control unit | 100 to 240V AC | 16-point of 24 V DC, 14-point output of 0.5 A transistor (PNP)<br>Program capacity 32 ksteps, 2-point potentiometer, USB port | AFPX-C30P |
| FP-X C60TD Control unit | 24V DC | 32-point of 24 V DC, 28-point output of 0.5 A transistor (NPN)<br>Program capacity 32 ksteps, 4-point potentiometer, USB port | AFPX-C60TD |
| FP-X C60T Control unit | 100 to 240V AC | 32-point of 24 V DC, 28-point output of 0.5 A transistor (NPN)<br>Program capacity 32 ksteps, 4-point potentiometer, USB port | AFPX-C60T |
| FP-X C60PD Control unit | 24V DC | 32-point of 24 V DC, 28-point output of 0.5 A transistor (PNP)<br>Program capacity 32 ksteps, 4-point potentiometer, USB port | AFPX-C60PD |
| FP-X C60P Control unit | 100 to 240V AC | 32-point of 24 V DC, 28-point output of 0.5 A transistor (PNP)<br>Program capacity 32 ksteps, 4-point potentiometer, USB port | AFPX-C60P |

*Relay output / Transistor output (side labels)*

## FP-X Expansion Unit

| Product name | Power supply | Specifications | Part number |
|---|---|---|---|
| FP-X E16R Expansion I/O unit | — | 8-point input of 24 V DC, 8-point relay output of 2 A<br>Remarks; Two or more E16R can't be connected serially because it can't supply the power to other units. With an 8cm extension cable | AFPX-E16R |
| FP-X E30R Expansion I/O unit | 100 to 240V AC | 16-point input of 24 V DC, 14-point relay output of 2 A<br>Remarks; Possible to connect up to 8 units including E16R, EFP0. With an 8cm extension cable | AFPX-E30R |
| FP-X E16T Expansion I/O unit | — | 8-point input of 24 V DC, 8-point transistor (NPN) output of 0.5 A<br>Remarks; Two or more E16T cannot be connected serially because it cannot supply the power to other units. With an 8cm extension cable | AFPX-E16T |
| FP-X E16P Expansion I/O unit | — | 8-point input of 24 V DC, 8-point transistor (PNP) output of 0.5 A<br>Remarks; Two or more E16T cannot be connected serially because it cannot supply the power to other units. With an 8cm extension cable | AFPX-E16P |
| FP-X E30TD Expansion I/O unit | 24V DC | 16-point input of 24 V DC, 14-point transistor (NPN) output of 0.5 A<br>Remarks; Possible to connect up to 8 units including E16, EFP0. With an 8cm extension cable | AFPX-E30TD |
| FP-X E30T Expansion I/O unit | 100 to 240V AC | 16-point input of 24 V DC, 14-point transistor (NPN) output of 0.5 A<br>Remarks; Possible to connect up to 8 units including E16, EFP0. With an 8cm extension cable | AFPX-E30T |
| FP-X E30PD Expansion I/O unit | 24V DC | 16-point input of 24 V DC, 14-point transistor (PNP) output of 0.5 A<br>Remarks; Possible to connect up to 8 units including E16, EFP0. With an 8cm extension cable | AFPX-E30PD |
| FP-X E30P Expansion I/O unit | 100 to 240V AC | 16-point input of 24 V DC, 14-point transistor (PNP) output of 0.5 A<br>Remarks; Possible to connect up to 8 units including E16, EFP0. With an 8cm extension cable | AFPX-E30P |
| Expansion FP0 Adapter | 24V DC | Up to 3 FP0 expansion units can be connected via an adapter.<br>With an 8cm extension cable and power cable | AFPX-EFP0 |

