

Smart **AXIS**
Controller

FT1A



CE cUL US LISTED

• See website for details on approvals and standards.

Save installation space, wire, and time.

FT1A Controller × Small vivid LED display

Touch is an advanced, 3.8-inch display with integrated control and monitor functions. A bright LED backlight provides a vivid display.

Touch



Vertical
OK

TFT color
LCD
3.8 inch
400 cd/m²

STN monochrome
LCD
3.7 inch
740 cd/m²



Touch

Touch is an advanced, 3.8-inch display with integrated control and monitor functions (same functionality as Lite 12-I/O type).



Pro

Compact, easy-to-use controller. Independent dual axis, high-speed counter, and interrupt input are available. Pro is equipped with an LCD.



Lite

Compact, easy-to-use controller. Independent dual axis, high-speed counter, and interrupt input are available. Lite is a controller without an LCD.

SmartAXIS Touch

Save installation space, wire, and time.



Control Functions

Fast Processing Speed

Stable and efficient processing

Basic instructions processing time: 1850µs/1000 steps. Fast processing time is available in the integrated control function.

10A Relay

No external relay, reducing wiring

Max. 10A output enables direct operation of solenoid valves. No additional circuit necessary to connect a relay, reducing wiring.

Memory

Large memory size enables stress-free programming of easy-to-see screen

Stress-free programming with large memory size - 47.4kB program size (when using ladder program. FBD: 38kB) and 5MB configuration memory capacity.

*1) System software version V4.05 or later (47.4kB with V4.04 or earlier)

USB Flash Drive

Easy log data saving

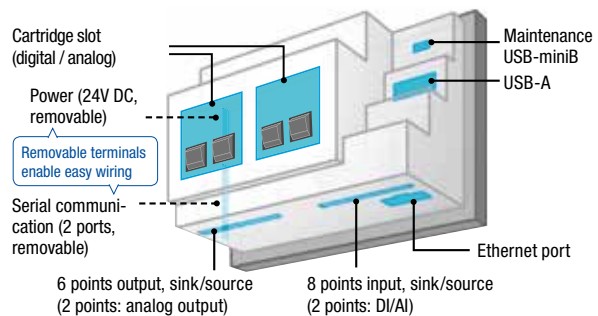
Integrated data logging function using a USB memory. Programs can also be changed easily.

High Speed

High-speed counter

Fast counter (single-phase 10 kHz/4 point, two-phase 5 kHz/1 point).

Structure



Display Functions

Color LCD

65,536-color high-resolution TFT LCD

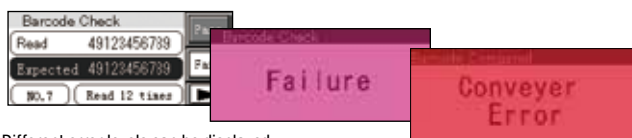
Brightest LCD in its class. Compact screen with unparalleled visibility.



Mono-chrome

Backlit with pink, red, or white colors

Check the system status easily with the super-bright display with pink, red, or white backlight. Displays the same level of brightness as the color LCD models.



Different error levels can be displayed.

Fast start-up

Stress-free, 3-second start-up

Fast start-up allows for easy debugging and stress-free operation.

32-level Brightness Adjustment

LED backlight dimming control

The brightness of the backlight can be adjusted according to surrounding conditions (day/night), saving energy.

Rear Mount Adapter

Flexible system design with rear mount adapter

An adapter to rear mount the Touch. Choose the most suitable mounting method to mount on the equipment.

(The customer should prepare the panel surface sheet and panel cut-out.)



When installed

APEM

Switches & Pilot Lights

Control Boxes

Emergency Stop Switches

Enabling Switches

Safety Products

Explosion Proof

Terminal Blocks

Relays & Sockets

Circuit Protectors

Power Supplies

LED Illumination

Controllers

Operator Interfaces

Sensors

AUTO-ID

FC6A

FT1A

FL1F



Download catalogs and CAD from <http://asia.idec.com/downloads>

SmartAXIS Pro/Lite

Controls for various applications



Fast Processing Speed

Stable and efficient processing

Basic instructions processing time: 950µs/1000 steps

Memory

Large memory size for easy-to-see screen

Large program memory (12 I/O: 12 kB^{*1}, 24 I/O and up: 47.4 kB^{*2}) achieves reduction of development processes.

*1: When using ladder program. FBD: 10kB

*2: When using ladder program. FBD: 38kB

High Speed Counter

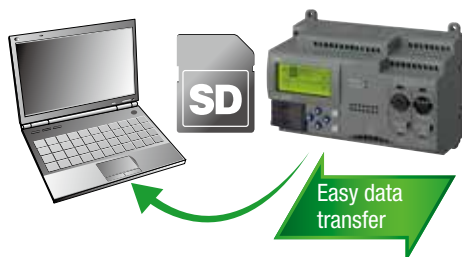
Positioning control possible with only one controller

Supports positioning control with a single-phase (100 kHz)/4 point or a single-phase (100 kHz)/two-phase (50 kHz)/2 point high-speed counter input. Ideal for easy positioning or motor control using a rotary encoder. Equipped with 6 points for interrupt input, catch input, and frequency input.

SD Memory Card

Easy log data saving

Data can be saved or transferred by using an SD memory card. Saved data can be read via Ethernet. Up to 64 data registers can be saved at the same time. Can store up to 4 data per second (depends on the program processing speed.)



10A Relay

No external relay, reducing wiring

10A output relays connect directly to small motors and solenoid valves. No additional circuit necessary to connect a relay, reducing wiring.



High-speed Output

Built-in biaxial positioning function

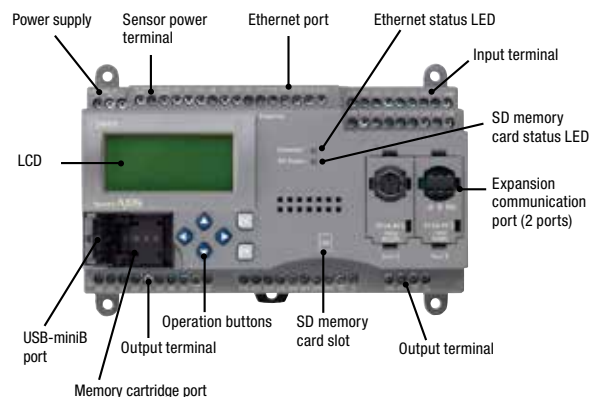
Independent dual-axis control is performed using two pulse outputs. Locational values can be easily defined for precise position (trapezoidal) control.

Memory Cartridge

Easy maintenance, no PC required.

User programs can be read or written easily, reducing labor. When a memory cartridge is installed in the SmartAXIS, the user program stored in the memory cartridge is executed.

Structure



SmartAXIS Touch/Pro/Lite

- APEM
- Switches & Pilot Lights
- Control Boxes
- Emergency Stop Switches
- Enabling Switches
- Safety Products
- Explosion Proof
- Terminal Blocks
- Relays & Sockets
- Circuit Protectors
- Power Supplies
- LED Illumination
- Controllers**
- Operator Interfaces
- Sensors
- AUTO-ID

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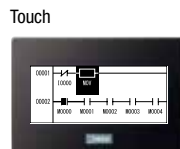
I/O Monitor "I/O status monitor" screen for monitoring I/O status

The monitor screens on LCD show ON/OFF status of I/Os (Touch/Pro only), enabling quick I/O status monitoring when error occurs.



Ladder Monitor Easy troubleshooting

Easy ladder program monitoring using 4 buttons. Parameters on monitor screens can be checked and changed easily. (Touch/Pro only) (monitor function is not possible with FBD).

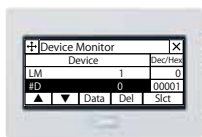


Inputs from the operation buttons can be programmed as digital inputs. No external device necessary for checking the programs.

Device Monitor Easy and quick program change

Parameters can be confirmed/checked using the device monitor function of Pro/Touch (monitoring FBD is not possible).

Touch

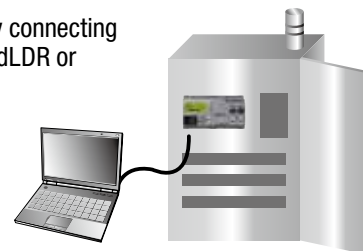


Pro



Online Monitor Easy set-up

Debugging is possible by connecting the SmartAXIS with WindLDR or WindO/I-N3.

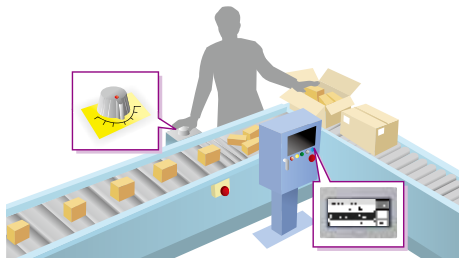


Clock Easy time schedule control using "Clock Function"

Clock function enables you to automatically control the time schedule for systems such as lighting or water sprinkler.

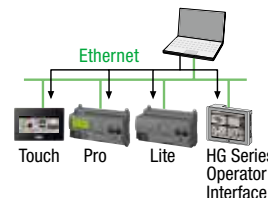
Efficiency Digital/analog (0 to 10V DC) compatible input

External analog potentiometer makes it easy to set the timer. Suitable for applications requiring a few analog inputs. (Pro/Lite: DC power model only)



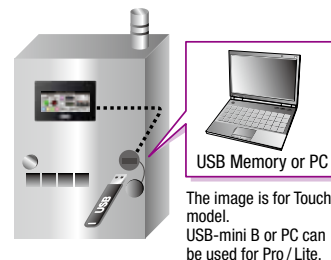
Ethernet Remote maintenance

The user program can be downloaded to/uploaded from the SmartAXIS at remote locations via Ethernet (except 12 I/O type of Pro/Lite).



Front Panel Maintenance Easy data maintenance, shortening setup and adjustment time.

Using a panel mount extension cable, data can be transferred without opening the panel. Debugging of ladder program in the controller is also possible (Touch only).



Security Password protection for secure system operation

Protect systems and programs using a password.



Operator Interface Connection to Operator Interface

Pro/Lite can be connected to IDEC's HG series operator interface for powerful expressivity and rich information.



Photo: HG3G Operator Interface

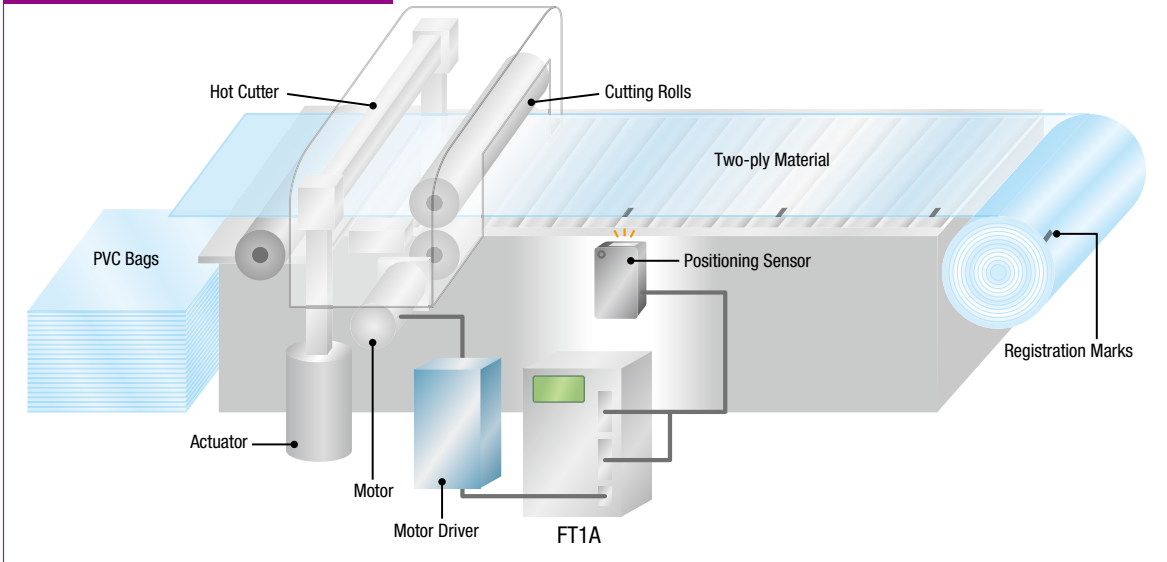
SmartAXIS Pro/Lite

Positioning Multistage Control

Independent dual-axis control is possible using two pulse outputs. Positioning (ramp-up/down control) can be achieved easily by setting the required values. (Pro/Lite pulse output model only)

For applicable models, see L-055 & L-056 ▶

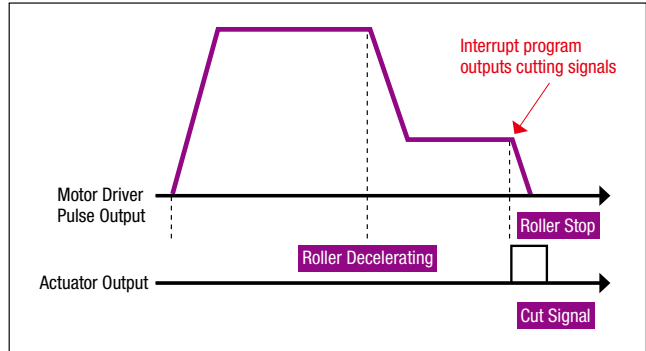
Application example: PVC bag machine



■ WindLDR: setting screen with preview



■ Target frequency change programmable for 18 steps maximum



Various Application Examples

SmartAXIS is suitable for various applications.

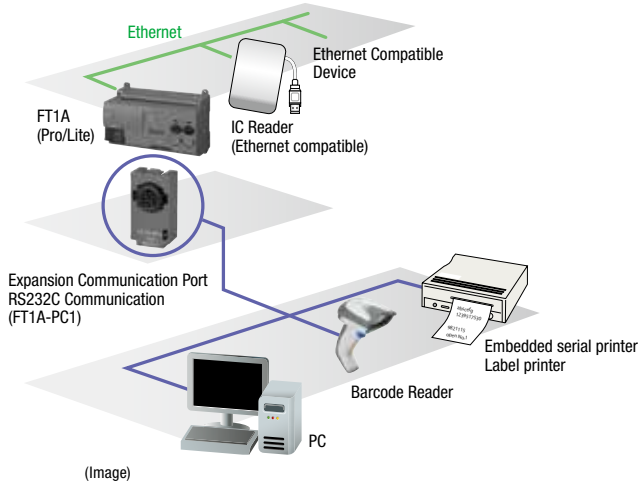
| Applications | Functions | 10A Relay | Analog Input | Calendar | Pulse Output | Data Logging | Ethernet Communication | User Communication | USB Communication |
|--------------------------|-----------|-----------|--------------|----------|--------------|--------------|------------------------|--------------------|-------------------|
| Elevator Control | | ● | | | ● | | | | |
| Drain Pumps | | ● | ● | ● | | ● | ● | | |
| Water Server | | ● | | | | ● | | ● | |
| Coffee Server | | ● | ● | | | | | | |
| Vending Machine | | ● | ● | | | ● | | | |
| Sprinkler | | ● | | ● | | | | ● | |
| Mist Generator | | | ● | ● | | | | | |
| Greenhouse Control | | | ● | ● | | ● | ● | | |
| Coin-operated Shower | | ● | ● | | | ● | | | |
| Golf Ball Feeder | | | | | ● | ● | | | |
| System Status Collection | | | | | | ● | ● | | |
| Barcode Reader | | | | | | ● | | ● | ● |

Various Networks for a Wide Variety of Applications

(Except for 12 I/O type of Pro/Lite)

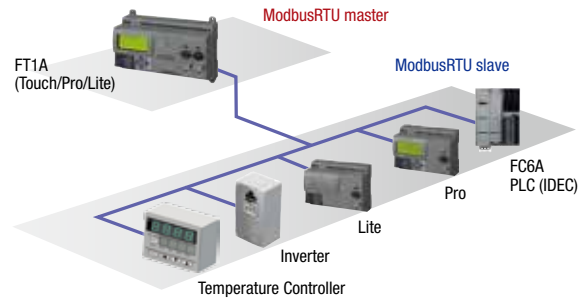
User Communication

The user communication of the SmartAXIS enables you to control external devices such as PCs, printers, and barcode readers.



