All-in-one touchscreen interface and logic controller

FT1A Touch

The FT1A SmartAXIS Touch combines operator interface and control in a single compact package, all programmable with IDEC's PC-based software. The FT1A Touch is available in 12 I/O and 14 I/O configurations with analog I/O expansion capability suitable for advanced analog monitoring and control.

KEY FEATURES

- 3.8" HMI+PLC
- Models with 12 or 14 I/O
- Embedded RJ45 Ethernet Port
- Modbus TCP or RTU
- Built-in 2 analog inputs
- Built-in 2 analog outputs
- Optional Analog Cartridges
- PID Controls
- USB Maintenance Port
- Seamless interface with other PLCs
- Class 1 Div. 2 Hazardous Locations
- -20 to 55 degree C operating temp.
- IP66f, Nema 4X (indoor), 13

General Specifications

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	9.2 W maximum	11W maximum
Allowable Momentary Power Interruption	10 ms maximum	
Dielectric Strength	Between power terminal and FE terminal: 500V AC, 5 mA, 1 minute Between power terminal and output terminal: 2,300V AC, 5 mA, 1 minute	Between power terminal and FE terminal: 500V AC, 5 mA, 1 minute 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 (Note 1) (Note 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) (Note 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

Note 1: FT1A-*12RA-* hardware version V130 (indicated on hardware) and earlier is UL, c-UL listed at 50°C (maximum operating temperature).
Note 2: See SmartAXIS Touch User's Manual FT9Y-B1390(2) for I/O derating.
Note 3: Operation not guaranteed when used with certain types of oils.

Function Specifications

Part Number			FT1A-*12RA-*	FT1A-*14KA-*	FT1A-*14SA-*
Control System			Stored program system		
Ladder Program	Instruction Words	Basic Instructions	42 types		
		Advanced Instructions	98 types	99 types	
	Program Capacity		Program size: 47.4 kB, Configuration memory capacity: 5 MB		
	Processing Time	Basic Instruction	1850μs/1,000 steps		
		END Processing	5 msec minimum		
FBD	FB		37 types		
	Program Capacity		Program size: 38kB, Configuration memory capacity: 5MB		
	No. of FB	FB (Note 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	Inputs		8 (V3.90 or above: 90 max. can be added with remote I/O master function)	8 (90 additional can be added with remote I/O master function)	
	Outputs		4 (V3.90 or above: 54 max. can be added with remote I/O master function)	4 (54 additional can be added with remote I/O master function)	
Analog Input			2 (V3.90 or above: 24 max. can be added with remote I/O master function)	2 (4 additional can be added with analog cartridge, and 24 max. can be added with remote master function)	
Analog Output			—	2 (4 additional 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)	
USB-mini B (Note 2)			×		
USB-A (Note 2)			×		
RS232C (Note 2)			×		
RS485/422 (Note 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-PK2AV, FC6A-PK2AW, FC6A-PJ2CP)	

Note 1: Except for timer, counter, input FB, and output FB.
Note 2: Not isolated from internal circuits.

Display Specifications

Display Element		TFT color LCD	STN monochrome LCD
Colors/Shades		65,536 colors	Monochrome 8 shades
Effective Display Area		88.92 W x 37.05 H mm	87.59 W x 35.49 H mm
Display Resolution		240 W x 100 H pixels	
View Angle		Left/right 40°, top 20°, bottom 60°	Left/right/top/bottom: 45°
Contrast Adjustment		Not possible	32 levels
Backlight		LED	LED (white, red, pink)
Backlight Life		50,000 hours (Note 1)	
Brightness		400 cd/m² (Note 2)	740 cd/m² (Note 2)
Brightness Adjustment		32 levels	
Backlight Control		Auto off function	
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)	
		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)	
	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	
	Full Size	15 characters x 6 lines/screen	
	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)	
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

Switching Element	Analog resistive membrane (touch panel)
Operating Force	0.2 to 2.5N
Mechanical Life	1 million operations
Acknowledgment Sound	Electric Buzzer
Multiple Press	Not possible

HMI Function Specifications

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, 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