*Relay output / Transistor output (side labels)*

## FP-X Add-on Cassette

| Product name | Specifications | Part number |
|---|---|---|
| FP-X COM1 Communication cassette | RS232C 1 ch. RS, CS control signal equipped (non-insulated) | AFPX-COM1 |
| FP-X COM2 Communication cassette | RS232C 2 ch. (non-insulated) | AFPX-COM2 |
| FP-X COM3 Communication cassette | RS485/422 selectable 1ch (insulated) | AFPX-COM3 |
| FP-X COM4 Communication cassette | RS485 1 ch. (insulated) + RS232C 1 ch. (non-insulated) | AFPX-COM4 |
| FP-X COM5 Communication cassette | Ethernet 1 ch.(10BASE-T, 100BASE-TX) + RS232C 1 ch. (non-insulated) | AFPX-COM5 |
| FP-X Input cassette | 8 point input of 24 V DC | AFPX-IN8 |
| FP-X Output cassette | 8 point output of NPN 0.3 A | AFPX-TR8 |
| FP-X Output cassette | 6 point output of PNP 0.5 A | AFPX-TR6P |
| FP-X Analog input cassette | 2 point 12-bit non-insulated 0 to 10 V DC/0 to 20 mA | AFPX-AD2 |
| FP-X Pulse I/O cassette (for relay output type control unit only) | High-speed counter: single-phase 2 ch., each 80 kHz or two-phase 1 ch., 30 kHz.<br>Pulse output: one axis 100 kHz/ch. (Use restriction is applied for a two-unit installation) | AFPX-PLS |
| FP-X Master memory with a real-time clock | Master memory: Capable of storing all program steps and comments simultaneously. Storage of FPWIN Pro source files.<br>Real-time clock: Year, month, day, hour, minute, second, day of week (optional battery required) | AFPX-MRTC |

## FP-X Options and Service Parts

| Product name | Specifications | Part number |
|---|---|---|
| FP-X Backup battery | Battery for backing up the operation memory and real-time clock | AFPX-BATT |
| FP-X Expansion cable (8 cm) | Expansion unit connection cable, 8 cm | AFPX-EC08 |
| FP-X Expansion cable (30 cm) | Expansion unit connection cable, 30 cm | AFPX-EC30 |
| FP-X Expansion cable (80 cm) | Expansion unit connection cable, 80 cm | AFPX-EC80 |
| FP-X Terminal block | Terminal block for C30, C60 and E30, 21 pins, cover with no marking, five units included | AFPX-TAN1 |

# Related Products List

## FP Memory Loader

| Product name | Part number |
|---|---|
| Data non-hold type | AFP8670 |
| Data hold type | AFP8671 |

## PCWAY Ver. 2.7 (Operation Data Managing Software)

| Product name | Part number |
|---|---|
| PCWAY IBM printer port version | AFW10011 |
| PCWAY USB port version | AFW10031 |
| PCWAY Version upgrade | AFW10401 |

* Charged version upgrade for Ver. 2.0 to 2.6.

## Control CommX Ver. 1.3 (OCX for Communication)

| Product name | Part number |
|---|---|
| Control CommX IBM printer port | AFW20011 |
| Control CommX USB port | AFW20031 |

## FP Web-Server Unit

| Product name | Part number |
|---|---|
| FP Web-Server unit | AFP0610 |
| FP Web Configurator Tool | AFPS30510 |

## Key Unit

Economical type is available for secondary key.
The key unit is available for PCWAY and Control CommX.

| Product name | Part number |
|---|---|
| Key unit IBM printer port version | AFW1031* |
| Key unit USB port version | AFW1033 |

*The discontinuation of AFW1031 production is scheduled for August 2007.

