



Think Automation and beyond...



FT1A Controller

Function Block Diagram (FBD) added!

NEW



Smart **AXIS**








Touch

Built-in LCD enables control and display


Pro/Lite

User-friendly interface for use in various applications

SmartAXIS Selection Guide

Specifications		Touch		Pro								
		 Color LCD	 Monochrome LCD									
Part No.		FT1A-*12RA-□		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		
No. of Inputs	Digital	6 points		6 points	8 points	12 points	16 points	18 points	18 points	24 points		
	Analog (digital compatible)	2 points		2 points	—	4 points	—	6 points	6 points	—		
No. of outputs	Transistor (sink output)		—		—	—	—	—	4 points	—	—	
	Transistor (source output)		—		—	—	—	—	4 points	—		
	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	
Ladder Program	Program Capacity		47.4kB (11,850 steps equivalent) Configuration Memory Capacity: 5MB		12kB (3,000 steps equivalent)		47.4kB (11,850 steps equivalent)		47.4kB (11,850 steps equivalent)			
	Instructions Processing Time	Basic Instruction Time	1,850µs/1,000 steps		950µs/1,000 steps							
		END Processing	5ms minimum		2ms							
FBD	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 (Note 1)	—	2 points (Note 1)	—	2 points (Note 1)	—	—		
	Single-phase	4 points (x10kHz)		2 points (x100kHz)	—	4 points (x100kHz)	—	4 points (x100kHz)	—	—		
Pulse Output	100kHz	—		—	—	—	—	2 points	2 points	—		
	5kHz	—		—	—	—	—	2 points	2 points	—		
Interface	USB Port		2 (USB-A, USB-miniB)		1 (Note 2)		1 (Note 2)		1 (Note 2)			
	Ethernet		1		—		1		1			
	Expansion Communication Ports	—		—		—		1		2		
		RS232C		1		—		1 max. (Note 3)		2 max. (Note 3)		
		RS422/485		1		—		1 max. (Note 3)		2 max. (Note 3)		
	SD Memory Card		—		—		—		1 (Note 4)			
Memory Cartridge		—		1		1		1				
Clock Function		✓		✓		✓		✓				
LCD		TFT color (65,536 colors) STN monochrome (pink/red/white backlight)		✓ (STN monochrome)		✓ (STN monochrome)		✓ (STN monochrome)				
Page		4		6		6		6				

* LCD: M (STN monochrome), C (TFT color) □ Bezel color: W (light gray), B (dark gray), S (silver)
 Note 1: Single-phase: 100kHz, two-phase: 50kHz, 2/4-edge Note 2: USB-miniB (maintenance port)
 Note 3: When expansion communication cartridge is installed. Note 4: SD memory card: 32GB max.

	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	—	—	
	18 points	—	18 points	—	—	—	—	—	4 points	—	—	18 points	—	18 points	—	
	—	18 points	—	18 points	—	—	—	—	—	4 points	—	—	18 points	—	18 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	—	—	—	—	
	47.4kB (11,850 steps equivalent)				12kB (3,000 steps equivalent)		47.4kB (11,850 steps equivalent)		47.4kB (11,850 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 (Note 1)		—		2 points (Note 1)		—		2 points (Note 1)		—		2 points (Note 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 (Note 2)				1 (Note 2)		1 (Note 2)		1 (Note 2)			1 (Note 2)				
	1				—		1		1			1				
	2				—		1		2			2				
	2 max. (Note 3)				—		1 max. (Note 3)		2 max. (Note 3)			2 max. (Note 3)				
	2 max. (Note 3)				—		1 max. (Note 3)		2 max. (Note 3)			2 max. (Note 3)				
	1 (Note 4)				—		—		1 (Note 4)			1 (Note 4)				
	1				1		1		1			1				
	✓				✓		✓		✓			✓				
	✓ (STN monochrome)				—		—		—			—				
	6				6		6		6			6				

SmartAXIS Touch

FT1A Controller



Small vivid LED display

Save installation space, wire, and time.

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

Actual Size



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.