Input Specifications

Part Number			*12RA-*	*14KA-*	*14SA-*
Digital Input	Input Points		6		
	Input Type		Sink	Source	Sink
	Input Voltage Range		0 to 28.8V DC		
	Rated Input Current		4.4 mA	5.2 mA	4.4 mA
	Input Impedance		5.5 kΩ	4.7 kΩ	5.5 kΩ
	Input Delay Time	OFF →ON	2.5 µs + soft filter setting		
		ON → OFF	5 µs + soft filter setting		
	Isolation	Between input terminals	Not isolated		
		Internal circuit	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.		
		ON voltage	Sink type: 15V DC min. Source type: 5V DC max.		
		OFF current	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.		
Analog Input	Input Points		2		
	Input Type		Voltage input	Voltage/Current input	
	Input Range		0 to 10.0 VDC	0 to 10.0 VDC / 4 to 20 mA	
	Sampling Duration Time		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)	
	Digital Resolution		0 to 1,000 (10 bits)		
	Input Error	25°C	±3% of full scale		
		Total	±5% of full scale		
	Isolation	Between input terminals	Not isolated		
		Internal circuit	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		
			ON current: 0.20 mA minimum		
External Power for Input		Input Voltage Range	—		
		Output Current Capacity	—		

Output Specifications

Part Number			*12RA-*	*14KA-*	*14SA-*
Transistor Output	Output Points	Transistor Sink Output	—	4	—
		Transistor Source Output		—	4
	Rated Load Voltage			24V DC	
	Input Voltage Range			20.4 to 28.8V DC	
	Maximum Load Current	1 point		0.3A maximum	
		1 common		1A maximum	
	Voltage Drop (ON Voltage)			1V maximum (voltage between COM and output terminals when output is ON)	
	Inrush Current			1A	
	Leakage Current			0.1 mA maximum	
	Clamping Voltage			39V ± 1V	
	Maximum Lamp Load			8 W maximum	
	Inductive Load			L/R = 10 ms (28.8V DC, 1 Hz)	
	External Current Draw			100 mA maximum, 24V DC	
	Isolation	Between output terminal and internal circuit		Photocoupler isolated	
		Between output terminals		Not isolated	
	Output Delay	OFF ON		100µS max.	
		ON OFF		200µS max.	
Relay Output Common	Electrical Life		100,000 operations minimum (resistive load 1,800 operations/h)	—	—
	Mechanical Life		20 million operations minimum (no load 18,000 operations/h)	—	—
	Dielectric Strength	Between output terminal and internal circuit	2,300V AC, 1 minute	—	—
		Between output terminals (between COMs)	2,300V AC, 1 minute	—	—
Analog Output	Output Points		—	2	
	Analog Output Signal Type			Voltage/Current output (Selectable)	
	Analog Output Range			0 to 10V DC / 4 to 20mA	
	Load Impedance			2kΩ min (voltage input) / 500 Ω max (current input)	
	Applicable Load Type			Resistive Load	
	Maximum Deviation at 25°C			±0.3% of full scale	
	Temperature Coefficient			±0.02%/°C of full scale	
	Repeatability After Stabilization Time			±0.4% of full scale	
	Non-linearity			±0.01% of full scale	
	Output Ripple			30mV max. (spike noise not included)	
	Overshoot			0% (Note 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	

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

Note 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.

Analog Expansion Cartridge Specifications (FC6A-P)

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			

Output Specifications

Part Number		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%	
	Maximum Error	±1.0% of full scale	
	Effect of Improper Output Terminal Connection	No damage	
Data	Digital Resolution	4096 (12 bits)	
	LSB Output Value	2.44mV (0 to 10V)	3.91µA (4 to 20mA)
	Data Format in Application	0 to 4095 (0 to 10V)	0 to 4095 (4 to 20mA)
	Monotonicity	Yes	
	Open Current Loop	—	Cannot be detected
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	±4.0 of full scale	
	Recommended Cable	Shieleded twisted pair	
	Crosstalk	1 LSB max.	
Isolation		None	
Calibration to Maintain Rated Accuracy		Impossible	
Selection of Output Signal Type		Voltage output only	Current output only

Applicable Wire

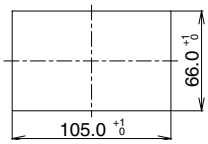
Cartridge Part No.	FC6A-PJ2A	FC6A-PJ2CP	FC6A-PK2AV	FC6A-PK2AW
Applicable Wire	0.3mm2 (AWG22) shielded twisted pair	0.3mm2 (AWG22) twisted pair	0.3mm2 (AWG22) shielded twisted pair	