Modbus RTU Communication

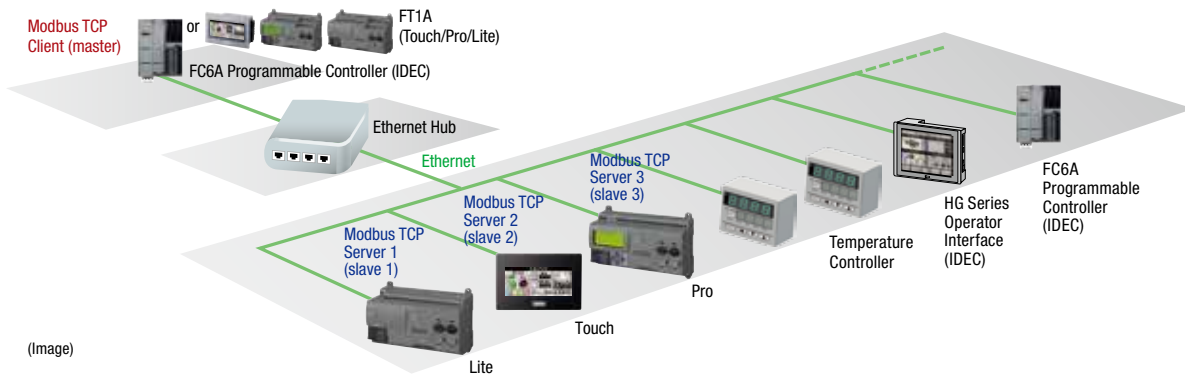
The SmartAXIS is compliant with Modbus protocol and can be used as either a Modbus communication master or slave. When used as a Modbus master, the SmartAXIS can monitor and modify data of Modbus compliant devices such as inverters and temperature controllers using Modbus communication (Touch can be used as a master only).



Modbus TCP

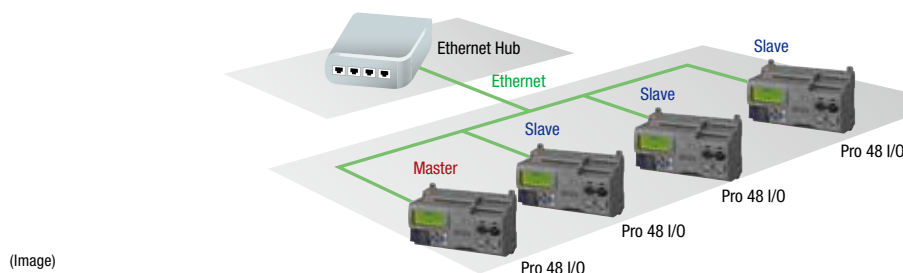
The SmartAXIS supports Modbus communications protocols. Modbus TCP protocol can also be used on the built-in Ethernet port, and can be used as a client (master) or server (slave), to monitor and change data of devices such as inverters and temperature controllers.

Note: When Pro/Lite is the client (master): up to 3 servers (slaves) can be connected.
When Touch is the client (master): up to 16 servers (slaves) can be connected.



Remote I/O

The remote I/O of the SmartAXIS enables you to expand the number of inputs and outputs by connecting separate SmartAXIS modules over Ethernet as remote I/O slaves. The total number of I/Os can be expanded up to 144 I/Os. The SmartAXIS remote I/O master can use the analog inputs on the remote I/O slaves (Pro/Lite only).



- APEM
- Switches & Pilot Lights
- Control Boxes
- Emergency Stop Switches
- Enabling Switches
- Safety Products
- Explosion Proof
- Terminal Blocks
- Relays & Sockets
- Circuit Protectors
- Power Supplies
- LED Illumination
- Controllers**
- Operator Interfaces
- Sensors
- AUTO-ID

FC6A

FT1A

FL1F



SmartAXIS Selection Guide

| Specifications | | Touch | | | Pro | | | | | | | | |
|--|-------------------------------------|--|---|--|--|----------------------------------|-----------------------|-------------------------------------|-----------------------|--------------------|-----------------|-----------|-----------|
| | | Color LCD | | Monochrome LCD | 12 | | 24 | | 40 | | | | |
| Part Number | | FT1A- *12RA-□ | FT1A- *14KA-□ | FT1A- *14SA-□ | FT1A- H12RA | FT1A- H12RC | FT1A- H24RA | FT1A- H24RC | FT1A- H40RKA | FT1A- H40RSA | FT1A- H40RC | | |
| Power Voltage | | 24V DC | | | 24V DC | 100- 240V AC | 24V DC | 100- 240V AC | 24V DC | 24V DC | 100- 240V AC | | |
| I/O Points | No. of Inputs | Digital | Sink 6 points | Source 6 points | Sink 6 points | 6 points | 8 points | 12 points | 16 points | 18 points | 18 points | 24 points | |
| | | Analog | 2pt (0-10VDC, 10-bit Resolution) | | 2pt (0-10VDC, 4-20mA, 10-bit Resolution) | | 2 points | — | 4 points | — | 6 points | 6 points | — |
| | No. of outputs | Relay output | 10A relay | 4 points | — | — | 4 points | 4 points | 4 points | 4 points | 4 points | 4 points | 4 points |
| | | | 2A relay | — | — | — | — | — | 4 points | 4 points | 8 points | 8 points | 12 points |
| | | Transistor (sink output) | — | 4 points | — | — | — | — | — | — | 4 points | — | — |
| Transistor (source output) | — | — | 4 points | — | — | — | — | — | — | 4 points | — | — | |
| Analog output | | — | 2 points | 2 points | — | — | — | — | — | — | — | — | |
| Maximum Expansion I/O Points | Analog input/ Analog output (*6) | | 2/0 points | 2/6 points 4/4 points 6/2 points | 2/6 points 4/4 points 6/2 points | — | — | — | — | — | — | — | |
| | Ladder Program | | 94.8kB (23,700 steps equivalent) (*5) Configuration Memory Capacity: 5MB | | | 12kB (3,000 steps equivalent) | | 47.4kB (11,850 steps equivalent) | | | | | |
| FC6A | Instructions Processing Time | Basic Instruction Time | 1,850µs/1,000 steps | | | 950µs/1,000 steps | | | | | | | |
| | | END Processing | 5ms minimum | | | 2ms | | | | | | | |
| FT1A | Program Capacity | | Program Size: 38kB Configuration Memory Size: 5MB | | | 10kB | | 38kB | | | | | |
| | Instructions Processing Time | Instruction Time | 4ms/100 points | | | 1.3ms/100 points | | | | | | | |
| | | Scan End Processing | 5ms minimum | | | 2.5ms | | | | | | | |
| (Maximum Counter Frequency and Points) | Single/two-phase selectable | | 1 point (5kHz, 2/4-edge, no single-phase use) | | | 2 points (*1) | — | 2 points (*1) | — | 2 points (*1) | — | — | |
| | Single-phase | | 4 points (×10kHz) | | | 2 points (×100kHz) | — | 4 points (×100kHz) | — | 4 points (×100kHz) | — | — | |
| Pulse Output | 100kHz | | — | | | — | | — | | 2 points | 2 points | — | |
| | 5kHz | | — | | | — | | — | | 2 points | 2 points | — | |
| Interface | USB Port | | 2 (USB-A, USB-miniB) (*2) | | | 1 (*2) | | 1 (*2) | | 1 (*2) | | | |
| | Ethernet | | 1 | | | — | | 1 | | 1 | | | |
| | Expansion Communication Ports | | — | | | — | | 1 | | 2 | | | |
| | | RS232C | | 1 | | | — | | 1 max. (*3) | | 2 max. (*3) | | |
| | | RS422/485 | | 1 | | | — | | 1 max. (*3) | | 2 max. (*3) | | |
| | SD Memory Card | | — | | | — | | — | | 1 (*4) | | | |
| Memory Cartridge | | — | | | 1 | | 1 | | 1 | | | | |
| USB Memory | | ○ | | | — | | — | | — | | | | |
| Clock Function | | ○ | | | ○ | | ○ | | ○ | | | | |
| LCD | | TFT color (65,536 colors) STN monochrome (pink/red/white backlight) | | | ○ (STN monochrome) | | ○ (STN monochrome) | | ○ (STN monochrome) | | | | |

* LCD: M (STN monochrome), C (TFT color) □ Bezel color: W (light gray), B (dark gray), S (silver)

*1) Single-phase: 100kHz, two-phase: 50kHz, 2/4-edge



*3) When expansion communication cartridge is installed.

*5) Touch system software version V4.05 or later (47.4KB with V4.04 or earlier) (11,850 steps equivalent)

*2) USB-miniB (maintenance port)

*4) SD memory card: 32GB max.

*6) Depends on the cartridge combination.

| Pro | | | | Lite | | | | | | | | | | | |
|---|------------|-------------|-------------|--|-------------|----------------------------------|-------------|--------------------|-------------|-------------|------------|--------------------|-------------|-------------|----------|
|  | | | |  | | | | | | | | | | | |
| 48 | | | | 12 | | 24 | | 40 | | | | 48 | | | |
| FT1A-H48KA | FT1A-H48SA | FT1A-H48KC | FT1A-H48SC | FT1A-B12RA | FT1A-B12RC | FT1A-B24RA | FT1A-B24RC | FT1A-B40RKA | FT1A-B40RSA | FT1A-B40RC | FT1A-B48KA | FT1A-B48SA | FT1A-B48KC | FT1A-B48SC | |
| 24V DC | 24V DC | 100-240V AC | 100-240V AC | 24V DC | 100-240V AC | 24V DC | 100-240V AC | 24V DC | 24V DC | 100-240V AC | 24V DC | 24V DC | 100-240V AC | 100-240V AC | |
| 22 points | 22 points | 30 points | 30 points | 6 points | 8 points | 12 points | 16 points | 18 points | 18 points | 24 points | 22 points | 22 points | 30 points | 30 points | |
| 8 points | 8 points | — | — | 2 points | — | 4 points | — | 6 points | 6 points | — | 8 points | 8 points | — | — | |
| — | — | — | — | 4 points | 4 points | 4 points | 4 points | 4 points | 4 points | 4 points | — | — | — | — | |
| — | — | — | — | — | — | 4 points | 4 points | 8 points | 8 points | 12 points | — | — | — | — | |
| 18 points | — | 18 points | — | — | — | — | — | 4 points | — | — | 18 points | — | 18 points | — | |
| — | 18 points | — | 18 points | — | — | — | — | — | 4 points | — | — | 18 points | — | 18 points | |
| — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | |
| — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | |
| 47.4kB (11,850 steps equivalent) | | | | 12kB (3,000 steps equivalent) | | 47.4kB (11,850 steps equivalent) | | | | | | | | | |
| 950µs/1,000 steps | | | | 950µs/1,000 steps | | | | | | | | | | | |
| 2ms | | | | 640µs | | | | | | | | | | | |
| 38kB | | | | 10kB | | 38kB | | | | | | | | | |
| 1.3ms/100 points | | | | 1.3ms/100 points | | | | | | | | | | | |
| 2.5ms | | | | 1ms | | | | | | | | | | | |
| 2 points (*1) | | — | | 2 points (*1) | | — | | 2 points (*1) | | — | | 2 points (*1) | | — | |
| 4 points (×100kHz) | | — | | 2 points (×100kHz) | | — | | 4 points (×100kHz) | | — | | 4 points (×100kHz) | | — | |
| 2 points | 2 points | 2 points | 2 points | — | | — | | 2 points | 2 points | — | | 2 points | 2 points | 2 points | 2 points |
| 2 points | 2 points | 2 points | 2 points | — | | — | | 2 points | 2 points | — | | 2 points | 2 points | 2 points | 2 points |
| 1 (*2) | | | | 1 (*2) | | 1 (*2) | | 1 (*2) | | | | 1 (*2) | | | |
| 1 | | | | — | | 1 | | 1 | | | | 1 | | | |
| 2 | | | | — | | 1 | | 2 | | | | 2 | | | |
| 2 max. (*3) | | | | — | | 1 max. (*3) | | 2 max. (*3) | | | | 2 max. (*3) | | | |
| 2 max. (*3) | | | | — | | 1 max. (*3) | | 2 max. (*3) | | | | 2 max. (*3) | | | |
| 1 (*4) | | | | — | | — | | 1 (*4) | | | | 1 (*4) | | | |
| 1 | | | | 1 | | 1 | | 1 | | | | 1 | | | |
| — | | | | — | | — | | — | | | | — | | | |
| ○ | | | | ○ | | ○ | | ○ | | | | ○ | | | |
| ○ (STN monochrome) | | | | — | | — | | — | | | | — | | | |

- APEM
- Switches & Pilot Lights
- Control Boxes
- Emergency Stop Switches
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- Controllers**
- Operator Interfaces
- Sensors
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FC6A

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SmartAXIS Series FT1A Controller

FT1A

Touch (Display Models)

Package Quantity: 1

| Type | Power | I/O | Input | | Output | Program Size (ladder/FBD) | Interfaces | LCD | Bezel Color | Part No. |
|-------------------|--------|-----------------|---------------------|-----------------|--|---|--|----------------|-------------|--------------|
| | | | Digital I/O | Analog I/O (*1) | | | | | | |
| Relay Output | 24V DC | 12 points (8/4) | 6 (sink) (24V DC) | 2 | 4 points 10A relay output | Program size: 94.8 (*3)/38kB Configuration memory size: 5 MB | USB-A USB-mini B RS232C RS422/485 Ethernet | STN monochrome | Light gray | FT1A-M12RA-W |
| | | | | | | | | | Dark gray | FT1A-M12RA-B |
| Transistor Output | 24V DC | 14 points (8/6) | 6 (source) (24V DC) | 2 | 4 points Tr. sink output 2 points analog output | Program size: 94.8 (*3)/38kB Configuration memory size: 5 MB | USB-A USB-mini B RS232C RS422/485 Ethernet | STN monochrome | Silver | FT1A-M12RA-S |
| | | | | | | | | | Light gray | FT1A-C12RA-W |
| | | | | | | | | | Dark gray | FT1A-C12RA-B |
| | | | | | | | | | Silver | FT1A-C12RA-S |
| | | | | | | | | | Light gray | FT1A-M14KA-W |
| | | | | | | | | | Dark gray | FT1A-M14KA-B |
| | | | | | | | | | Silver | FT1A-M14KA-S |
| | | | | | | | | | Light gray | FT1A-M14SA-W |
| | | | | | | | | | Dark gray | FT1A-M14SA-B |
| | | | | | | | | | Silver | FT1A-M14SA-S |
| Transistor Output | 24V DC | 14 points (8/6) | 6 (sink) (24V DC) | 2 | 4 points Tr. source output 2 points analog output | Program size: 94.8 (*3)/38kB Configuration memory size: 5 MB | USB-A USB-mini B RS232C RS422/485 Ethernet | TFT color | Light gray | FT1A-C14KA-W |
| | | | | | | | | | Dark gray | FT1A-C14KA-B |
| | | | | | | | | | Silver | FT1A-C14KA-S |
| | | | | | | | | | Light gray | FT1A-C14SA-W |
| | | | | | | | | | Dark gray | FT1A-C14SA-B |
| | | | | | | | | | Silver | FT1A-C14SA-S |