USB Flash Drive

Easy log data saving

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

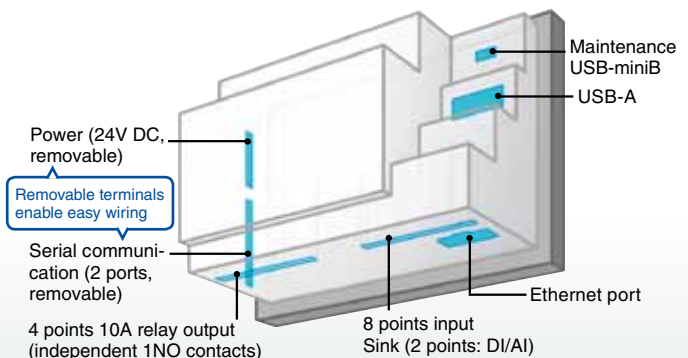


High Speed

High-speed counter

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

Structure





Vertical OK

SmartAXIS

TFT color LCD
3.8 inch
400 cd/m²

STN monochrome LCD
3.7 inch
740 cd/m²

Display Functions

Color LCD 65,536-color high-resolution TFT LCD

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



Monochrome 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.



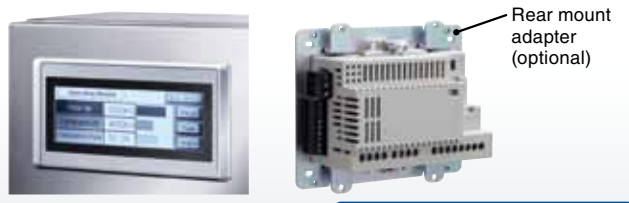
32-level Brightness Adjustment LED backlight dimming control

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

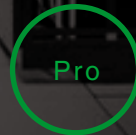
For other functions see page 8

SmartAXIS Pro/Lite

Control functions x Optimum control

Controls for various applications

Compact, easy-to-use controller. Independent dual axis, high-speed counter, and interrupt input are available. Equipped with an LCD, HMI functions such as messages, monitoring, and parameters can be changed easily. Status monitoring and maintenance is possible to enhance productivity.



(Photo: when cartridge is used)

Control Functions

Fast Processing Speed

Stable and efficient processing

Basic instructions processing time: 950 μ s/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.

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.

[See page 9](#)



(Photo: when cartridge is used)

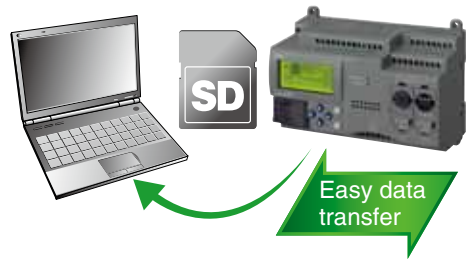
Lite

SmartAXIS Lite is a controller without an LCD. Ideal for use in a control panel where there is no need for user operation.



SD Memory Card Easy log data saving

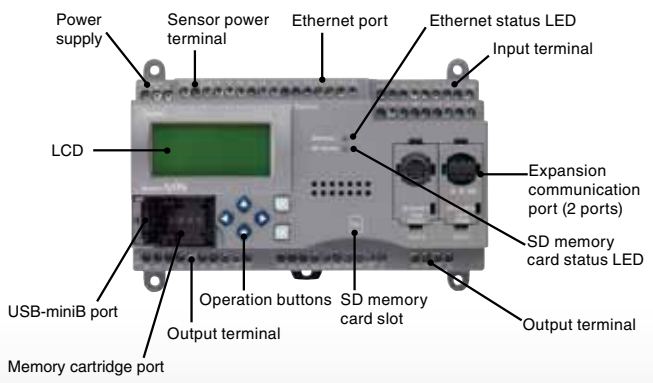
Data can be saved or transferred by using an SD memory card. Saved data can be read via Ethernet. Up to 64 data registers can be saved at the same time. Can store up to 4 data per second (depends on the program processing speed.)