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 800°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-liniarity	±0.01% of full scale			
	Maximum Error	±1.0% of full scale			
Data	**Digital Resolution**	4096 (12 bits)		Pt100: 10,500 (14 bits) Pt1000: 8000 (13 bits) Ni100: 2400 (12 bits) Ni1000: 2400 (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)
	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			
Noise Resistance	**Maximum Temporary Deviation during Electrical Noise Tests**	±4.0% of full scale			
	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			

Mounting Hole Layout

FT1A-∗12RA-∗
FT1A-∗14∗A-∗



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

LCD Active Area

LCD Type	X	Y
TFT	88.92	37.05
STN	87.59	35.49

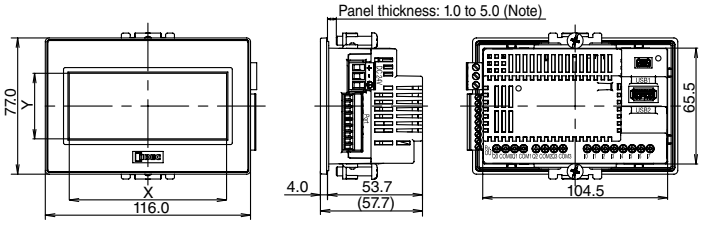
All dimensions in mm.

Dimensions

Relay Output Model (FT1A-12RA-∗)

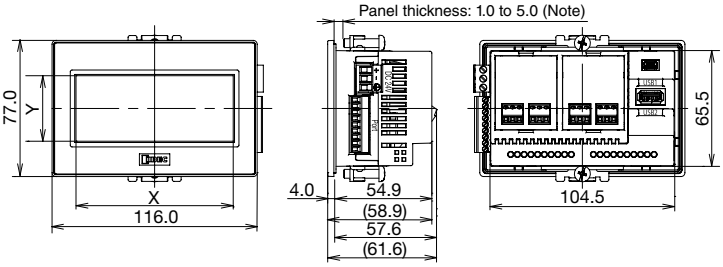
When using mounting bracket (HG9Z-4K2PN04)

All dimensions in mm.

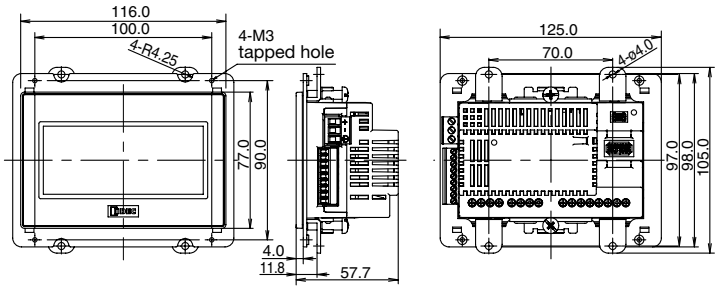


Transistor Output Model (FT1A-14KA-∗ / FT1A-14SA-∗)

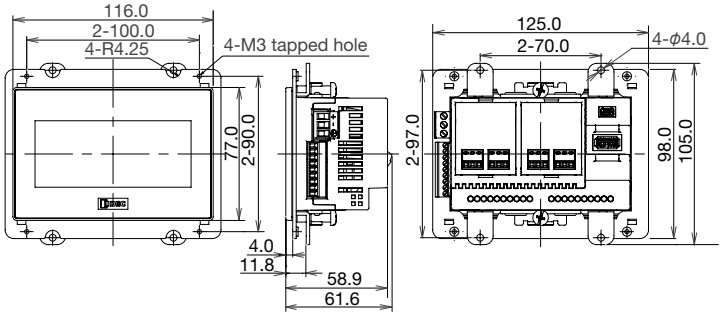
When using mounting bracket (HG9Z-4K2PN04)



When using rear mount adapter (FT9Z-1A01)



When using rear mount adapter (FT9Z-1A01)