Pro (LCD Models)

Package Quantity: 1

| Power | I/O | Input | | Output | High-Speed Tr. Output | Program Size (ladder/FBD) | Interfaces | | | | Memory Cartridge | SD Memory Card | Part No. | | | | | | | | | |
|----------------|-------------------|--------------|-----------------|--------|--|---------------------------|-----------------|---------------|-----------------------------------|---|------------------|----------------|----------|------------|------------|---|---|---|---|---|----------------------------|--------------------------|
| | | Digital I/O | Analog I/O (*1) | | | | USB mini-B Port | Ethernet Port | Expansion communication port (*2) | | | | | | | | | | | | | |
| | | | | | | | | Port 2 | Port 3 | | | | | | | | | | | | | |
| 24V DC | 12 points (8/4) | 24V DC Input | 6 | 2 | 4 points 10A relay output | — | 12/10 kB | ○ | — | — | — | — | — | FT1A-H12RA | | | | | | | | |
| | 24 points (16/8) | | 12 | 4 | 4 points 10A relay output 4 points 2A relay output | | | | | | | | | FT1A-H24RA | | | | | | | | |
| | 40 points (24/16) | | 18 | 6 | 4 points 10A relay output 8 points 2A relay output | ○ | ○ | | | | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | FT1A-H40RKA FT1A-H40RSA | |
| | 48 points (30/18) | | 22 | 8 | 18 points Tr. sink output 18 points Tr. source output | ○ | ○ | | | | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | FT1A-H48RKA FT1A-H48SA | |
| 100 to 240V AC | 12 points (8/4) | 24V DC Input | 8 | — | 4 points 10A relay output | — | 12/10 kB | ○ | — | — | — | — | — | — | FT1A-H12RC | | | | | | | |
| | 24 points (16/8) | | 16 | | 4 points 10A relay output 4 points 2A relay output | | | | | | | | | | FT1A-H24RC | | | | | | | |
| | 40 points (24/16) | | 24 | | 4 points 10A relay output 12 points 2A relay output | ○ | ○ | | | | | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | FT1A-H40RC FT1A-H48KC |
| | 48 points (30/18) | | 30 | | 18 points Tr. sink output 18 points Tr. source output | ○ | ○ | | | | | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Lite (No LCD Models)

Package Quantity: 1

| Power | I/O | Input | | Output | High-Speed Tr. Output | Program Size (ladder/FBD) | Interfaces | | | | Memory Cartridge | SD Memory Card | Part No. | | | | | | | | | | | |
|----------------|-------------------|--------------|-----------------|--------|--|---------------------------|-----------------|---------------|-----------------------------------|---|------------------|----------------|----------|---|------------|------------|---|---|---|---|---|----------------------------|---|--------------------------|
| | | Digital I/O | Analog I/O (*1) | | | | USB mini-B Port | Ethernet Port | Expansion communication port (*2) | | | | | | | | | | | | | | | |
| | | | | | | | | Port 2 | Port 3 | | | | | | | | | | | | | | | |
| 24V DC | 12 points (8/4) | 24V DC Input | 6 | 2 | 4 points 10A relay output | — | 12/10 kB | ○ | — | — | — | — | — | — | FT1A-B12RA | | | | | | | | | |
| | 24 points (16/8) | | 12 | 4 | 4 points 10A relay output 4 points 2A relay output | | | | | | | | | | FT1A-B24RA | | | | | | | | | |
| | 40 points (24/16) | | 18 | 6 | 4 points 10A relay output 8 points 2A relay output | ○ | ○ | | | | | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | FT1A-B40RKA FT1A-B40RSA | | |
| | 48 points (30/18) | | 22 | 8 | 18 points Tr. sink output 18 points Tr. source output | ○ | ○ | | | | | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | FT1A-B48RKA FT1A-B48SA | | |
| 100 to 240V AC | 12 points (8/4) | 24V DC Input | 8 | — | 4 points 10A relay output | — | 12/10 kB | ○ | — | — | — | — | — | — | — | FT1A-B12RC | | | | | | | | |
| | 24 points (16/8) | | 16 | | 4 points 10A relay output 4 points 2A relay output | | | | | | | | | | | FT1A-B24RC | | | | | | | | |
| | 40 points (24/16) | | 24 | | 4 points 10A relay output 12 points 2A relay output | ○ | ○ | | | | | | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | FT1A-B40RC FT1A-B48KC |
| | 48 points (30/18) | | 30 | | 18 points Tr. sink output 18 points Tr. source output | ○ | ○ | | | | | | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | FT1A-B48SC |

*1) Digital/analog-compatible input

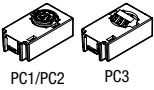
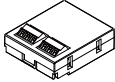
*2) The following communication cartridges can be connected.

FT1A-PC1: RS232C, mini-DIN type, FT1A-PC2: RS485, mini-DIN type, FT1A-PC3: RS485, terminal block type

*3) Touch system software version V4.05 or later (47.4KB with V4.04 or earlier).

Options / Maintenance Parts

Options

| Name/Appearance | | Applicable Model | | | Part No. (Ordering No.) | Package Quantity | Specifications |
|--|----------------|------------------|-----------|-----------|----------------------------|---------------------|--|
| | | Touch | Pro | Lite | | | |
| Application software | | ○ | ○ | ○ | SW1A-W1C | 1 | Automation Organizer Ver. 2.0 or higher (*1) |
| USB maintenance cable | | ○ | ○ | ○ | HG9Z-XCM42 | 1 | USB cable (length 2 m), USB-miniB |
| Panel mount extension cable | | ○ | — | — | HG9Z-XCE11 | 1 | USB-A port extension cable (length 1 m) |
| | | ○ | ○ | ○ | HG9Z-XCE21 | 1 | USB-mini B port extension cable (length 1 m) |
| Screen protection sheet (*2) | | ○ | — | — | FT9Z-1D3PN05 | 5 | |
| Protective cover | | ○ | — | — | FT9Z-1E3PN05 | 5 | |
| Memory card | | — (*3) | ○ (*4) | ○ (*4) | HG9Z-XMS2 | 1 | SD memory card (2 GB) |
| Memory cartridge | | — | ○ | ○ | FT1A-PM1 | 1 | Dedicated user program save memory (1 MB) |
| Communication cartridge  | | — | ○ (*5) | ○ (*5) | FT1A-PC1 | 1 | RS232C, mini-DIN type |
| | | — | ○ (*5) | ○ (*5) | FT1A-PC2 | 1 | RS485, mini-DIN type |
| | | — | ○ (*5) | ○ (*5) | FT1A-PC3 | 1 | RS485, terminal block type |
| Digital I/O Cartridge | Digital Input | ○ (*5) | — | — | FC6A-PN4 | 1 | 4 (4/1 common) |
| | Digital Output | ○ (*5) | — | — | FC6A-PTK4 | 1 | 4 sink (4/1 common) |
| | | ○ (*5) | — | — | FC6A-PTS4 | 1 | 4 source (4/1 common) |
| Analog cartridge  | | ○ (*6) | — | — | FC6A-PJ2A | 1 | Voltage/current input (2 points) |
| | | ○ (*6) | — | — | FC6A-PK2AV | 1 | Voltage output (2 points) |
| | | ○ (*6) | — | — | FC6A-PK2AW | 1 | Current output (2 points) |
| | | ○ (*6) | — | — | FC6A-PJ2CP | 1 | Temperature input (2 points) |
| Rear mount adapter | | ○ | — | — | FT9Z-1A01 | 1 | Rear mount bracket |
| 35-mm-wide DIN Rail | | — | ○ | ○ | BAA1000PN10 | 10 | See H-071 for details on DIN rail products. |
| | | — | ○ | ○ | BAP1000PN10 | 10 | |
| DIN rail end clip | | — | ○ | ○ | BNL6PN10 | 10 | |
| Touch User's Manual | Japanese | ○ | — | — | FT9Y-B1389 | 1 | |
| | English | ○ | — | — | FT9Y-B1390 | 1 | |
| Pro/Lite User's Manual | Japanese | — | ○ | ○ | FT9Y-B1377 | 1 | |
| | English | — | ○ | ○ | FT9Y-B1378 | 1 | |
| SmartAXIS Ladder Programming Manual | Japanese | ○ | ○ | ○ | FT9Y-B1381 | 1 | |
| | English | ○ | ○ | ○ | FT9Y-B1382 | 1 | |
| FBD Programming Manual | Japanese | ○ | ○ | ○ | FT9Y-B1385 | 1 | |
| | English | ○ | ○ | ○ | FT9Y-B1386 | 1 | |

*1) Upgrade from earlier version is possible on IDEC website. The following manuals in PDF can be downloaded from <http://www.idec.com/language>.

- FT1A SmartAXIS Touch User's Manual (English, Japanese, Simplified Chinese)
- FT1A SmartAXIS Pro/Lite User's Manual (English, German, Japanese, Simplified Chinese)
- FT1A SmartAXIS Ladder Programming Manual (English, German, Japanese, Simplified Chinese)
- FT1A SmartAXIS FBD Programming Manual (English, German, Japanese, Simplified Chinese)

*2) UV resistance material is used. However, resistance against direct sunlight in outdoor usage is not guaranteed.






*3) Use commercially-available USB memory to store project data, log data, and recipe file of Touch models.

*4) Can be used for 40-I/O and 48-I/O types. Note that user programs cannot be stored or read using an SD memory card. If necessary, use a memory cartridge.

*5) Cannot be used for expansion with 12-I/O type.

*6) Cannot be used for expansion with relay output type.

Maintenance Parts

| Name | Applicable Model (*1) | | | Part No. (Ordering No.) | Package Quantity | Specification |
|---|-----------------------|-----|------|----------------------------|---------------------|---|
| | Touch | Pro | Lite | | | |
| Communication Interface plug  | ○ | — | — | FT9Z-1T09 | 1 | For communication ports (black) One supplied with Touch |
| Power supply plug  | ○ | — | — | FT9Z-1X03 | 1 | For power supply terminals (black) One supplied with Touch |
| Mounting bracket  | ○ | — | — | HG9Z-4K2PN04 | 4 | Two sets Two supplied with Touch |
| USB cable lock pin  | ○ | — | — | HG9Z-XU1PN05 | 5 | Used when using the USB cable on a regular basis Two supplied with Touch |
| Direct mounting hook  | — | ○ | ○ | FT9Z-PSP1PN05 | 5 | Direct mounting hook for Pro/Lite One set supplied with Pro/Lite |

*1) Supplied with FT1A.



Download catalogs and CAD from <http://asia.idec.com/downloads>

APEM

Switches & Pilot Lights

Control Boxes

Emergency Stop Switches

Enabling Switches

Safety Products

Explosion Proof

Terminal Blocks

Relays & Sockets

Circuit Protectors

Power Supplies

LED Illumination

Controllers

Operator Interfaces

Sensors

AUTO-ID

FC6A

FT1A

FL1F

FT1A Controllers

General Specifications

Touch (Display Model)

| Part No. | FT1A-*12RA-* | FT1A-*14KA-* / FT1A-*14SA-* |
|--|--|--|
| Output | Relay output | Transistor output |
| Rated Power Voltage/ Power Supply Isolation | 24V DC/Not isolated | |
| Allowable Voltage Range | 20.4 to 28.8V DC (including ripple) | |
| Power Consumption | 9.2W maximum | 11W maximum |
| Allowable Momentary Power Interruption | 10 ms maximum | |
| Dielectric Strength | 1. Between power terminal and FE terminal: 500V AC, 5 mA, 1 minute 2. Between power terminal and output terminal: 2,300V AC, 5 mA, 1 minute | 1. Between power terminal and FE terminal: 500V AC, 5 mA, 1 minute 2. Between power terminal and output terminal: 500V AC, 5 mA, 1 minute |
| EMC Immunity | IEC/EN 61131-2:2007 compliant | |
| Inrush Current | 50A maximum (5ms maximum) | |
| Operating Temperature | Color display: -20 to +55°C, Monochrome display: 0 to +55°C (*1) (*2) | |
| Storage Temperature | -20 to +60°C (no freezing) | |
| Relative Humidity | 10 to 95% RH (no condensation) | |
| Pollution Degree | 2 (IEC 60664-1) | |
| Corrosion Immunity | Atmosphere free from corrosive gases | |
| Degree of Protection | IP66F TYPE 4X TYPE 13 (Panel front) (*3), IP20 (Rear) | |
| Ground | Functional grounding | |
| Protective grounding conductor | UL1007 AWG16 | |
| Vibration Resistance | 5 to 8.4 Hz half amplitude 3.5 mm, 8.4 to 150 Hz, acceleration 9.8 m/s ² (1G), 2 hours per axis on each of three mutually perpendicular axis (IEC 61131-2) | |
| Shock Resistance | 147 m/s ² , 11 ms, X, Y, Z directions 3 times (IEC 61131-2) | |
| Mounting Structure | Panel mount | |
| Weight (approx.) | 300g | 250g |

*1) FT1A-*12RA-* hardware version V130 (indicated on hardware) and earlier is UL, c-UL listed at 50°C (maximum operating temperature).

*2) See SmartAXIS Touch User's Manual FT9Y-B1390(2) for I/O derating.

*3) Operation not guaranteed when used with certain types of oils.