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



For other functions see page 8 ▶

SmartAXIS Functions

Touch/Pro/Lite Functions

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.



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).



Clock

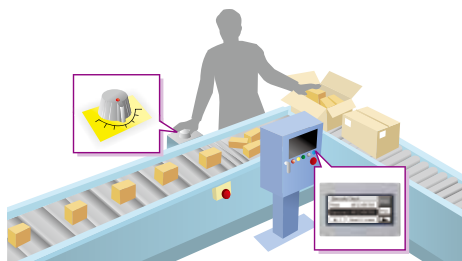
Easy time schedule control using "Clock Function"

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)



Security

Password protection for secure system operation

Protect systems and programs using a password.

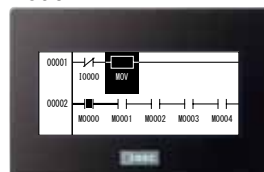


Ladder Monitor

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.)

Touch



Pro

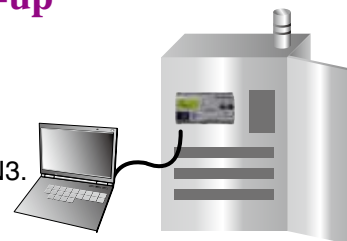


Inputs from the operation buttons can be programmed as digital inputs. No external device necessary for checking the programs.

Online Monitor

Easy set-up

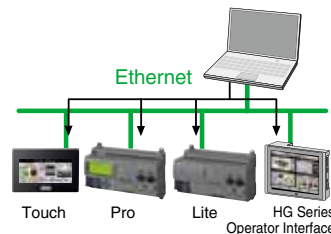
Debugging is possible by connecting the SmartAXIS with WindLDR or WindO/I-N3.



Ethernet

Remote maintenance

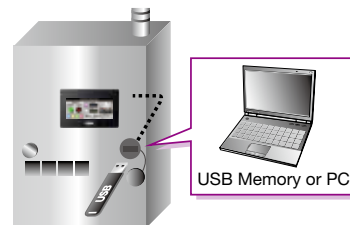
The user program can be downloaded to/uploaded from the SmartAXIS at remote locations via Ethernet (except 12 I/O type of Pro/Lite).



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).



