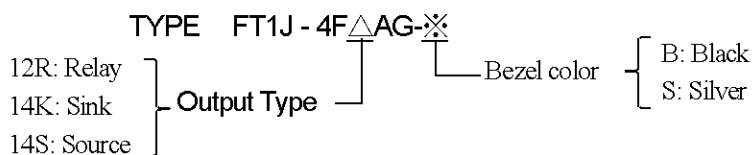


FT1J CONTROLLER WITH OPERATOR INTERFACE



1. Applicable standard

UL61010-1/61010-2-201 (UL-Listing)
 UL121201 (UL-Listing)
 CSA C22.2No.61010-1-12 (c-UL-Listing)
 CSA C22.2No.61010-2-201 (c-UL-Listing)
 CSA C22.2No.213 (c-UL-Listing)
 IEC/EN61131-2

2. Operating conditions

(1) Operating temperature	-20 to +55°C (no freezing)
(2) Operating humidity	10 to 95%RH (no condensation)
(3) Storage temperature	-20 to +70°C (no freezing)
(4) Storage humidity	10 to 95%RH (no condensation)
(5) Corrosion immunity	Free from corrosive gases
(6) Pollution degree	2

3. Rating

(1) Rated power voltage	24V DC
(2) Power voltage range	20.4 to 28.8V DC
(3) Power consumption	• Backlight off 3W maximum when not using USB1, USB2, IN, OUT, Slot 1, Slot 2 • 5W maximum when not using USB1, USB2, IN, OUT, Slot 1, Slot 2 • 15W maximum

4. Constructions

(1) Outside view	See attached sheet
(2) Degree of protection	When panel thickness is between 1mm and 1.6mm: IP65F (IEC 60529) When panel thickness is between 1.6mm and 5mm: IP66F, IP67F (IEC 60529), TYPE 4X (indoor use only), TYPE 13
(3) Bezel color (※)	Black(B), Silver(S)
(4) Mounting	Panel mount (panel thickness: 1.0 to 5.0mm)
(5) Weight (approx.)	320g

5. General Specifications

(1) Dielectric strength

500V AC, 5mA, 1 minute between power and FG terminals
 500V AC, 5mA, 1 minute between input and FG terminals
 2300V AC, 5mA, 1 minute between relay output and FG terminals
 500V AC, 5mA, 1 minute between transistor output and FG terminals
 500V AC, 5mA, 1 minute between power and transistor output terminals
 2300V AC, 5mA, 1 minute between power and relay output terminals
 500V AC 5mA, 1 minute between input and transistor output terminals
 2300V AC 5mA, 1 minute between input and relay output terminals

(2) Mechanical Specifications

(a) Vibration resistance

5 to 8.4Hz single amplitude 3.5mm,
 8.4 to 150Hz acceleration 9.8m/s²
 (10 times each in 3 axes)(IEC61131-2)

(b) Shock resistance

147m/s² 11ms (FT1J-4F14SAG-※, FT1J-4F14KAG-※)
 98 m/s² 11ms (FT1J-4F12RAG-※)
 (3 times in each in 3 axes)(IEC61131-2)

(3) First transient/burst

±2kV (power supply terminal)
 ±1kV (communication line)

(4) Electrostatic discharge

±6kV (contact discharge)
 ±8kV (air discharge)

(5) Voltage interruptions

10ms maximum (power supply voltage: 24.0V DC)
 5ms maximum (power supply voltage: 20.4V DC).

(6) Inrush Current

40A maximum

6. Display Specifications

(1) Display

TFT color LCD

(2) Color / Shade

16.77 million colors (24-bit color)

(3) Effective display area

95.04(W)×53.856(H) mm

(4) Display resolution

480(W)×272(H) dots

(5) Dot pitch

0.198 (W) x 0.198 (H) mm

(6) View angle

Left/Right/Top/ Bottom: 80°

(7) Backlight

White LED

(8) Backlight life

50,000 hours standard

(The time until brightness becomes 50% of the initial value)

(9) Brightness

500 cd/m²

(10) Brightness adjustment

32 levels

7. Operation Specifications

(1) Switching element

PCAP touchscreen (projected capacitive)