Pro/Lite (LCD Model/No LCD Model)

| Part No. | Pro/Lite | | | | | | | | | |
|---|---|---|----------------|----------------|------------------|------------------|----------------|----------------|----------------|----------------|
| | 12-I/O Type | | 24-I/O Type | | 40-I/O Type | | | 48-I/O Type | | |
| | H12RA B12RA | H12RC B12RC | H24RA B24RA | H24RC B24RC | H40RKA B40RKA | H40RSA B40RSA | H40RC B40RC | H48KA B48KA | H48SA B48SA | H48KC B48KC |
| Rated Power Voltage/Power Supply Isolation | AC power: 100 to 240V AC/Isolation with transformer DC power: 24V DC/Not isolated | | | | | | | | | |
| Allowable Voltage Range | AC power: 85 to 264V AC DC power: 20.4 to 28.8V DC (including ripple) | | | | | | | | | |
| Rated Power Frequency | AC power: 50 to 60 Hz (47 to 63 Hz) | | | | | | | | | |
| Power Consumption | AC power | 12-I/O: 18 VA maximum, 24-I/O: 41 VA maximum, 40-I/O: 48VA maximum, 48-I/O: 43 VA maximum | | | | | | | | |
| | DC power | 12-I/O: 4.3W maximum, 24-I/O: 4.8W maximum, 40-I/O: 7.9W maximum, 48-I/O: 6.0W maximum | | | | | | | | |
| Allowable Momentary Power Interruption | AC power: 20 ms maximum, DC power: 10 ms maximum | | | | | | | | | |
| Dielectric Strength | AC power type: Between power/input and PE terminals: 1,500V AC, 5mA, 1 minute Between transistor output and PE terminals: 1,500V AC, 5mA, 1 minute Between relay output and PE terminals: 2,300V AC, 5mA, 1 minute Between power and input terminals: 1,500V AC, 5mA, 1 minute Between power/input and transistor output terminals: 1,500V AC, 5mA, 1 minute Between power/input and relay output terminals: 2,300V AC, 5mA, 1 minute DC power type: Between power/input and FE terminals: 500V AC, 5mA, 1 minute Between transistor output and FE terminals: 500V AC, 5mA, 1 minute Between relay output and FE terminals: 2,300V AC, 5mA, 1 minute Between power/input and transistor output terminals: 500V AC, 5mA, 1 minute Between power/input and relay output terminals: 2,300V AC, 5mA, 1 minute | | | | | | | | | |
| EMC Immunity | IEC/EN 61131-2:2007 compliant | | | | | | | | | |
| Inrush Current | AC power: 35A maximum (Cold start with Ta=25°C, 200V AC) DC power: 30A maximum (5ms maximum) | | | | | | | | | |
| Operating Temperature | 0 to +55°C (*1) | | | | | | | | | |
| Storage Temperature | -25 to +70°C (no freezing) | | | | | | | | | |
| Relative Humidity | 10 to 95% RH (no condensation) | | | | | | | | | |
| Pollution Degree | 2 (IEC 60664-1) | | | | | | | | | |
| Corrosion Immunity | Atmosphere free from corrosive gases | | | | | | | | | |
| Degree of Protection | IP20 (IEC 60529) | | | | | | | | | |
| Ground | D-type ground (Class 3 ground) | | | | | | | | | |
| Protective grounding conductor | UL1007 AWG16 | | | | | | | | | |
| Vibration Resistance | 5 to 8.4 Hz half amplitude 3.5 mm, 8.4 to 150 Hz, acceleration 9.8 m/s ² (1G), 2 hours per axis on each of three mutually perpendicular axis (IEC 61131-2) | | | | | | | | | |
| Shock Resistance | 147 m/s ² , 11 ms, X, Y, Z directions 3 times (IEC 61131-2) | | | | | | | | | |
| Mounting Structure | DIN rail or direct mount | | | | | | | | | |
| Weight (approx.) | AC power | 12-I/O: 230g, 24-I/O: 400g, 40-I/O: 580g, 48-I/O: 540g | | | | | | | | |
| | DC power | 12-I/O: 190g, 24-I/O: 310g, 40-I/O: 420g, 48-I/O: 380g | | | | | | | | |

*1) Hardware version V110 (indicated on hardware) is UL, c-UL Listed at 50°C (maximum operating temperature).

Function Specifications (Touch)

| Part No. | | Touch | | | |
|---|---------------------------------------|--|---|--|--|
| | | FT1A-*12RA-* | FT1A-*14KA-* | FT1A-*14SA-* | |
| Control System | | Stored program system | | | |
| Ladder Program | Instruction Words | Basic Instructions | | 42 types | |
| | | Advanced Instructions | | 98 types | |
| | Program Capacity | 99 types | | | |
| Processing Time | Basic Instruction | 1850µs/1,000 steps | | | |
| | END Processing | 5 msec minimum | | | |
| FB | | 37 types | | | |
| FBD | Program Capacity | | Program size: 38kB, configuration memory capacity: 5MB | | |
| | No. of FB | FB (*1) | 1,000 | | |
| | | Timer (T) | 200 | | |
| | | Counter (C) | 200 | | |
| Processing Time | Basic Instruction | 4ms/100 | | | |
| | END Processing | 5ms minimum | | | |
| User Program Storage | | Flash ROM (100,000 times) | | | |
| I/O Points (*3) | Inputs | 8 (90 max. can be added with remote I/O master function) | 8 (90 max. can be added with remote I/O master function) | | |
| | Outputs | 4 (54 max. can be added with remote I/O master function) | 4 (54 max. can be added with remote I/O master function) | | |
| Analog Input (*3) | | 2 (24 max. can be added with remote I/O master function) | 2 (4 max. can be added with analog cartridge, and 24 max. can be added with remote master function) | | |
| Analog Output | | — | 2 (4 max. can be added with analog cartridge) | | |
| Internal Relays | | 1,024 | | | |
| Shift Registers | | 128 | | | |
| Data Registers | | 2000 | | | |
| Special Data Registers | | 200 | | | |
| Counters | | 200 | | | |
| Timer (1ms, 10 ms, 100 ms, 1s) | | 200 | | | |
| Clock | | Precision: ±30 seconds/month (25°C, typical) | | | |
| RAM Backup | Backup Data | Internal relays, shift registers, counters, data registers, clock data | | | |
| | Backup Duration | Approximately 30 days (typical) at 25°C after backup battery is fully charged | | | |
| | Battery | Lithium secondary battery | | | |
| | Charging Time | Approximately 15 hours required to charge from 0 to 90% | | | |
| | Replaceability | Not possible | | | |
| Self-Diagnostic Functions | | Keep data check, power failure check, watchdog timer check, timer/counter preset value change error check, user program syntax check, user program execution check | | | |
| Input Filter | | No filter, 3 to 15 ms (selectable in increments of 1 ms) | | | |
| Catch Input/Interrupt Input | | 4/4 | | | |
| High-speed Counter | Maximum Counting Frequency and Points | Single/two-phase selectable | 1 (5 kHz, multiple 2/4, single-phase cannot be used) | | |
| | | Single-phase | 4 (x 10 kHz) | | |
| | Counting Range | | 0 to 4,294,967,295 (32 bits) | | |
| | Operation Mode | | Rotary encoder mode and adding counter mode | | |
| Analog Voltage Inputs | Built-in Points | | 2 | | |
| | Input Range | | 0 to 10V DC | 0 to 10V DC (voltage input) / 4 to 20 mA (current input) | |
| | Input Impedance | | 78 kΩ | 78 kΩ (voltage input) / 250 Ω (current input) | |
| | Digital Resolution | | 0 to 1,000 (10 bits) | | |
| Number of Relay Outputs | | 10A relay: 4 | | | |
| Number of Transistor Outputs | | — | 4 (sink) | 4 (source) | |
| Analog Output | Built-in Points | | 2 | | |
| | Output Range | | 0 to 10V DC (voltage output) / 4 to 20 mA (current output) | | |
| | Digital Resolution | | 0 to 1,000 (10 bits) | | |
| Pulse Outputs | 100 kHz | No. of outputs | — | | |
| | | Function | — | | |
| | 5 kHz | No. of outputs | — | | |
| | | Function | — | | |
| External Output Power Supply for Sensor | Output Voltage | | — | | |
| | Output Current | | — | | |
| | Overload Detection | | — | | |
| | Insulation | | — | | |
| USB-mini B (*2) | | ○ | | | |
| USB-A (*2) | | ○ | | | |
| RS232C (*2) | | ○ | | | |
| RS485/422 (*2) | | ○ | | | |
| Ethernet | | ○ | | | |
| Expansion Communication Ports | Port 2 | — | | | |
| | Port 3 | — | | | |
| Memory Cartridge | | — | | | |
| SD Memory Card | | — | | | |
| Analog Cartridge Interface | Number of Ports | 2 | | | |
| | Connectable Cards | 4 (FC6A-PJ2A, FC6A-PK2AW, FC6A-PK2AW, FC6A-PJ2CP) | | | |

*1) Except for timer, counter, input FB, and output FB.
 *3) FT1A-*12RA-*: system software V3.90 or later

*2) Not isolated from internal circuits.
 *4) Touch system software version V4.05 or later (47.4KB with V4.04 or earlier)

- APEM
- Switches & Pilot Lights
- Control Boxes
- Emergency Stop Switches
- Enabling Switches
- Safety Products
- Explosion Proof
- Terminal Blocks
- Relays & Sockets
- Circuit Protectors
- Power Supplies
- LED Illumination
- Controllers
- Operator Interfaces
- Sensors
- AUTO-ID
- FC6A
- FT1A
- FL1F

FT1A Controllers

Function Specifications (Pro/Lite)

| Part No. | Pro/Lite FT1A- | | | | | | | | | | | |
|---|--|---------------------------------------|---|----------------|--------------------------------------|----------------|----------------------------------|----------------------------------|---------------------|---------------|-----------|-----------|
| | H12RA B12RA | H12RC B12RC | H24RA B24RA | H24RC B24RC | H40RKA H40RSA B40RKA B40RSA | H40RC B40RC | H48KA H48SA B48KA B48SA | H48KC H48SC B48KC B48SC | | | | |
| Control System | Stored program system | | | | | | | | | | | |
| APEM Switches & Pilot Lights Control Boxes Emergency Stop Switches Enabling Switches Safety Products Explosion Proof Terminal Blocks Relays & Sockets Circuit Protectors Power Supplies LED Illumination | Ladder Program | Instruction Words | Basic Instructions | | 42 types | | | | | | | |
| | | Program Capacity | Advanced Instructions | | 99 types | 98 types | 103 types | 102 types | 110 types | 104 types | 110 types | 109 types |
| | | | 12 kB (3000 steps equivalent) | | 47.4 kB (11,850 steps equivalent) | | | | | | | |
| | | Processing Time | Basic Instruction | | 950 μs/1,000 steps | | | | | | | |
| Safety Products | FBD | FB | 38 types | 37 types | 38 types | 37 types | 45 types | 39 types | 45 types | 44 types | | |
| | | Program Capacity | 10kB | | 38kB | | | | | | | |
| | | | FB (*1) | 200 | | 1,000 | | | | | | |
| | | | Timer (T) | 100 | | 200 | | | | | | |
| Processing Time | Basic Instruction | | 1.3ms/100 | | | | | | | | | |
| | END Processing | | 2.5ms (Pro)/1ms (Lite) | | | | | | | | | |
| User Program Storage | Flash ROM (10,000 times) | | | | | | | | | | | |
| I/O Points | Inputs | 8 | | 16 | | 24 | | 30 | | | | |
| | Outputs | 4 | | 8 | | 16 | | 18 | | | | |
| Internal Relays | 256 | | 1,024 | | | | | | | | | |
| Shift Registers | 128 | | 128 | | | | | | | | | |
| Data Registers | 400 | | 2000 | | | | | | | | | |
| Special Data Registers | 200 | | 200 | | | | | | | | | |
| Adding/Reversible Counters | 100 | | 200 | | | | | | | | | |
| Timer (1ms, 10 ms, 10 ms, 1s) | 100 | | 200 | | | | | | | | | |
| Clock | Precision: ±30 seconds/month (25°C, typical) | | | | | | | | | | | |
| Operator Interfaces Sensors AUTO-ID | RAM Backup | Backup Data | Internal relays, shift registers, counters, data registers, clock data | | | | | | | | | |
| | | Backup Duration | Approximately 30 days (typical) at 25°C after backup battery is fully charged | | | | | | | | | |
| | | Battery | Lithium secondary battery | | | | | | | | | |
| | | Charging Time | Approximately 15 hours required to charge from 0 to 90% | | | | | | | | | |
| | | Replaceability | Not possible | | | | | | | | | |
| Self-Diagnostic Functions | Keep data check, power failure check, clock error check, watchdog timer check, timer/counter preset value change error check, user program syntax check, user program execution check, system error check, memory cartridge transfer error check | | | | | | | | | | | |
| Input Filter | No filter, 3 to 15 ms (selectable in increments of 1 ms) | | | | | | | | | | | |
| Catch Input/Interrupt Input | 4/4 | | | 6/6 | | | | | | | | |
| FC6A FT1A FL1F | High-speed Counter | Maximum Counting Frequency and Points | Single/two-phase selectable | 2 (*2) | — | 2 (*2) | — | 2 (*2) | — | 2 (*2) | — | |
| | | | Single-phase | 2 (x 100 kHz) | — | 4 (x 100 kHz) | — | 4 (x 100 kHz) | — | 4 (x 100 kHz) | — | |
| | | Counting Range | 0 to 4,294,967,295 (32 bits) | | | | | | | | | |
| Operation Mode | Rotary encoder mode and adding counter mode | | | | | | | | | | | |
| Analog Voltage Inputs | Points | 2 | None | 4 | None | 6 | None | 8 | None | | | |
| | Input Range | 0 to 10V DC | | | | | | | | | | |
| | Input Impedance | 78 kΩ | | | | | | | | | | |
| | Digital Resolution | 0 to 1,000 (10 bits) | | | | | | | | | | |
| Pulse Outputs | 100 kHz | No. of outputs | — | — | — | — | 2 | — | 2 | | | |
| | | Function | — | — | — | — | (*3) | — | (*3) | | | |
| | 5 kHz | No. of outputs | — | — | — | — | 2 | — | 2 | | | |
| | | Function | — | — | — | — | (*4) | — | (*4) | | | |
| External Output Power Supply for Sensor | Output Voltage | — | — | — | 24V DC (+10%, -15%) | — | 24V DC (+10%, -15%) | — | 24V DC (+10%, -15%) | | | |
| | Output Current | — | — | — | 250 mA | — | 300 mA | — | 300 mA | | | |
| | Overload Detection | — | — | — | Impossible | — | Impossible | — | Impossible | | | |
| | Insulation | — | — | — | Internal Circuit | — | Internal Circuit | — | Internal Circuit | | | |
| USB-mini B (*5) | ○ | | ○ | | ○ | | ○ | | | | | |
| USB-A (*5) | — | | — | | — | | — | | | | | |
| RS232C (*5) | — | | ○ (*6) | | ○ (*6) | | ○ (*6) | | | | | |
| RS485 (*5) | — | | ○ (*6) | | ○ (*6) | | ○ (*6) | | | | | |
| Ethernet | — | | ○ | | ○ | | ○ | | | | | |
| Expansion Communication Ports | Port 2 | — | | ○ | | ○ | | ○ | | | | |
| | Port 3 | — | | ○ | | ○ | | ○ | | | | |
| Memory Cartridge | ○ | | ○ | | ○ | | ○ | | | | | |
| SD Memory Card | — | | — | | ○ (*7) | | ○ (*7) | | | | | |

*1) Except for timer, counter, input FB, and output FB.

*2) 100 kHz when single-phase, 50 kHz when two-phase, multiple 2.4

*3) Pulse [PULS], Pulse without modulation [PWM], Ramp [RAMP, ARAMP], Zero return [ZRN]

*4) Pulse [PULS], Pulse without modulation [PWM]

*5) Not isolated from internal circuits.

*6) When communication cartridge is installed.

*7) The maximum capacity is 32 GB. DLOG/FB and TRACE/FB instructions are used to write data. For details, see L-071 to L-073.