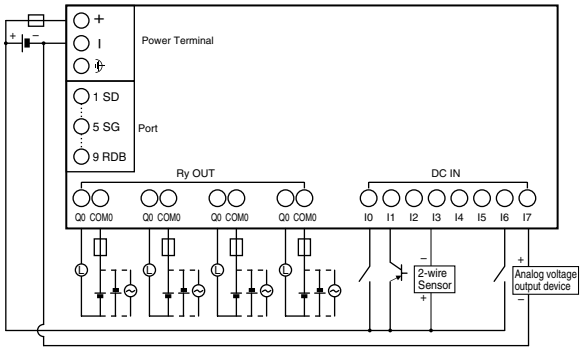


Terminal Arrangement and I/O Wiring Diagram Examples

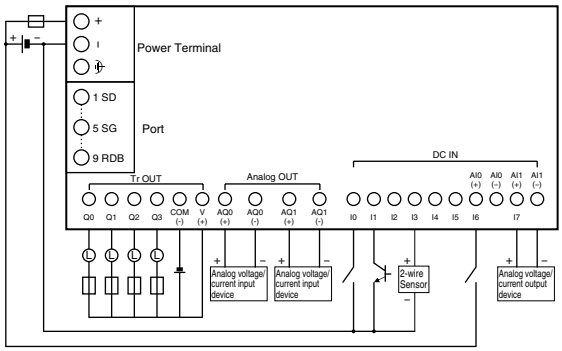
Touch (Display Model)

FT1A-∗12RA-∗

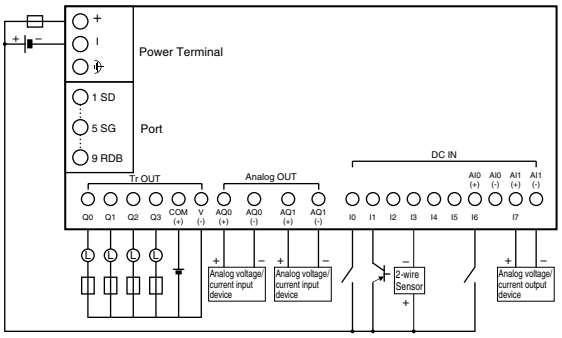
For terminal arrangement and I/O wiring diagram, see User's Manual.



FT1A-∗14KA-∗

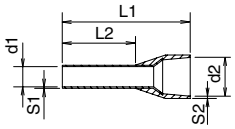


FT1A-∗14SA-∗

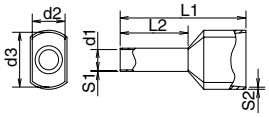


Recommended Ferrules

For 1-wire connection



For 2-wire connection



	Cross Section (mm2)	AWG	Phoenix Contact Part No.	Touch				Pro/Lite		L1	L2	d1	S1	d2	d3	S2
				Power Supply	Serial Interface	I/O Relay Output Model	I/O Transistor Output Model	Power Supply	I/O							
1-wire connection	0.25	24	AI0.25-8YE	—				×		12.5	8.0	0.8	0.15	1.8	—	0.25
	0.34	22	AI0.34-8TQ	×	×	×	×	—		12.5	8.0	0.8	0.15	2.0		0.25
	0.5	20	AI0.5-8WH	×	×	×	×			14.0	8.0	1.1	0.15	2.5		0.25
	0.75	18	AI0.75-8GY	×	—	×	—	—		14.0	8.0	1.3	0.15	2.8		0.25
	1.0		AI1-8RD	×		—		×		14.0	8.0	1.5	0.15	3.0		0.3
			AI1-10RD	—		×		—		16.0	10.0	1.5	0.15	3.0		0.3
	1.5	16	AI1.5-8BK	×		—		×		14.0	8.0	1.8	0.15	3.4		0.3
			AI1.5-10BK	—		×		—		18.0	10.0	1.8	0.15	3.4		0.3
2-wire connection	0.5	20	AI-TWIN2×0.5-8WH	×	×	—	×	—		15.0	8.0	1.5	0.15	2.5	4.6	0.25
	0.75	18	AI-TWIN2×0.75-8GY	×	—		—	×		15.0	8.0	1.8	0.15	2.8	5.2	0.25
			AI-TWIN2×0.75-10GY	—		×		—		17.0	10.0	1.8	0.15	2.8	5.2	0.25
Screwdriver			SZS 0.6×3.5	×	—	×	—	×								
			SZS 0.4×2.5	—	×	—	×	—								

Note: Crimping pliers - Phoenix Contact part number CRIMPFOX ZA3 (12101882)

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