(2) Multiple press

Up to 2 points

(3) Acknowledgment sound

Electronic buzzer

8. Function Specifications

- | | |
|---|---|
| (1) Screen types | Base screen, popup screen, system screen |
| (2) Number of screens | Base screen: 3,000 maximum
Popup screen: 3,015 maximum |
| (3) User memory | HMI function :24MB approx.
Control function : 96KB (equivalent to 12,000 steps) |
| (4) Backup data(Stored in nonvolatile memory) | HMI function: HMI keep relay, HMI keep register, log data
Control function: Internal relay, shift register, counter, data register, special data register, special internal relay |
| (5) Calendar
(Stored in a largecapacity capacitor) | Year, Month, Day, Hour, Min., Sec., Day of Week
±60 sec per month (at 25°C) |
| (6) Clock backup time | 20 days (at operating temperature of 25°C)
Note : If the power is cut off for a certain amount of time, the clock data will be initialized to"00:00:00 January 1, 2000" at the next start up. Log data, HMI keep relay, HMI keep register is stored in a unvolatile memory so there is no backup time limit. |

9. Interface Specifications

9. 1 Power supply interface

- | | |
|---------------------|---------------------------------|
| (1) applicable wire | AWG24~AWG12 |
| (2) Connector | Detachable 3-pin terminal block |

9. 2 Serial interface(COM)

(1) RS232C

- | | |
|--------------------------------|---|
| (a) Electrical characteristics | EIA RS232C compliant |
| (b) Transmission speed | 1200/2400/4800/9600/19,200/38,400/57,600/115,200bps |
| (c) Synchronization | Asynchronous |
| (d) Control system | Hardware control or none |
| (e) Maximum cable length | 15m |

(2) RS422/485

- | | |
|--------------------------------|--|
| (a) Electrical characteristics | EIA RS422/485 compliant |
| (b) Transmission speed | 1200/2400/4800/9600/19,200/38,400/57,600/115,200/187,500bps
*187,500 bps is available only with SIEMENS SIMATIC S7-300/400 series (MPI port direct connection). |
| (c) Synchronization | Asynchronous |
| (d) Communication method | Half or full duplex |
| (e) Control system | None |
| (f) Maximum cable length | 1200m |

- | | |
|---------------|----------------------------------|
| (3) Connector | Detachable 10-pin terminal block |
|---------------|----------------------------------|

9. 3 Ethernet interface(LAN)

- | | |
|------------------------------|---|
| (1) Interface specifications | IEEE802.3u(10BASE-T/100BASE-TX) compliant |
| (2) Connector | Modular jack (RJ-45) |

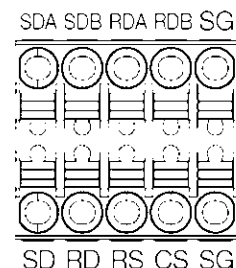
9. 4 USB interface(USB1/USB2)

(* USB output current varies depending on the mounting direction and ambient temperature)

- | | |
|------------------------------|----------------------|
| (1) Interface specifications | USB2.0 Host |
| (2) Connector | USB Type A connector |
| (3) Output current | 500mA maximum |

1 0. Serial Interface Connector Terminal Arrangement

Name	I/O	Function	Communication
SD	OUT	Send data	RS232C
RD	IN	Receive data	
RS	OUT	Request to send	
CS	IN	Clear to send	
SG	-	Signal ground	RS232C, RS422/485
SDA	OUT	Send data "+"	RS422/485
SDB	OUT	Send data "-"	
RDA	IN	Receive data "+"	
RDB	IN	Receive data "-"	



1 1. Performance Specifications

- (1) Instruction words(control function)
 - (a) Basic instructions 42
 - (b) Advanced instructions 109
- (2) Number of user program downloads 1000 times
- (3) Processing time(control function)
 - (a) Basic instructions 100μs/1000 steps
 - (b) END processing 2ms

(4) Built-in I/O points

Part No.		FT1J-4F14KAG-※	FT1J-4F14SAG-※	FT1J-4F12RAG-※
Input	Digital	6		
	Analog/Digital common	2		
Output	Relay	-	-	4
	Transistor sink	4	-	-
	Transistor source	-	4	-
	Analog	2		-

(5) Cartridge

- (a) Number of slots 2
- (b) Connectable cartridge types 7 (Digital I/O cartridges: 3, analog I/O cartridges: 4)
- (c) Expandable I/O points
Digital I/O: 8 maximum
Analog I/O: 4 maximum

(6) High-speed counter

- (a) Single/two-phase common 1 (2 times: 10kHz, 4 times: 5kHz)
- (b) Single phase only 4 (20kHz)

(7) Pulse output

	FT1J-4F14KAG-※	FT1J-4F14SAG-※	FT1J-4F12RAG-※
Number of points	4		-
Maximum response frequency	20KHz		-
Function	PULS and PWM instructions		-

(8) Number of devices (control function)

(a) Internal relay	6400
(b) Special internal relay	144
(c) Shift register	128
(d) Data register	4000
(e) Special data register	200
(f) Additional/reversible counters	200
(g) Timer(1ms, 10ms, 100ms, 1s)	200