Display Specifications

Touch/Pro (Display Model/Built-in LCD)

| Part No. | Touch | | Pro |
|-------------------------|--|---|---|
| Display Element | TFT color LCD | STN monochrome LCD | STN monochrome LCD |
| Colors/Shades | 65,536 colors | Monochrome 8 shades | Monochrome |
| Effective Display Area | 88.92 W x 37.05 H mm | 87.59 W x 35.49 H mm | 47.98 W x 18.22 H mm |
| Display Resolution | 240 W x 100 H pixels | | 192 W x 64 H pixels |
| View Angle | Left/right 40°, top 20°, bottom 60° | Left/right/top/bottom: 45° | Left/right 30°, top 20°, bottom 40° |
| Contrast Adjustment | Not possible | 32 levels | Not possible |
| Backlight | LED | LED (white, red, pink) | LED (green) |
| Backlight Life | 50,000 hours (Note 1) | | — |
| Brightness | 400 cd/m ² (Note 2) | 740 cd/m ² (Note 2) | 45 cd/m ² |
| Brightness Adjustment | 32 levels | | Not possible |
| Backlight Control | Auto off function | | On/off |
| Backlight Replacement | Not possible | | |
| Display Character Size | 1/4 Size | 8 x 8 pixels [JIS 8-bit code, ISO 8859-1 (Western European languages), ANSI 1250 (central Europe)], ANSI 1257 (Baltic), ANSI 1251 (Cyrillic) | — |
| | 1/2 Size | 8 x 16 pixels [JIS 8-bit code, ISO 8859-1 (Western European languages), ANSI 1250 (central Europe)], ANSI 1257 (Baltic), ANSI 1251 (Cyrillic) | 8 x 16 pixels [JIS 8-bit code, ISO 8859-1 (Western European languages), ANSI 1251 (Cyrillic)] |
| | | 16 x 32 pixels, 24 x 48 pixels, 32 x 64 pixels (Western European languages: ISO 8859-1) | — |
| | Full Size | 16 x 16 pixels (Japanese JIS first and second level characters, simplified Chinese, traditional Chinese, Korean) | 16 x 16 pixels (Japanese JIS first level characters, Chinese) |
| Double Size | 32 x 32 pixels (Japanese JIS first level characters, Mincho font) | — | |
| No. of Characters | 1/4 Size | 30 characters x 12 lines/screen | — |
| | 1/2 Size | 30 characters x 6 lines/screen | 24 characters x 4 lines |
| | Full Size | 15 characters x 6 lines/screen | 12 characters x 4 lines |
| | Double Size | 7 characters x 3 lines/screen | — |
| Character Magnification | 0.5x, 1x, 2x, 3x, 4x, 5x, 6x, 7x, 8x vertically and horizontally | | — |
| Character Attributes | Blink, reverse, bold, shadowed (blink is 1 sec or 0.5 sec) | | Blink, reverse |
| Graphics | Line, polyline, polygon, rectangle, circle, ellipse, arc, pie, equilateral polygons (3, 4, 5, 6, 8), fill, picture | | — |
| Window Display | 3 popup screens + 1 system screen | | — |

Note 1: The backlight life refers to the time until the brightness reduces by half after use at 25°C.

Note 2: Brightness of LCD only (monochrome LCD: when lit white).

Operation Specifications

Touch/Pro (Display/LCD Models)

| Part No. | Touch | Pro |
|----------------------|---|-------------------|
| Switching Element | Analog resistive membrane (touch panel) | Rubber switches |
| Operating Force | 0.2 to 2.5N | 2.0 N minimum |
| Mechanical Life | 1 million operations | 10,000 operations |
| Acknowledgment Sound | Electric Buzzer | Not provided |
| Multiple Press | Not possible | Possible |

HMI Function Specifications (Touch)

| | |
|-----------|---|
| Functions | Drawings, bit button, word button, goto screen button, key button, multi-button, keypad, selector switch, potentiometer, numerical input, character input, pilot lamp, picture display, message display, message switching display, alarm list display, alarm log display, numerical display, bar chart, line chart, pie chart, meter, calendar, bit write command, word write command, goto screen command, timer, script command, multi-command, system area, start time, Auto Backlight OFF, O/I Link, user communication, maintenance communication, DM Link Communication, PLC Link Communication (Note 1), alarm log, data log, operation log, data storage area, preventive maintenance, recipe, text group, global script, user account, project data transfer using external memory, downloading logged data in external memory, USB auto-run function |
|-----------|---|

Note 1: The up-to-date information on the connectable PLC can be obtained from <http://www.idec.com/language>.



Input Specifications (Touch/Pro/Lite)

| Part No. | Touch FT1A- | | | Pro/Lite FT1A- | | | | | | | | | | | | |
|--|---------------------------------------|-------------------------|---|---|-----------------------------------|--|-----------------------------------|-----------------------------------|---|----------------|----------------|------------------|----------------|----------------|-------------|--|
| | *12RA-* | *14KA-* | *14SA-* | H12RA B12RA | H12RC B12RA | H24RA B24RA | H24RC B24RC | H40RKA B40RKA | H40RSA B40RSA | H40RC B40RC | H48KA B48KA | H48SA B48SA | H48KC B48KC | H48SC B48SC | | |
| <p>APEM</p> <p>Switches & Pilot Lights</p> <p>Control Boxes</p> <p>Emergency Stop Switches</p> <p>Enabling Switches</p> <p>Safety Products</p> <p>Explosion Proof</p> <p>Terminal Blocks</p> <p>Relays & Sockets</p> <p>Circuit Protectors</p> <p>Power Supplies</p> <p>LED Illumination</p> <p>Controllers</p> <p>Operator Interfaces</p> <p>Sensors</p> <p>AUTO-ID</p> <p>FC6A</p> <p>FT1A</p> <p>FL1F</p> | Input Points | | 6 | | | 6 | 8 | 12 | 16 | 18 | 24 | 22 | 30 | | | |
| | Input Type | | Sink | Source | Sink | Sink | No-voltage (with contact) | Sink | Sink/Source | Source | Sink | Sink/Source | Source | Sink | Sink/Source | |
| | Input Voltage Range | | 0 to 28.8V DC | | | | | | | | | | | | | |
| | Rated Input Current | | 4.4 mA | 5.2 mA | 4.4 mA | No-voltage type and sink/source type: 5.3 mA, sink type: 4.4 mA, source type: 5.2 mA | | | | | | | | | | |
| | Input Impedance | | 5.5 kΩ | 4.7 kΩ | 5.5 kΩ | No-voltage type and sink/source type: 4.3 kΩ, sink type: 5.5 kΩ, source type: 4.7 kΩ | | | | | | | | | | |
| | Digital Input | Input Delay Time | OFF → ON | | | 2.5 μs + soft filter setting | | | 40 μs + filter value (high-speed input section: 2.5 μs + soft filter value) | | | | | | | |
| | | | ON → OFF | | | 5 μs + soft filter setting | | | 150 μs + filter value (high-speed input section: 5 μs + soft filter value) | | | | | | | |
| | Isolation | Between input terminals | Not isolated | | | Not isolated | | | | | | | | | | |
| | | Internal circuit | Not isolated | | | No-voltage type and sink/source type: optocoupler isolated, sink type and source type: not isolated | | | | | | | | | | |
| | Input Type | | Type 1 (IEC 61131-2) | | | | | | | | | | | | | |
| | External Load for I/O Interconnection | | Not needed | | | | | | | | | | | | | |
| | Operating Level | OFF voltage | Sink type: 5V DC max. Source type: 15V DC min. | | | No-voltage type: 18 kΩ min., sink/source type and sink type: 5 VDC max., source type: 15 VDC min. | | | | | | | | | | |
| | | ON voltage | Sink type: 15V DC min. Source type: 5V DC max. | | | No-voltage type: 2 kΩ max., sink/source type and sink type: 15 VDC min., source type: 5 VDC max. | | | | | | | | | | |
| | | OFF current | Sink type: 0.9 mA max. Source type: -1.0 mA min. | | | No-voltage type and sink/source type: 1.1 mA max., sink type: 0.9 mA max., source type: -1.0 mA min. | | | | | | | | | | |
| | | ON current | Sink type: 2.7 mA min. Source type: -3.0 mA max. | | | No-voltage type and sink/source type: 3.0 mA min., sink type: 2.7 mA min., source type: -3.0 mA max. | | | | | | | | | | |
| Analog Input | Input Points | | 2 | | 2 | 4 | 6 | 8 | | | | | | | | |
| | Input Type | | Voltage input | Voltage/Current input | Voltage input | Voltage input | Voltage input | Voltage input | | | | | | | | |
| | Input Range | | 0 to 10.0 VDC | 0 to 10.0 VDC / 4 to 20 mA | 0 to 10.0V DC | 0 to 10.0V DC | 0 to 10.0V DC | 0 to 10.0V DC | | | | | | | | |
| | Sampling Duration Time | | 2 ms maximum | | 2 ms maximum | 2 ms maximum | 2 ms maximum | 2 ms maximum | | | | | | | | |
| | Total Input System Transfer Time | | 3 ms + sampling time + scan time | 3 ms + sampling time + scan time (voltage input) 12 ms + sampling time + scan time (current input) | 2 ms + filtering time + scan time | 2 ms + filtering time + scan time | 2 ms + filtering time + scan time | 2 ms + filtering time + scan time | | | | | | | | |
| | Digital Resolution | | 0 to 1,000 (10 bits) | | 0 to 1,000 (10 bits) | 0 to 1,000 (10 bits) | 0 to 1,000 (10 bits) | 0 to 1,000 (10 bits) | | | | | | | | |
| | Input Error | 25°C | ±3% of full scale | | ±1.5% of full scale | ±1.5% of full scale | ±1.5% of full scale | ±1.5% of full scale | | | | | | | | |
| | | Total | ±5% of full scale | | ±5% of full scale | ±5% of full scale | ±5% of full scale | ±5% of full scale | | | | | | | | |
| | Isolation | Between input terminals | Not isolated | | Not isolated | Not isolated | Not isolated | Not isolated | | | | | | | | |
| | | Internal circuit | Not isolated | | Not isolated | Not isolated | Not isolated | Not isolated | | | | | | | | |
| When used as digital input | Digital I/O | | Type 1 (not conforming to IEC 61131-2 digital I/O type) | | | | | | | | | | | | | |
| | Operation Level | | OFF voltage: 5V maximum | | | | | | | | | | | | | |
| | | | ON voltage: 15V minimum | | | | | | | | | | | | | |
| | | | OFF current: 0.06 mA maximum | | | | | | | | | | | | | |
| External Power for Input | Input Voltage Range | | — | | — | — | 20.4 to 26.4V DC | — | 20.4 to 26.4V DC | — | — | 20.4 to 26.4V DC | | | | |
| | Output Current Capacity | | — | | — | — | 250 mA | — | 300 mA | — | — | 300 mA | | | | |

Output Specifications (Touch/Pro/Lite)

| Part No. | Touch FT1A- | | | Pro/Lite FT1A- | | | | | | | | | | | |
|--------------------------------------|---|---|---|-------------------------------|----------------|--|----------------|--|--|----------------|--|----------------|----------------|----------------|----|
| | *12RA-** | *14KA-** | *14SA-** | H12RA B12RA | H12RC B12RC | H24RA B24RA | H24RC B24RC | H40RKA B40RKA | H40RSA B40RSA | H40RC B40RC | H48KC B48KC | H48SC B48SC | H48KA B48KA | H48SA B48SA | |
| Transistor Output | Output Points Transistor Sink Output | 4 | — | 100% | — | — | — | 4 | — | — | 18 | — | 18 | — | |
| | Output Points Transistor Source Output | — | 4 | | | | | — | 4 | | — | — | 18 | — | 18 |
| | Rated Load Voltage | 24V DC | | | | | | 24V DC | | | 24V DC | | | | |
| | Input Voltage Range | 20.4 to 28.8V DC | | | | | | 20.4 to 28.8V DC | | | 20.4 to 28.8V DC | | | | |
| | Maximum Load Current 1 point 1 common | 0.3A maximum 1A maximum | | | | | | 0.3A maximum 1A maximum | | | 0.3A maximum 1A maximum | | | | |
| | Voltage Drop (ON Voltage) | 1V maximum (voltage between COM and output terminals when output is ON) | | | | | | 1V maximum (voltage between COM and output terminals when output is ON) | | | 1V maximum (voltage between COM and output terminals when output is ON) | | | | |
| | Inrush Current | 1A | | | | | | 1A | | | 1A | | | | |
| | Leakage Current | 0.1 mA maximum | | | | | | 0.1 mA maximum | | | 0.1 mA maximum | | | | |
| | Clamping Voltage | 39V ± 1V | | | | | | 39V ± 1V | | | 39V ± 1V | | | | |
| | Maximum Lamp Load | 8 W maximum | | | | | | 8 W maximum | | | 8 W maximum | | | | |
| | Inductive Load | L/R = 10 ms (28.8V DC, 1 Hz) | | | | | | L/R = 10 ms (28.8V DC, 1 Hz) | | | L/R = 10 ms (28.8V DC, 1 Hz) | | | | |
| | External Current Draw | 100 mA maximum, 24V DC | | | | | | 100 mA maximum, 24V DC (V terminal supply power) | | | 100 mA maximum, 24V DC (V terminal supply power) | | | | |
| | Isolation | Optocoupler isolated | | | | | | Optocoupler isolated | | | Optocoupler isolated | | | | |
| | Output Delay OFF → ON ON → OFF | 100µS max. 200µS max. | | | | | | Same common line: Not isolated Separate common line: isolated (*1) (*1) | | | Same common line: Not isolated Separate common line: isolated (*1) (*1) | | | | |
| 10A relay | Output Points | 4 | — | 4 | | | | | | | | | | | |
| | Output Type | 1NO contact | — | 1NO contact | | | | | | | | | | | |
| | Rated Load Current | 240V AC 10A, 30V DC 10A | — | 240V AC 10A, 30V DC 10A | | | | | | | | | | | |
| | Minimum Switching Load | 10 mA/5V DC (reference value) | — | 10 mA/5V DC (reference value) | | | | | | | | | | | |
| | Initial Contact Resistance | 100 mΩ maximum (1A, at 6V DC) | — | 100 mΩ maximum (1A, at 6V DC) | | | | | | | | | | | |
| 2A relay | Output Points | — | — | — | — | — | — | — | — | — | — | — | — | — | |
| | Output Points per Common Line COM4 COM5 COM6 | — | — | — | — | 4 | 4 | 8 | 8 | 12 | — | — | — | — | |
| | Output Type | — | — | — | — | — | — | — | — | — | — | — | — | — | |
| | Maximum Load Current 1 point 1 common | — | — | — | — | — | — | — | — | — | — | — | — | — | |
| Relay Output Common | Minimum Switching Load | — | — | — | — | — | — | — | — | — | — | — | — | — | |
| | Initial Contact Resistance | — | — | — | — | — | — | — | — | — | — | — | — | — | |
| | Electrical Life | 100,000 operations minimum (resistive load 1,800 operations/h) | — | — | — | — | 4 | 4 | 4 | 4 | 4 | — | — | — | |
| | Mechanical Life | 20 million operations minimum (no load 18,000 operations/h) | — | — | — | — | — | — | 4 | 4 | 4 | — | — | — | |
| Dielectric Strength | Between output terminal and internal circuit | 2,300V AC, 1 minute | — | — | — | — | — | — | — | 4 | — | — | — | — | |
| | Between output terminals (between COMs) | 2,300V AC, 1 minute | — | — | — | — | — | — | — | — | — | — | — | — | |
| Analog Output | Output Points | — | 2 | — | — | 240V AC 2A, 30V DC 2A | | | 240V AC 2A, 30V DC 2A | | | — | — | — | — |
| | Analog Output Signal Type | — | Voltage/Current output (Selectable) | — | — | 8A maximum | | | 8A maximum | | | — | — | — | — |
| | Analog Output Range | — | 0 to 10V DC / 4 to 20mA | — | — | 1 mA/5 VDC (reference value) | | | 1 mA/5 VDC (reference value) | | | — | — | — | — |
| | Load Impedance | — | 2kΩ min (voltage input) / 500 Ω max (current input) | — | — | 30 mΩ maximum (1A, at 6V DC) | | | 30 mΩ maximum (1A, at 6V DC) | | | — | — | — | — |
| | Applicable Load Type | — | Resistive Load | — | — | 100,000 operations minimum (resistive load 1,800 operations/h) | | | 100,000 operations minimum (resistive load 1,800 operations/h) | | | — | — | — | — |
| | Maximum Deviation at 25°C | — | ±0.3% of full scale | — | — | 20 million operations minimum (no load 18,000 operations/h) | | | 20 million operations minimum (no load 18,000 operations/h) | | | — | — | — | — |
| | Temperature Coefficient | — | ±0.02%/°C of full scale | — | — | 2,300V AC, 1 minute | | | 2,300V AC, 1 minute | | | — | — | — | — |
| | Repeatability After Stabilization Time | — | ±0.4% of full scale | — | — | 2,300V AC, 1 minute | | | 2,300V AC, 1 minute | | | — | — | — | — |
| | Non-linearity | — | ±0.01% of full scale | — | — | — | | | — | | | — | — | — | — |
| | Output Ripple | — | 30mV max. (spike noise not included) | — | — | — | | | — | | | — | — | — | — |
| | Overshoot | — | 0% (*2) | — | — | — | | | — | | | — | — | — | — |
| | Total Error | — | ±1.0% of full scale including ripple | — | — | — | | | — | | | — | — | — | — |
| Effect of Improper Output Connection | — | No damage | — | — | — | | | — | | | — | — | — | — | |
| Digital Resolution | — | 0 to 1,000 (10 bits) | — | — | — | | | — | | | — | — | — | — | |
| Output Value of LSB | — | 10mV (0-10V) / 16µA (4-20mA) | — | — | — | | | — | | | — | — | — | — | |
| Monotonicity | — | Yes | — | — | — | | | — | | | — | — | — | — | |
| Current loop open | — | Not detectable | — | — | — | | | — | | | — | — | — | — | |

*1) High-speed output terminal (100 kHz pulse output terminal): 5 µs max. Normal output terminal (including 5kHz pulse output terminal): 100 µs max.