# Specifications

*Programmable Controllers* **FP-X**

## 1. General Specifications

| Item | Description |
|---|---|
| Rated voltage | 100 to 240 V AC (AC power), 24 V DC (DC power) |
| Operating voltage range | 85 to 264 V AC (AC power), 20.4 to 28.8 V DC (DC power) |
| Rush current | 40 A or less (C14), 45 A or less (C30, C60) at 25°C (AC power) |
| | 12 A or less at 25°C (DC power) |
| Allowed momentary power off time | 10 ms or more |
| Ambient temperature | 0 to +55°C |
| Storage temperature | -40 to +70°C |
| Ambient humidity | 10 to 95% RH (at 25 °C, non-condensing) |
| Storage humidity | 10 to 95% RH (at 25 °C, non-condensing) |
| Breakdown voltage | Combined input/output terminals - Combined power and ground terminals, 2300 V AC 1 minute (AC power), 500 V AC*1 1 minute (DC power) |
| | Input terminals - Relay output terminals, 2300 V AC*1 1 minute |
| | Input terminals - Transistor output terminals, 500 V AC*1 1 minute |
| | Power terminals - Ground terminals, 1500 V AC*1 1 minute (AC power), 500 V AC*1 1 minute (DC power) |
| Insulation resistance | Combined input/output terminals - Combined power and ground terminals, 100 MΩ or higher (500 V DC using an insulation resistance meter) |
| | Input terminals - Output terminals, 100 MΩ or higher (500 V DC using an insulation resistance meter) |
| | Power terminals - Ground terminals, 100 MΩ or higher (500 V DC using an insulation resistance meter) |
| Vibration resistance | 5 to 9 Hz, single amplitude 3.5 mm/9 to 150 Hz, constant acceleration 9.8 m/s$^2$, 1 sweep/min, 10 sweeps in each XYZ direction |
| Shock resistance | 147 m/s$^2$ |
| Noise immunity | 1500 V [P-P] pulse width 50 ns, 1 μs (AC power), 500 V [P-P] pulse width 50 ns, 1 μs (DC power) (per noise simulator method) (power terminals) |
| Operating condition | No corrosive gas and no excessive dust |
| EC Directive Compliance Standard | Conforming to EN61131-2 |
| Level of contamination | 2 |
| Over-voltage category | II |

*1 Cutoff current 5 mA

## 2. Power Consumption, Weight

| Product name | Part number | Current consumption | Weight |
|---|---|---|---|
| Control unit | AFPX-C14○○ | 26 W or less *2 | Approx. 280 g or less |
| | AFPX-C30○○ | 52 W or less *2 | Approx. 490 g or less |
| | AFPX-C60○○ | 64 W or less *2 | Approx. 780 g or less |
| Expansion I/O unit | AFPX-E16○○ | 8 W or less *2 | Approx. 195 g or less |
| | AFPX-E30○○ | 42 W or less *2 | Approx. 430 g or less |
| Expansion FP0 adapter | AFPX-EFP0 | 0.24 W or less *3 | Approx. 65 g |
| FP-X communication cassette | AFPX-COM1 | 2 W or less *2 | Approx. 20 g |
| | AFPX-COM2 | 2 W or less *2 | Approx. 20 g |
| | AFPX-COM3 | 2 W or less *2 | Approx. 20 g |
| | AFPX-COM4 | 2 W or less *2 | Approx. 20 g |
| | AFPX-COM5 | 2 W or less *2 | Approx. 20 g |
| FP-X analog input cassette | AFPX-AD2 | 2 W or less *2 | Approx. 25 g |
| FP-X input cassette | AFPX-IN8 | 1 W or less *2 | Approx. 25 g |
| FP-X output cassette | AFPX-TR8 | 1 W or less *2 | Approx. 25 g |
| | AFPX-TR6P | 1 W or less *2 | Approx. 25 g |
| FP-X pulse I/O cassette | AFPX-PLS | 2 W or less *2 | Approx. 25 g |
| FP-X master memory cassette | AFPX-MRTC | 2 W or less *2 | Approx. 20 g |

*2 Power consumption by the AC power supply connected to the control unit    *3 Power consumption by the DC power supply connected to the expansion FP0 adapter
*4 Please refer to FP0 users manual for FP0 expansion units.
Please refer to the user manual and specifications for further details.