1 2 . Input Specifications

1 2 . 1 Digital input

(1) Input points	6
(2) Input type	Sink (FT1J-4F14SAG-※、 FT1J-4F12RAG-※)/Source(FT1J-4F14KAG-※)
(3) Input voltage range	0 to 28.8V DC
(4) Rated input current	5.2mA/1point (Source), 4.6mA/1point (Sink)
(5) Input impedance	4.7k Ω (Source), 5.2k Ω (Sink)
(6) Input delay time	
(a) OFF \rightarrow ON	25 μ s + soft filter setting
(b) ON \rightarrow OFF	25 μ s + soft filter setting
(7) Isolation	
(a) Between input terminals	Not isolated
(b) Internal circuit	Not isolated
(8) Input type	Type1(IEC61131-2)
(9) External load for I/O interconnection	Not needed.
(1 0) Operating level	
(a) OFF voltage	5V DC maximum
(b) ON voltage	15V DC minimum
(c) OFF current	1.0mA maximum
(d) ON current	3.0mA minimum(Source), 2.9mA minimum (Sink)

1 2 . 2 Analog input (common digital input)

(1) Number of inputs	2
(2) Input style	Voltage/current input (selectable)
(3) Input range	0 to 10V DC / 4 to 20mA
(4) Sampling duration time	5ms maximum
(5) Total input delay time	6ms + 1 scan time
(6) Analog resolution	4096 (12 bit)
(7) Input error	
(a) 25 $^{\circ}$ C	\pm 3% of full scale
(b) Maximum	\pm 5% of full scale
(8) Isolation	
(a) Between input terminals	Not isolated
(b) Internal circuit	Not isolated

(9) When used as digital input

- | | |
|------------------------|---|
| (a) Digital input type | Type 1 (not conforming to IEC 61131-2) |
| (b) Operating Level | OFF voltage 5V DC maximum
ON voltage 15V DC minimum
OFF current 0.06mA maximum
ON current 0.20mA minimum |

1 3. Output Specifications

1 3. 1 Transistor output

- | | |
|-------------------------------|---|
| (1) Output type/ points | 4 |
| (2) Output style | Sink (FT1J-4F14KAG-※)/Source (FT1J-4F14SAG-※) |
| (3) Rated load voltage | 24V DC |
| (4) Input voltage range | 20.4 to 28.8V DC |
| (5) Maximum load current | 1 point 0.5A maximum, 1 common 2A maximum |
| (6) Voltage drop (ON voltage) | 1V maximum (voltage between COM and output terminals when on) |
| (7) Maximum inrush current | 1A |
| (8) Leakage current | 0.1mA maximum |
| (9) Inductive load | L/R = 10ms (28.8V DC, 1Hz) |
| (1 0) External current draw | 100mA maximum 24V DC |
| (1 1) Isolation | Photocoupler-isolated |
| (1 2) Output delay time | |
| (a) OFF → ON | 25μs maximum |
| (b) ON → OFF | 25μs maximum |

1 3. 2 Relay output

- | | |
|--------------------------------|--|
| (1) Output points | 4 |
| (2) Rated load current | 240V AC 2A
30V DC 2A
* If the output voltage exceeds 200V AC, use adjacent COM with a single power supply. |
| (3) Minimum switching load | 1mA/5V DC (reference value) |
| (4) Initial contact resistance | 30mΩ maximum |
| (5) Electrical life | 100,000 times min. (resistance load: 1800 operations/hour) |
| (6) Mechanical Life | 20 million times min. (no load: 18000 operations/hour) |

1 3. 3 Analog output

- | | |
|--|---|
| (1) Output points | 2 points |
| (2) Output type | Voltage/current output (selectable) |
| (3) Output range | 0 to 10V DC / 4 to 20mA |
| (4) Output load impedance | 2kΩ minimum (voltage), 500Ω maximum (current) |
| (5) Output load type | Resistive load |
| (6) Maximum error at 25°C | ±0.3% of full scale |
| (7) Temperature coefficient | ±0.02% of full scale/°C |
| (8) Reproducibility after stability time | ±0.4% of full scale |
| (9) Non-linearity | ±0.01% of full scale |
| (1 0) Output ripple | 30mV maximum |

(1 1) Overshoot	0%	*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
(1 2) Overall accuracy	±1.0% of full scale	
(1 3) Effects of improper output connection	None	
(1 4) Digital resolution	4096 (12 bit)	
(1 5) Monotonicity	Yes	
(1 6) Open current loop	Cannot be detected	