*2) Overshoot may occur under light load conditions. Overshoot can be suppressed by inserting a damping resistor. Damping resistor value: approx. 150Ω including the input impedance.

Cartridges

Digital I/O Cartridge Specifications

Input Cartridge

| Part No. | FC6A-PN4 | |
|--|---|--------------------------------|
| Input Points | 4 (4/1 common) | |
| Rated Input Voltage | 12/24V DC sink/source input signal | |
| Input Voltage Range | 0 to 28.8V DC | |
| Rated Input Current | 2.5 mA/point (12V DC) 5mA/point (24V DC) | |
| Input Impedance | 4.4 kΩ | |
| OFF Voltage | 5V maximum | |
| ON Voltage | 8.5V minimum | |
| OFF Current | 0.9 mA maximum | |
| ON Current | 1.7 mA minimum (at 8.5V DC) | |
| Input Delay Time (24V DC) | Turn ON | 0.5ms |
| | Turn OFF | 0.5ms |
| Isolation | Between input terminals: Not isolated Internal circuit: Optocoupler-isolated | |
| External Load for I/O Interconnection | Not needed | |
| Signal Determination Method | Static | |
| Effect of Improper Input Connection | Both sink and source input signals can be connected. If any input exceeding the rated value is applied, permanent damage may be caused. | |
| Internal Current Draw | All Inputs ON | 35mA (3.3V DC) 0mA (24V DC) |
| | All Inputs OFF | 30mA (3.3V DC) 0mA (24V DC) |
| Internal Power Consumption (at 24V DC while all inputs ON) | 0.10W | |
| Cable Length | 3m in compliance with electromagnetic immunity | |
| Applicable Ferrule | 1-wire: AI 0.5-8 WH (Phoenix Contact) | |
| Weight (approx.) | 15g | |

Output Cartridge

| Part No. | FC6A-PTK4 | FC6A-PTS4 |
|---|---|--|
| Output Points | 4 sink (4/1 common) | 4 source (4/1 common) |
| Rated Input Voltage | 12/24V DC | |
| Input Voltage Range | 10.2 to 28.8V DC | |
| Maximum Load Current | Per Point | 0.1A |
| | Per Common | 0.4A |
| Output Delay | Turn ON | 450μs maximum |
| | Turn OFF | 450μs maximum |
| Isolation | Between input terminals: Not isolated Internal circuit: Optocoupler-isolated | |
| Voltage Drop (ON Voltage) | 1V max (voltage between COM and output terminal when output is on.) | |
| Inrush Current | 1A | |
| Leakage Current | 0.1mA maximum | |
| Clamping Voltage | Approx. 50V | |
| Maximum Lamp Load | 2.4W | |
| Inductive Load | L/R=10ms (28.8V DC, 1Hz) | |
| External Current Draw | 100mA maximum, 24V DC (power voltage at the +V terminal at source) | 100mA maximum, 24V DC (power voltage at the -V terminal at source) |
| Overcurrent Protection | No | |
| Internal Current Draw | All Outputs ON | 35mA (3.3V DC) 0mA (24V DC) |
| | All Outputs OFF | 30mA (3.3V DC) 0mA (24V DC) |
| Internal Power Consumption (at 24V DC while all outputs ON) | 0.10W | |
| Applicable Ferrule | 1-wire: AI 0.5-8 WH (Phoenix Contact) | |
| Weight (approx.) | 15g | |

FC6A

FT1A

FL1F

Cartridges

Analog Cartridges

Specifications

| Part No. | FC6A-PJ2A | | FC6A-PJ2CP | | FC6A-PK2AV | | FC6A-PK2AW | |
|------------------------|--------------------------------------|--|-------------------|--|--------------------------|--|---------------------------|--|
| Type | Voltage/Current Input | | Temperature Input | | Voltage Output | | Current Output | |
| Number of Input/Output | 2 | | 2 | | 2 | | 2 | |
| Rated Voltage | 5.0V, 3.3V (supplied from the Touch) | | | | | | | |
| Consumption Current | 5.0V: – 3.3V: 30mA | | | | 5.0V: 70mA 3.3V: 30mA | | 5.0V: 185mA 3.3V: 30mA | |
| Weight | 15g | | | | | | | |

Input Specifications

| Part No. | FC6A-PJ2A | | FC6A-PJ2CP | |
|---|---|---|--|---|
| Input Type | Voltage Input | Current Input | Resistance Thermometer | Thermocouple |
| Input Range | 0 to 10V DC | 4 to 20mA DC 0 to 20mA DC | Pt100: –200 to +850°C Pt1000: –200 to +600°C Ni100: –60 to +180°C Ni1000: –60 to +180°C 3-wire RTD | K: –200 to 1300°C J: –200 to 1000°C R: 0 to 1760°C S: 0 to 1760°C B: 0 to 1820°C E: –200 to 8200°C T: –200 to 400°C N: –200 to 1300°C C: 0 to 2315°C |
| Input Impedance | 1MΩ min. | 250Ω max. | 1MΩ min. | — |
| Allowable Conductor Resistance | — | | 10Ω max. | — |
| Input Detection Current | — | | Typ: 0.2mA, 1.0mA max. | — |
| AD Conversion | Sample Duration Time | 10ms | 250ms | |
| | Sample Interval | 20ms | 500ms | |
| | Total Input System Transfer Time | 20ms + 1 scan | 500ms + 1 scan | |
| | Type of Input | Single-ended input | | |
| | Operating Mode | Self-scan | | |
| | Conversion Method | SAR | | |
| Input Error | Maximum Error at 25°C | ±0.1% of full scale | ±0.1% of full scale | ±0.1% of full scale Cold junction compensation accuracy ±4.0°C or less Exceptions R, S thermocouple error: ±6.0°C (0 to 200 °C range only) B thermocouple error: Not guaranteed (0 to 300 °C range only) K, J, E, T, N thermocouple error: ±0.4% of full scale (0°C or lower range only) |
| | Temperature Coefficient | ±0.02%/°C of full scale | | |
| | Reproducibility After Stabilization Time | ±0.5% of full scale | | |
| | Non-linearity | ±0.01% of full scale | | |
| | Maximum Error | ±1.0% of full scale | | |
| | Digital Resolution | 4096 (12 bits) | Pt100: 10,500 (14 bits) Pt1000: 8,000 (13 bits) Ni100: 2,400 (12 bits) Ni1000: 2,400 (12 bits) | K: 15,000 (14 bits) J: 12,000 (14 bits) R: 17,600 (15 bits) S: 17,600 (15 bits) B: 18,200 (15 bits) E: 10,000 (14 bits) T: 6,000 (13 bits) N: 15,000 (14 bits) C: 23,150 (15 bits) |
| Data | LSB Input Value | 2.44mV (0 to 10V DC) | 4.88µA (DC0 to 20mA) 3.91µA (DC4 to 20mA) | 0.1°C 0.18°F |
| | Data Format in Application | Can be arbitrarily set for each channel in the range of –32,768 to 32,773 | | |
| | Monotonicity | Yes | | |
| | Maximum Temporary Deviation during Electrical Noise Tests | ±4.0% of full scale | | |
| Noise Resistance | Recommended Cable | Shielded twisted pair | Twisted pair | |
| | Crosstalk | 1LSB max. | | |
| Isolation | None | | | |
| Effect When Input is Incorrectly Wired | No damage | | | |
| Maximum Allowable Constant Load (non-destructive) | 13V DC | 40mA | 13V DC | |
| Input Type Modification | Software programming | | | |
| Calibration to Maintain Rated Accuracy | Impossible | | | |

Output Specifications

| Part No. | FC6A-PK2AV | | FC6A-PK2AW | |
|--|---|-------------------------|-----------------------|--|
| Type | Voltage Output | | Current Output | |
| Output Type | Voltage Output | 0 to 10V DC | — | |
| | Current Output | — | 4 to 20mA DC | |
| Load | Impedance | 2kΩ min. | 500 kΩ max. | |
| | Load Type | Resistance Load | | |
| D/A Conversion | Cycle Time | 20ms | | |
| | Settling Time | 40ms max. | 20ms max. | |
| | Total Output System Transfer Type | 60ms+1 scan | 40ms+1 scan | |
| Output error | Maximum Error at 25°C | ±0.3% of full scale | | |
| | Temperature Coefficient | ±0.02%/°C of full scale | | |
| | Reproducibility after Stabilization Time | ±0.4% of full scale | | |
| | Non-linearity | ±0.01% of full scale | | |
| | Output Ripple | 30mV max. | | |
| | Overshoot | 0% | | |
| Data | Maximum Error | ±1.0% of full scale | | |
| | Effect of Improper Output Terminal Connection | No damage | | |
| | Digital Resolution | 4096 (12 bits) | | |
| | LSB Output Value | 2.44mV (0 to 10V) | 3.91µA (4 to 20mA) | |
| Noise Resistance | Data Format in Application | 0 to 4095 (0 to 10V) | 0 to 4095 (4 to 20mA) | |
| | Monotonicity | Yes | | |
| | Open Current Loop | — | Cannot be detected | |
| Isolation | Maximum Temporary Deviation during Electrical Noise Tests | ±4.0 of full scale | | |
| | Recommended Cable | Shielded twisted pair | | |
| | Crosstalk | 1 LSB max. | | |
| Calibration to Maintain Rated Accuracy | Impossible | | | |
| Selection of Output Signal Type | Voltage output only | | Current output only | |

Applicable Wire

| Cartridge Part No. | FC6A-PJ2A | FC6A-PJ2CP | FC6A-PK2AV | FC6A-PK2AW |
|--------------------|--|---|--|------------|
| Applicable Wire | 0.3mm ² (AWG22) shielded twisted pair | 0.3mm ² (AWG22) twisted pair | 0.3mm ² (AWG22) shielded twisted pair | |

- APEM
- Switches & Pilot Lights
- Control Boxes
- Emergency Stop Switches
- Enabling Switches
- Safety Products
- Explosion Proof
- Terminal Blocks
- Relays & Sockets
- Circuit Protectors
- Power Supplies
- LED Illumination
- Controllers
- Operator Interfaces
- Sensors
- AUTO-ID
- FC6A
- FT1A
- FL1F

FT1A Controllers

Expansion Communication Cartridges

Specifications

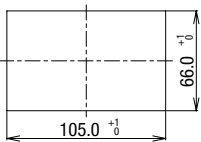
| Part No. | FT1A-PC1 | FT1A-PC2 | FT1A-PC3 |
|---|--|---|--|
| Termination Connector | Mini DIN | Mini DIN | Screw Terminal block |
| Standards | EIA RS232C | EIA RS485 | EIA RS485 |
| Maximum Baud Rate | 115,200 bps | 115,200 bps | 115,200 bps |
| Communication Functions | Maintenance communication, User communication, Modbus RTU master/slave | Maintenance communication, User communication, odbus RTU master/slave | Maintenance communication, User communication, Modbus RTU master/slave |
| Isolation between Internal Circuit and Communication Port | Not isolated | Not isolated | Not isolated |
| Recommended Communication Cable | Special cable | Special cable | Twisted-pair shielded cable with a minimum core wire of 0.3 mm ² (Conductor resistance 85 Ω/km maximum, shield resistance 20 Ω/km maximum) |
| Maximum Cable Length | — | — | 200m |

Mounting Hole Layout

Touch

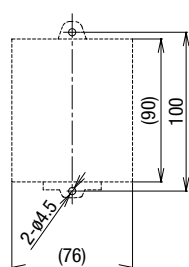
FT1A-*12RA-*

FT1A-*14*A-*

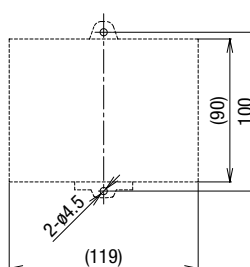


Pro/Lite

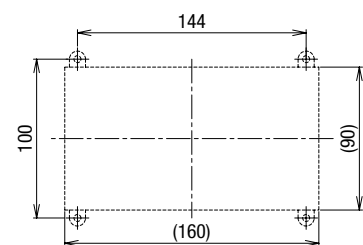
FT1A-*12**



FT1A-*24**



FT1A-*40**/FT1A-*48**

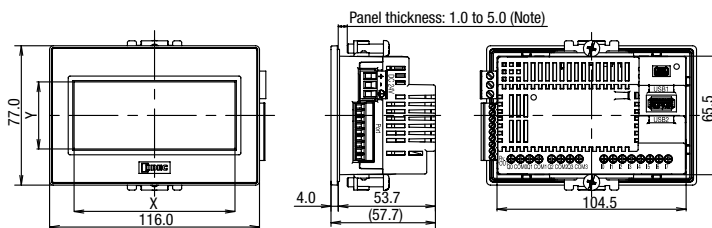


All dimensions in mm.