Operator Interface

Connection to Operator Interface

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

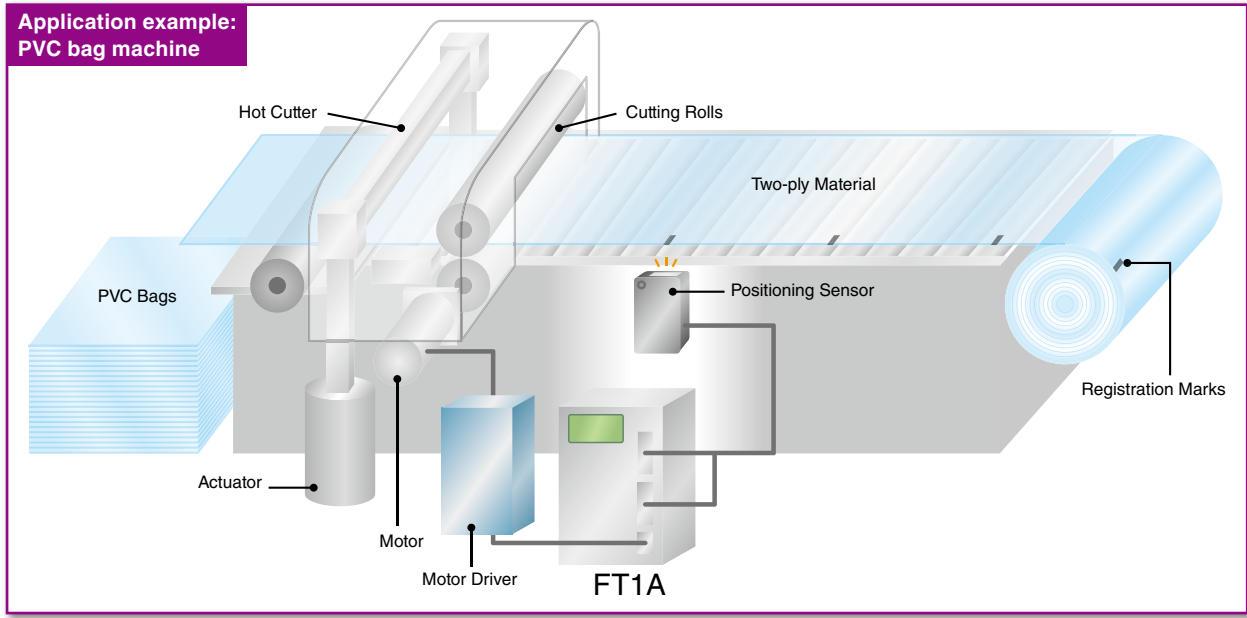


Photo: HG3G Operator Interface

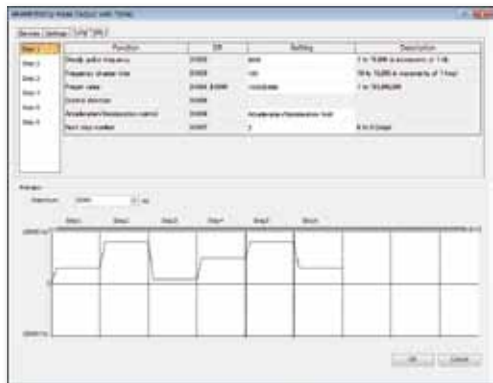
Positioning **Multistage Control**

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 out put model only)

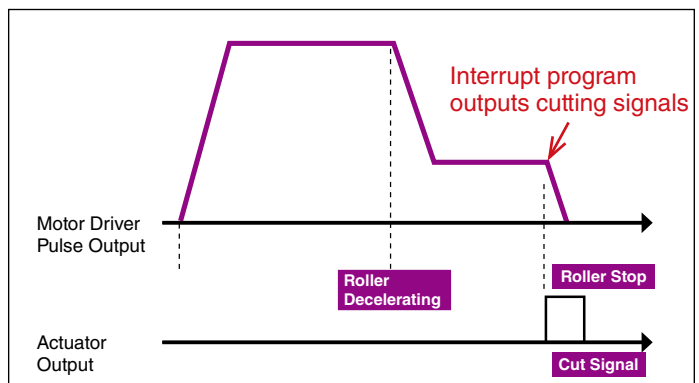
For applicable models, see pages 2 & 3 ▶



■ WindLDR: setting screen with preview



■ Target frequency change programmable for 18 steps maximum



Various Application Examples

Applications	10A Relay	Analog Input	Calendar	Pulse Output	Data Logging	Ethernet Coommunication	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					●		●	●

SmartAXIS Programming Software

Automation Organizer WindLDR PLC Programming Software



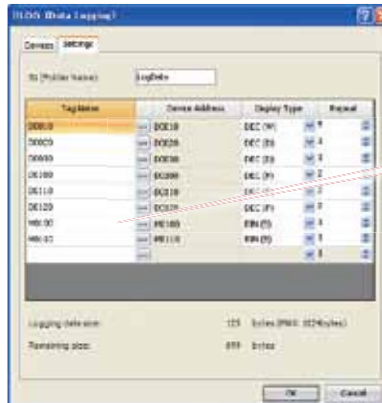
SmartAXIS Pro/Lite can be programmed using programming software WindLDR Ver. 7.0 or higher. WindLDR has a program editor, cross reference, monitor, simulation, and other functions that are required to use the SmartAXIS. WindLDR programs can also be used on the MicroSmart series PLC, making it possible to utilize existing resources effectively.

1. Calendar



Yearly and weekly schedule can be programmed easily using dialog setting.