17

# Specifications

## 4. Input Specifications (Control unit, expansion unit)

| Item | Description | |
|---|---|---|
| | Relay output | Transistor output |
| Insulation method | Photo-coupler | |
| Rated input voltage | 24 V DC | |
| Operating voltage range | 21.6 to 26.4 V DC | |
| Rated input current | Approx. 4.7 mA (Control unit X0 to X7) | Approx. 8 mA (Control unit X0 to X3) |
| | | Approx. 4.7 mA (Control unit X4 to X7) |
| | Approx 4.3 mA (Control unit X8 and after, expansion unit) | Approx. 4.3 mA (Control unit X8 and after, expansion unit) |
| Input points per common | 8 points/common (C14, E16) 16 points/common (C30, C60) | |
| | (Input power polarity either positive or negative) | |
| Min. ON voltage/ON current | 19.2 V/3 mA | 19.2 V/6 mA (Control unit X0 to X3) 19.2 V/3 mA (Control unit X4 and after, expansion unit) |
| Max. OFF voltage/OFF current | 2.4 V/1 mA | 2.4 V/1.3 mA (Control unit X0 to X3) 2.4 V/1 mA (Control unit X4 and after, expansion unit) |
| Input impedance | Approx. 5.1 kΩ (Control unit X0 to X7) Approx. 5.6 kΩ (Control unit X8 and after, expansion unit) | Approx. 3 kΩ (Control unit X0 to X3) Approx. 5.1 kΩ (Control unit X4 to X7) Approx. 5.6 kΩ (Control unit X8 and after, expansion unit) |
| Response time | OFF → ON | Control unit X0 to X7   0.6 ms or less: Normal input   50 ms or less: High-speed counter, pulse catch, interruption input setting [1] Control unit X8 and after, expansion unit   0.6 ms or less | Control unit X0 to X3   135 µs or less: Nominal input   5 µs or less: High-speed counter, pulse catch, interruption input setting[1] Control unit X4 to X7   135 µs or less: Nominal input   50 µs or less: High-speed counter, pulse catch, interruption input setting[1] Control unit X8 and after, expansion unit   0.6 ms or less |
| | ON → OFF | Same as above | |
| Operating indicator | LED display | |

[1] Specification at the rated input voltage of 24 V DC, 25°C.

## 5. Relay Output Specifications (Control units, Expansion units)

| Item | | Description |
|---|---|---|
| Output type | | 1a contact |
| Rated control capacity (Resistive load) | | 2 A 250 V AC, 2 A 30 V DC (8 A or less/common) |
| Output points per common | | 4 points/common |
| Response time | OFF → ON | Approx. 10 ms |
| | ON → OFF | Approx. 8 ms |
| Life time | Mechanical | 20 million operations or more (Operation frequency 180 times/min) |
| | Electrical | 100,000 operations or more (Operation frequency 20 times/min at the rated control capacity) |
| Surge absorber | | None |
| Operating indicator | | LED display |

## 6. Transistor Output Specifications

| Item | | Description |
|---|---|---|
| Insulation method | | Photocoupler |
| Output type | | Open collector |
| Rated loadf voltage | | NPN type: 5 to 24 V DC, PNP type: 24 V DC |
| Load voltage allowable range | | NPN type: 4.75 to 26.4 V DC, PNP type: 21.6 to 26.4 V DC |
| Max. load current | | 0.5 A |
| Max. inrush current | | 1.5 A |
| Output points per common | | 8 points/common (C14, E16)     8 points/common, 6 points/common (C30, C60, E30) |
| OFF state leakage current | | 1 µA or less |
| ON state voltage drop | | 0.3 V DC or less |
| Response time | OFF → ON | 1 ms or less[2] |
| | ON → OFF | 1 ms or less[2] |
| Voltage range for external power supply | | 21.6 to 26.4 V DC |
| Surge absorber | | Zener diode |
| Operating indicator | | LED display |

[2] Please refer to the user manual for Y0 to Y7 of the transistor output type.