Dimensions

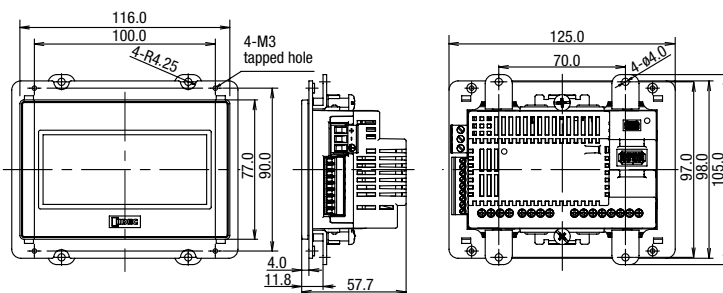
Touch (Display Model) / Relay Output Model (FT1A-12RA-*)

When using mounting bracket (HG9Z-4K2PN04)



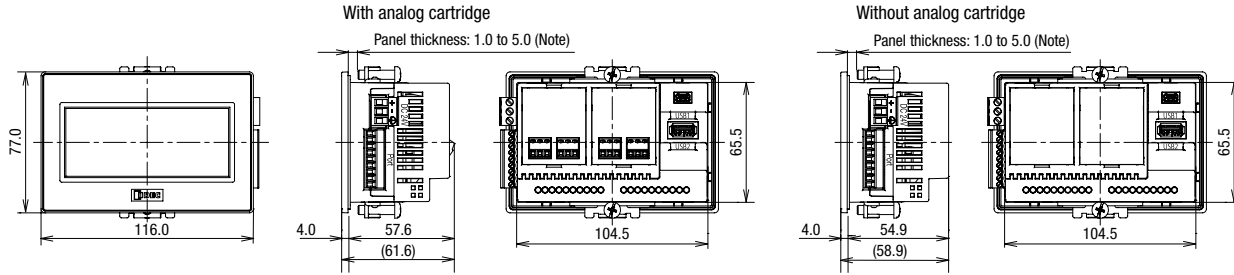
Note: Waterproof characteristic may not be obtained depending on the panel material and size.

When using rear mount adapter (FT9Z-1A01)



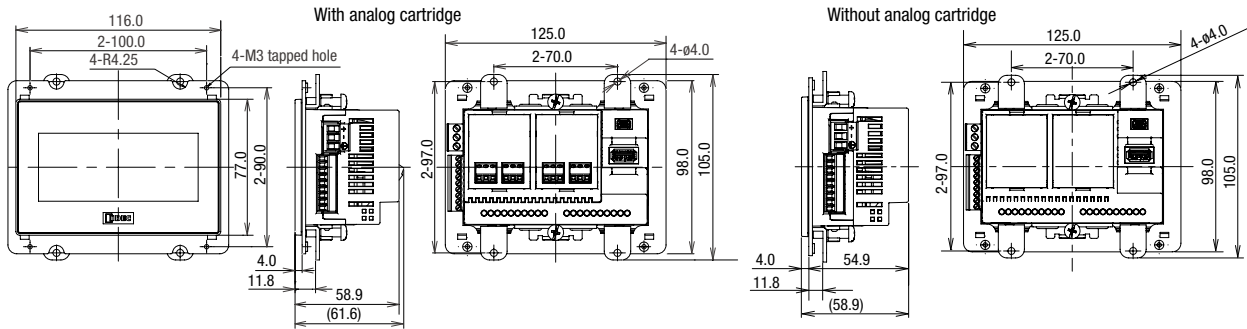
Dimensions

Touch (Display Model)/Transistor Output Model (FT1A-14KA-* / FT1A-14SA-*)
When using mounting bracket (HG9Z-4K2PN04)



Note: Waterproof characteristic may not be obtained depending on the panel material and size.

When using rear mount adapter (FT9Z-1A01)



Pro (LCD Model)

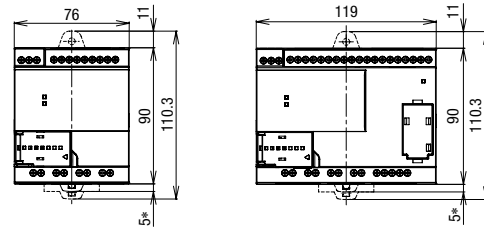
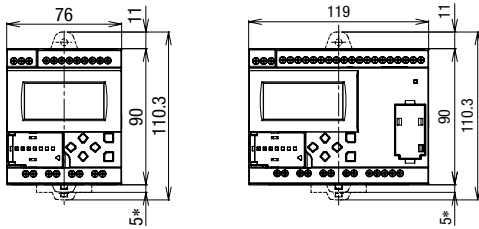
Lite (No LCD Model)

FT1A-H12*A/*C

FT1A-H24*A/*C

FT1A-B12*A/*C

FT1A-B24*A/*C



FT1A-H40*A/*C

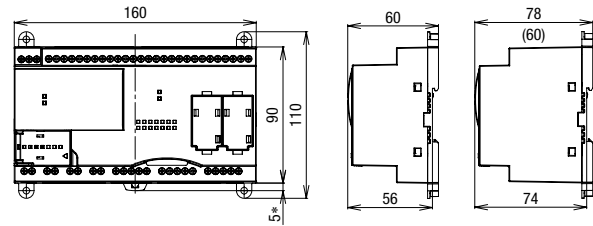
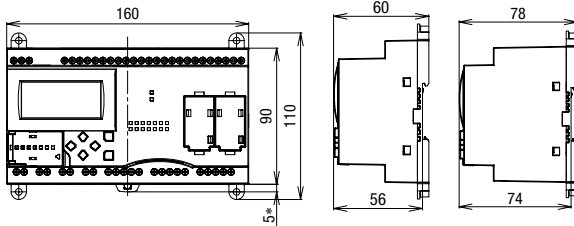
FT1A-H***A

FT1A-H***C

FT1A-B40*A/*C

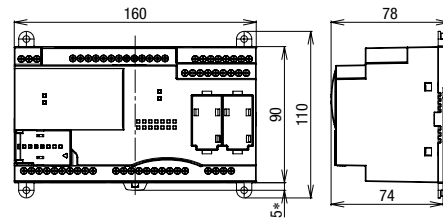
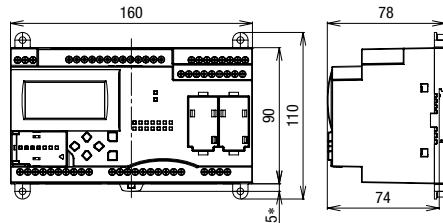
FT1A-B***A

FT1A-B***C



FT1A-H48*A/*C

FT1A-B48*A/*C



Note: 9.3 mm when the clamp is pulled out.

Note: 9.3 mm when the clamp is pulled out.

All dimensions in mm.

APEM

Switches & Pilot Lights

Control Boxes

Emergency Stop Switches

Enabling Switches

Safety Products

Explosion Proof

Terminal Blocks

Relays & Sockets

Circuit Protectors

Power Supplies

LED Illumination

Controllers

Operator Interfaces

Sensors

AUTO-ID

FC6A

FT1A

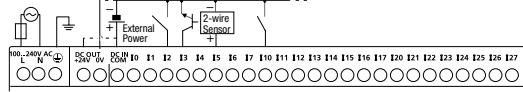
FL1F

Terminal Arrangement and I/O Wiring Diagram Examples

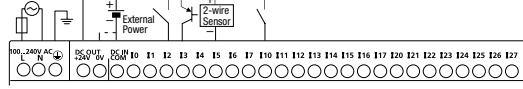
Pro/Lite (LCD/No LCD Models)

FT1A-*40RC

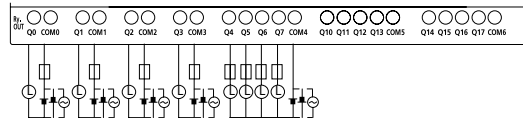
Input Side
Source Input



Sink Input



Output Side

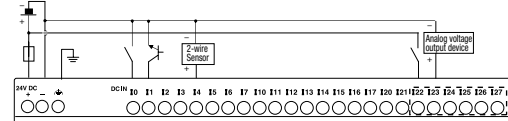


For terminal arrangement and I/O wiring diagram, see Instruction Sheet.

FT1A-*40RKA

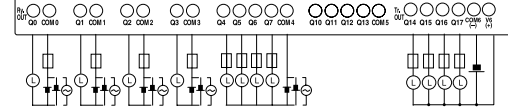
Input Side

Source Input (Analog/Digital Shared Input) is Sink Input



Output Side

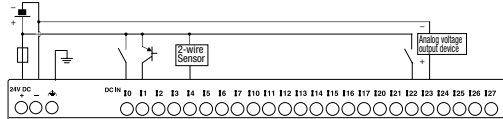
Sink Output (transistor output)



FT1A-*40RSA

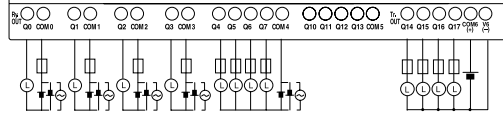
Input Side

Sink Input



Output Side

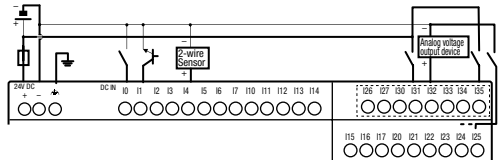
Source Output (transistor output)



FT1A-*48KA

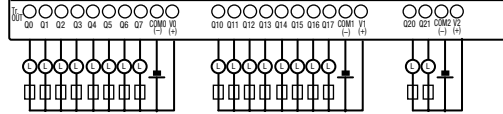
Input Side

Source Input (Analog/Digital Shared Input)



Output Side

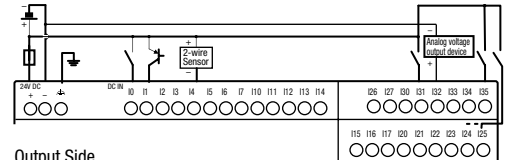
Sink Output



FT1A-*48SA

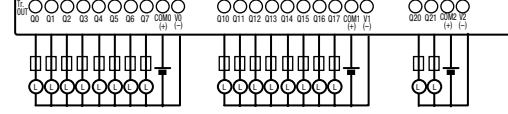
Input Side

Sink Input



Output Side

Source Output



Recommended Ferrules for Touch/Pro/Lite Terminals

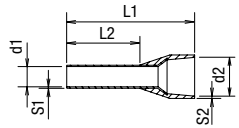
Touch (LCD Model), Pro/Lite (LCD/No Models)

(All dimensions in mm)

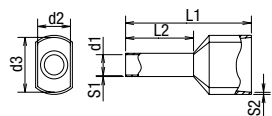
| Type | Cross Section (mm ²) | AWG | Phoenix Contact Part No. | Ordering No. | Package Quantity | Touch | | | | Pro/Lite | | FC6A Cartridge | L1 | L2 | d1 | S1 | d2 | d3 | S2 |
|-------------------|----------------------------------|-------------------|--------------------------|--------------|------------------|--------------|------------------|--------------------|-------------------------|--------------|------|----------------|------|------|------|------|------|------|------|
| | | | | | | Power Supply | Serial Interface | Relay Output Model | Transistor Output Model | Power Supply | I/O | | | | | | | | |
| 1-wire connection | 0.25 | 24 | AI 0.25-6 BU | 3203040 | 100 | — | — | — | — | — | × | 10.5 | 6.0 | 0.8 | 0.15 | 1.8 | — | 0.25 | |
| | 0.34 | 22 | AI 0.34-6 TQ | 3203053 | 100 | — | — | — | — | — | × | 10.5 | 6.0 | 0.8 | 0.15 | 1.8 | — | 0.25 | |
| | | | AI 0.34-8 TQ | 3203066 | 100 | × | × | × | × | — | — | 12.5 | 8.0 | 0.8 | 0.15 | 2.0 | — | 0.25 | |
| | 0.5 | 20 | AI 0.5-6 WH | 3200687 | 100 | — | — | — | — | — | × | 12.0 | 6.0 | 1.1 | 0.15 | 2.5 | — | 0.3 | |
| | | | AI 0.5-8 WH | 3200014 | 100 | × | × | × | × | × | — | 14.0 | 8.0 | 1.1 | 0.15 | 2.5 | — | 0.25 | |
| | 0.75 | 18 | AI 0.75-8 GY | 3200519 | 100 | × | — | × | — | — | — | 14.0 | 8.0 | 1.3 | 0.15 | 2.8 | — | 0.25 | |
| | | | AI 1-8 RD | 3200030 | 100 | × | — | — | — | — | × | 14.0 | 8.0 | 1.5 | 0.15 | 3.0 | — | 0.3 | |
| 1.0 | 16 | AI 1-10 RD | 3200182 | 100 | — | — | × | — | — | — | 16.0 | 10.0 | 1.5 | 0.15 | 3.0 | — | 0.3 | | |
| | | AI 1.5-8 BK | 3200043 | 100 | × | — | — | — | — | × | 14.0 | 8.0 | 1.8 | 0.15 | 3.4 | — | 0.3 | | |
| 1.5 | 16 | AI 1.5-10 BK | 3200195 | 100 | — | — | × | — | — | — | 18.0 | 10.0 | 1.8 | 0.15 | 3.4 | — | 0.3 | | |
| | | AI-TWIN2×0.5-8 WH | 3200933 | 100 | × | × | — | × | — | — | 15.0 | 8.0 | 1.5 | 0.15 | 2.5 | 4.6 | 0.25 | | |
| 2-wire connection | 0.5 | 20 | AI-TWIN2×0.75-8 GY | 3200807 | 100 | × | — | — | — | × | — | 15.0 | 8.0 | 1.8 | 0.15 | 2.8 | 5.2 | 0.25 | |
| | | | AI-TWIN2×0.75-10 GY | 3200975 | 100 | — | — | × | — | — | × | — | 17.0 | 10.0 | 1.8 | 0.15 | 2.8 | 5.2 | 0.25 |
| Screwdriver | 0.6×3.5 | 10 | SZS | 1205053 | 10 | × | — | × | — | × | — | — | — | — | — | — | — | — | |
| | | | SZS | 1205037 | 10 | — | × | — | × | — | — | — | — | — | — | — | — | — | — |

Note: Crimping pliers - Phoenix Contact part number CRIMPFOX 6 (1212034)

For 1-wire connection



For 2-wire connection



All dimensions in mm.