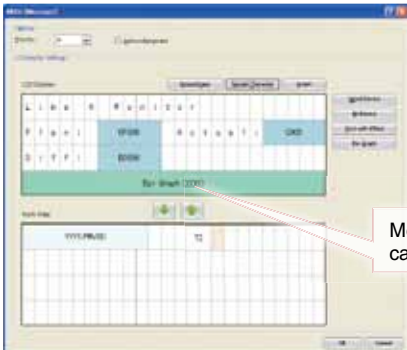
2. Log Setting



Log data can be configured easily.

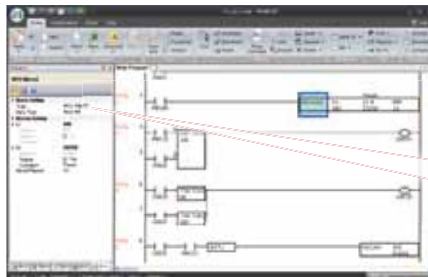
Note: Pro/Lite log data are stored in SD memory card.

3. Message Instruction



Message on Pro's LCD can be programmed easily.

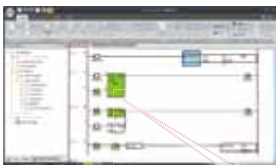
4. Property Sheet



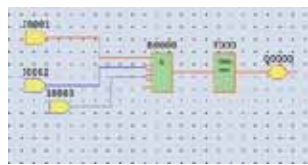
Parameters can be changed without opening a dialog box.

5. Simulation

Ladder Program

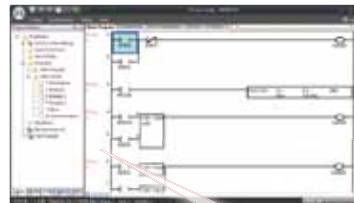


FBD



The operation of ladder programs and FBDs can be confirmed on the WindLDR without connecting a PC to the SmartAXIS.

6. Program Management



Subroutine function enables creating programs depending on the program function and subject for operation.

System Requirements

- OS Windows 7 (32-bit/64-bit), Windows Vista (32-bit), Windows XP (32-bit, Service Pack 3 or later) (Ensure that your operating system has the latest update from the Microsoft Windows Update website)
- 1.0GHz or faster CPU • Microsoft .NET Framework 3.5 • 1GB RAM • 1GB hard disk space
- Screen resolution of 1024 × 768 • Mouse, CD-ROM drive, [administrator account](#)
- * IDEC does not guarantee that all operations will function on all personal computers satisfying the above conditions.
- * Windows is a registered trademark of Microsoft Corporation, USA and other countries.
- * WindLDR is included in IDEC's package software "Automation Organizer."

7. Function Block Diagram (FBD)

45 types of terminals and function blocks (FB) can be programmed easily and quickly, by drag and drop. (Ladder programs and FBDs are not compatible. Program language needs to be selected before programming.)

Simple & Easy FBD Programming
Choose from various function blocks and set parameters in property to configure a program quickly and easily.

Calendar (WEEK/YEAR)
Simply connect a calendar function block to the relevant function block.

Data Logging (DLOG)
Data logging program useful for maintenance can be established easily just by connecting to the function block to determine the logging timing.

SCRIPT (SCRPT)
Complicated processing is possible with the script language.

Analog Input
Linear conversion can be configured for 10-bit analog input values within -32768 to +32768.

Range Comparison (RCMP)
Analog input value and the upper/lower limits are compared to turn on/off the output.

Message (MSG)
Message can be displayed easily by combining with a dialog.

Function Block Specifications

	Touch	Pro/Lite 12 points	Pro/Lite 24/40/48 points	
Maximum Program Capacity (kB)	38kB	10kB	38kB	
Maximum Programmable No. of Blocks	1,400 points	400 points	1,400 points	
No. of Device	Internal Relay	1,024 points	256 points	1,024 points
	Data Register	1,000 points	400 points	1,000 points
	Timer	200 points	100 points	200 points
	Counter	200 points	100 points	200 points
	Shift Register	128 points	128 points	128 points

The size (numbers of bytes) and the number of used devices of FBs are listed in the FBD Programming Manual.

Program Reproduction

Programs uploaded from the FT1A can be reproduced in WindLDR.