- APEM
- Switches & Pilot Lights
- Control Boxes
- Emergency Stop Switches
- Enabling Switches
- Safety Products
- Explosion Proof
- Terminal Blocks
- Relays & Sockets
- Circuit Protectors
- Power Supplies
- LED Illumination
- Controllers
- Operator Interfaces
- Sensors
- AUTO-ID

FT1A Controllers

Instructions

Basic Instructions (Touch/Pro/Lite)

| Instructions | Function |
|--------------|--|
| LOD | Stores intermediate results and reads contact status |
| LODN | Stores intermediate results and reads inverted contact status |
| AND | Series connection of NO contact |
| ANDN | Series connection of NC contact |
| OR | Parallel connection of NO contact |
| ORN | Parallel connection of NC contact |
| ANDL0D | Series connection of circuit blocks |
| ORL0D | Parallel connection of circuit blocks |
| BPS | Saves the result of bit logical operation temporarily |
| BRD | Reads the result of bit logical operation which was saved temporarily |
| BPP | Restores the result of bit logical operation which was saved temporarily |
| OUT | Outputs the result of bit logical operation |
| OUTN | Output the inverted result of bit logical operation |
| SET | Sets output, internal relay, or shift register bit |
| RST | Resets output, internal relay, or shift register bit |
| TMS | Subtracting 1-ms on-delay timer (0 to 65.535 sec) |
| TMH | Subtracting 10-ms on-delay timer (0 to 655.35 sec) |
| TIM | Subtracting 100-ms on-delay timer (0 to 6553.5 sec) |
| TML | Subtracting 1-sec on-delay timer (0 to 65535 sec) |
| TMSO | Subtracting 1-ms off-delay timer (0 to 65.535 sec) |
| TMHO | Subtracting 10-ms off-delay timer (0 to 655.35 sec) |
| TIMO | Subtracting 100-ms off-delay timer (0 to 6553.5 sec) |
| TMLO | Subtracting 1-sec off-delay timer (0 to 65535 sec) |
| CNT | Adding counter (0 to 65,535) |
| CNTD | Double-word adding counter (0 to 4,294,967,295) |
| CDP | Dual pulse reversible counter (0 to 65,535) |
| CDPD | Double-word dual pulse reversible counter (0 to 4,294,967,295) |
| CUD | Up/down selection reversible counter (0 to 65,535) |
| CUDD | Double-word up/down selection reversible counter (0 to 4,294,967,295) |
| CC= | Equal to comparison of counter current value |
| CC≥ | Greater than or equal to comparison of counter current value |
| DC= | Equal to comparison of data register value |
| DC≥ | Greater than or equal to comparison of data register value |
| SFR | Forward shift register |
| SFRN | Reverse shift register |
| SOTU | Rising-edge differentiation output |
| SOTD | Falling-edge differentiation output |
| JMP | Jumps a designated program area |
| JEND | Ends a jump instruction |
| MCS | Starts a master control |
| MCR | Ends a master control |
| END | Ends a program |

Advanced Instructions (Touch/Pro/Lite continued)

| Instructions | Name |
|-----------------|----------------------------|
| RAD | Degree to Radian |
| DEG | Radian to Degree |
| SIN | Sine |
| COS | Cosine |
| TAN | Tangent |
| ASIN | Arc Sine |
| ACOS | Arc Cosine |
| ATAN | Arc Tangent |
| LOGE | Natural Logarithm |
| LOG10 | Common Logarithm |
| EXP | Exponent |
| POW | Power |
| ANDW | AND Word |
| ORW | OR Word |
| XORW | Exclusive OR Word |
| SFTL | Shift Left |
| SFTR | Shift Right |
| BCDLS | BCD Left Shift |
| WSFT | Word Shift |
| ROTL | Rotate Left |
| ROTR | Rotate Right |
| HTOB | Hex to BCD |
| BTOH | BCD to Hex |
| HTOA | Hex to ASCII |
| ATOH | ASCII to Hex |
| BTOA | BCD to ASCII |
| ATOB | ASCII to BCD |
| ENCO | Encode |
| DECO | Decode |
| BCNT | Bit Count |
| ALT | Alternate Output |
| CVDT | Convert Data Type |
| DTDV | Data Divide |
| DTCB | Data Combine |
| SWAP | Data Swap |
| TXDn (Note 1) | Transmit |
| RXDn (Note 1) | Receive |
| ETXDn (Note 1) | Transmit over Ethernet |
| ERXDn (Note 1) | Receive over Ethernet |
| LABEL | Label |
| LJMP | Label Jump |
| LCAL | Label Call |
| LRET | Label Return |
| DJNZ | Decrement Jump Non-zero |
| MSG (Note 2) | Message |
| IOREF | I/O Refresh |
| HSCRF (Note 3) | High-speed Counter Refresh |
| WEEK | Week Timer |
| YEAR | Yearly Timer |
| TADD | Time Addition |
| TSUB | Time Subtraction |
| HOURL | Hour Meter |
| HTOS | HMS to Sec |
| STOH | Sec to HMS |
| DTML | 1-sec Dual Timer |
| DTIM | 100-ms Dual Timer |
| DTMH | 10-ms Dual Timer |
| DTMS | 1-ms Dual Timer |
| TTIM | Teaching Timer |
| PULSn (Note 4) | Pulse Output |
| PWMn (Note 4) | Pulse Width Modulation |
| RAMPn (Note 4) | Ramp Pulse Output |
| ZRNn (Note 4) | Zero Return |
| ARAMPn (Note 4) | Advanced Ramp |
| DI | Disable Interrupt |
| EI | Enable Interrupt |
| XYFS | XY Format Set |
| CVXY | Convert X to Y |
| CVYX | Convert Y to X |
| PID (Note 5) | Perform PID control |
| AVRG | Average |
| FIFO | FIFO Format |
| FIEX | First-In Execute |
| FOEX | First-Out Execute |
| NDSRC | N Data Search |
| SCRPT | Script |
| DLOG (Note 6) | Data Logging |
| TRACE (Note 6) | Data Trace |

Note 1: Pro/Lite 24-I/O, 40-I/O, 48-I/O type only
 Note 2: Pro only
 Note 3: Touch, Pro/Lite DC power type only
 Note 4: Pro/Lite 40-I/O DC type and 48-I/O AC/DC type only
 Note 5: Touch transistor output model only (FT1A-*14SA/FT1A-*14KA)
 Note 6: Pro/Lite 40-I/O, 48-I/O only

Advanced Instructions (Touch/Pro/Lite)

| Instructions | Name |
|--------------|---|
| NOP | No Operation |
| MOV | Move |
| MOVN | Move Not |
| IMOV | Indirect Move |
| IMOVN | Indirect Move Not |
| IBMV | Indirect Bit Move |
| IBMVN | Indirect Bit Move Not |
| BMOV | Block Move |
| NSET | N Data Set |
| NRS | N Data Repeat Set |
| XCHG | Exchange |
| TCCST | Timer/Counter Current Value Store |
| CMP= | Compare Equal To |
| CMP<> | Compare Unequal To |
| CMP< | Compare Less Than |
| CMP> | Compare Greater Than |
| CMP<= | Compare Less Than or Equal To |
| CMP>= | Compare Greater Than or Equal To |
| ICMP>= | Interval Compare Greater Than or Equal to |
| LC= | Load Compare Equal To |
| LC<> | Load Compare Unequal To |
| LC< | Load Compare Less Than |
| LC> | Load Compare Greater Than |
| LC<= | Load Compare Less Than or Equal To |
| LC>= | Load Compare Greater Than or Equal To |
| ADD | Addition |
| SUB | Subtraction |
| MUL | Multiplication |
| DIV | Division |
| INC | Increment |
| ADD | Addition |
| SUB | Subtraction |
| MUL | Multiplication |
| DIV | Division |
| INC | Increment |
| DEC | Decrement |
| ROOT | Root |
| SUM | Sum |

Function Blocks

| Type | Symbol | Name and Diagram | Function |
|-------------------|--------|-----------------------------------|--|
| Input | I | Digital Input | Inputs ON/OFF information from an external to the SmartAXIS. |
| | SM | Special Internal Relay | Special internal relays can be used as bit inputs for FBs in the SmartAXIS. Special function is allocated to each special internal relay. |
| | R | Shift Register | Outputs ON/OFF state of a shift register device. |
| | AI | Analog Input | The analog input values (0 to 10V DC) for the analog input terminals are converted to digital values (0 to 1,000) and output. With the analog input linear conversion function, the analog input value can be linearly conversion within a range of -32,768 to 32,767. |
| Output | Q | Digital Output | Outputs ON/OFF information from the SmartAXIS to an external device. |
| | M | Internal Relay | A bit unit FB used internally by the SmartAXIS. |
| Logical Operation | AND | Logical AND | Implements logical AND for a maximum of four input signals (ON/OFF) and outputs the result. |
| | NAND | Negative Logical AND | Implements negative logical AND for a maximum of four input signals (ON/OFF) and outputs the result. |
| | OR | Logical OR | Implements logical OR for a maximum of four input signals (ON/ OFF) and outputs the result. |
| | NOR | Negative Logical OR | Implements negative logical OR for a maximum of four input signals (ON/OFF) and outputs the result. |
| | XOR | Exclusive Logical OR | Implements exclusive logical OR for a maximum of two input signals (ON/OFF) and outputs the result. |
| | NXOR | Negative Exclusive Logical OR | Implements negative exclusive logical OR for a maximum of two input signals (ON/OFF) and outputs the result. |
| | NOT | Negation | Outputs the result of negating the input signal (ON/OFF). |
| | SOTU | Shot up | Turns on the output for one scan when the input signal turns from off to on. |
| | SOTD | Shot down | Turns on the output for one scan when the input signal turns from on to off. |
| | TRUTH | Truth Table | A truth table for the output can be configured corresponding to the 16 patterns combination of the four input signals, and TRUTH FB outputs the result according to the table. |
| Timer | TIMU | On-delay Count Up Timer | After the execution input turns on, the output turns on when the on-delay time elapses. The current value is incremented from zero to the preset value. |
| | TIMD | On-delay Count Down Timer | After the execution input turns on, the output turns on when the on-delay time elapses. The current value is decremented from the preset value to zero. |
| | TIMOU | Off-delay Count Up Timer | When the execution input turns on, the output turns on. After the execution input turns off, the output turns off when the off-delay time elapses. The current value is incremented from zero to the preset value. |
| | TIMOD | Off-delay Count Down Timer | When the execution input turns on, the output turns on. After the execution input turns off, the output turns off when the off-delay time elapses. The current value is decremented from the preset values to zero. |
| | TIMCU | On/off-delay Timer | After the execution input turns on, the output turns on when the on-delay time elapses. After the execution input turns off, the output turns off when the off-delay time elapses. |
| | SPULS | Single Shot Pulse | After the execution input turns on, the output turns on for the configured time period. |
| | DTIM | Dual Timer | The output is turned on and off according to the configured ON and OFF time. |
| | RPULS | Random Pulse Output | The output is turned on for the length of random time within the configured range of time. |

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- AUTO-ID

- FC6A
- FT1A
- FL1F

FT1A Controllers

| | | | |
|-----------------------|-------|--|--|
| Counter | CNT | | When the clock input is turned on, the current value is incremented by one. The output turns on when the current value reaches the preset value. |
| | CUD | | When the clock input is turned on, the current value is incremented or decremented by one according to the up/down selection input. The current value is compared with ON/OFF thresholds. The output turns on or off according to the comparison result. |
| | HOUR | | Accumulates the ON duration of the execution input in hours, minutes, and seconds. The output turns on when the accumulated time reaches the configured time. |
| Shift Register | SFR | | When the execution input turns on, the shift registers are shifted to the specified shift direction. |
| Data Comparison | CMP | | Two inputs values are compared and the output turns on or off according to the comparison result. |
| | STTG | | The comparison input value and the ON/OFF thresholds are compared and the output turns on or off according to the comparison result. |
| | RCMP | | The comparison input value and the upper/lower limits are compared and the output turns on or off according to the comparison result. |
| Data Conversion | ALT | | Sets/resets the output. |
| Week Programmer | WEEK | | Compares the specified day of the week, ON time, and OFF time with the current time and outputs the result. |
| | YEAR | | Compares the specified date with the current date and outputs the result. |
| Interface (Note 1) | MSG | | Displays data such as text and device values on the LCD on the SmartAXIS Pro. |
| Pulse (Note 2) | PULS | | Outputs pulses at the specified frequency. |
| | PWM | | Outputs pulses at the specified frequency and duty cycle. |
| | RAMP | | Outputs pulses with the frequency change function. |
| | ZRN | | Outputs pulses with the different pulse frequency corresponding to the on/off state of a deceleration signal. |
| | ARAMP | | Output pulses with the frequency change function according to the settings configured in the frequency table. |
| Data Logging (Note 3) | DLOG | | Saves the values of the specified devices in the specified data format as a CSV file to the SD memory card. |
| | TRACE | | Saves the values of the previous number of scans for the specified device in the specified data format as a CSV file to the SD memory card. |
| Script | SCRPT | | Enables you to program complicated processing with the script language that supports conditional branching, logical operations, arithmetic operations, and functions. |
| Special | HSC | | Operates the high-speed counter configured in the function area settings. Turns on/off the high-speed counter gate input/reset input/clear input. |
| | RSFF | | When the set input turns on, the output turns on and keeps on. When the reset input turns on, the output turns off. |

Note 1: Pro only

Note 2: Pro/Lite 40-I/O DC type and 48-I/O AC/DC type only

Note 3: Pro/Lite 40-I/O, 48-I/O only

Note 4: Touch, Pro/Lite DC power type only

Scripts

| Type | Format | Description |
|--|--|---|
| Control statements | if | if ((Cond. expr.)){(Exe. line);} |
| | if else | if ((Cond. expr.)){(Exe. line1);} else{(Exe. line2);} |
| | if else if else | if ((Cond. expr1.)) {(Exe. line1);} else if ((Cond. expr2.)) {(Exe. line2);} else{(Exe. line3);} |
| | switch case default | switch (Cond. expr.) {case constant 1: (Cond. expr1.);break; case constant2: (Cond. expr2.); break; default: (Cond. expr3.);break;} |
| | while | while ((Cond. expr.)){(Exe. line);} |
| | break | break; |
| return | return; | |
| Relational operator | ==, !=, <, >, <=, >= | Two values are compared. |
| Logical operator | &&, , ! | Logical operation of two values (AND, OR, NOT). |
| Arithmetic operator | +, -, *, /, %, = | Addition, subtraction, multiplication, division, remainder, assignment |
| Bit operator | &, , ^, ~, <<, >> | Logical product (AND), logical sum (OR), exclusive logical sum (XOR), reverse, shift left, shift right |
| Bit function | Bit set | SET ([a]); |
| | Bit reset | RST ([a]); |
| | Bit reverse | REV ([a]); |
| Arithmetic operation | Maximum value | MAX([a], [b], [c]) |
| | Minimum value | MIN([a], [b], [c]) |
| | Exponential function | EXP([a]) |
| | Natural logarithm | LOGE([a]) |
| | Common logarithm | LOG10([a]) |
| | Exponentiation | POW([a], [b]) |
| | Square root | ROOT([a]) |
| | Sine | SIN([a]) |
| | Cosine | COS([a]) |
| | Tangent | TAN([a]) |
| | Arcsine | ASIN([a]) |
| | Arccosine | ACOS([a]) |
| | Arctangent | ATAN([a]); |
| | Conversion from angle to radian | RAD([a]); |
| | Conversion from radian to angle | DEG([a]); |
| Data type conversion | Conversion from BCD to Binary | BCD2BIN([a]) |
| | Conversion from binary to BCD | BIN2BCD([a]) |
| | Conversion from float32 to binary | FLOAT2BIN([a]) |
| | Conversion from binary to float32 | BIN2FLOAT([a]) |
| | Conversion from decimal to string character | DEC2ASCII([a], [b]) |
| | Conversion from string character to decimal | ASCII2DEC([a]) |
| | Data comparison and copy | MEMCMP([a], [b], [c]) |
| Character string operation | Data copy | MEMCPY([a], [b], [c]) |
| | Character string copy | STRCUT([a], [b], [c], [d]) |
| | Character number count | STRLEN([a]) |
| | Character string concatenation | STRCAT([a], [b]) |
| Character string search | STRSTR([a], [b]) | |
| Draw (Note 1) | Drawing of straight line | LINE([a], [b], [c], [d]) |
| | Drawing of rectangle | RECTANGLE([a], [b], [c], [d]) |
| | Drawing of circle and ellipse | CIRCLE([a], [b], [c], [d]) |
| Offset | Indirect specification | OFFSET([a], [b]) |
| Bit device ↔ word device Cross Operator Functions (Note 2) | Bit device (1 word length) to bit device (1 word length) | BITS2BITS([a], [b]) |
| | Bit device (1 word length) to Word device | BITS2WORD([a], [b]) |
| | Word device to bit device (1 word length) | WORD2BITS([a], [b]) |

Note 1: Touch (WindO/I-NV3) only

Note 2: Pro/Lite (WindLDR)

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