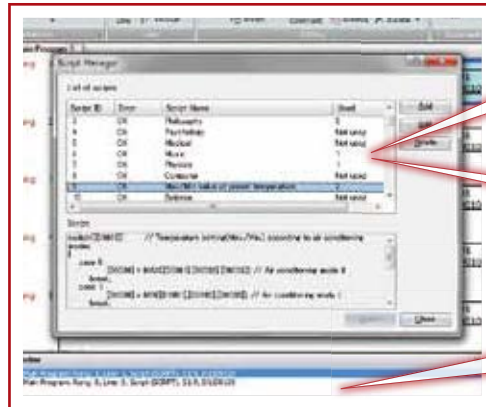
8. Scripts

Script enables you to program complicated processing such as conditional branch, logical/arithmetic operation, and functions as texts in C-language.

The programmed scripts can be executed in ladder, FBD, or HMI (WindO/I-N3).

Script Manager

Scripts can be managed easily by adding and deleting.



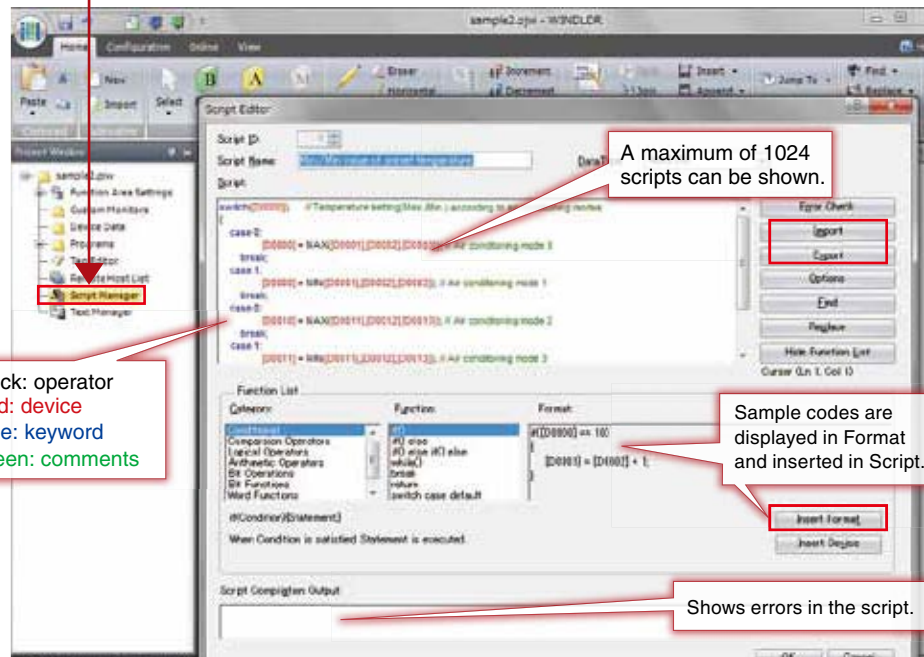
As much as 255 scripts (Pro/Lite) or 32,000 scripts (Touch) can be registered.

Shows the list of scripts and errors.

Frequently used scripts can be shown on the info window.

Script Editor

Scripts can be programmed easily by selecting conditional expressions, operators, and functions from a list. Errors can be also checked, improving the programming efficiency and quality.



Black: operator
Red: device
Blue: keyword
Green: comments

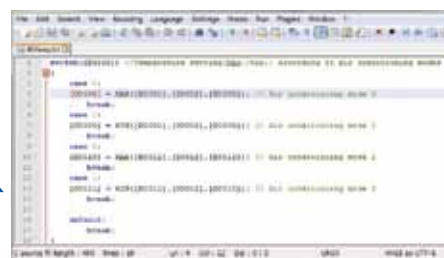
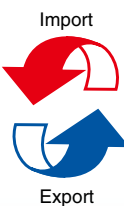
A maximum of 1024 scripts can be shown.

Sample codes are displayed in Format and inserted in Script.

Shows errors in the script.

Exporting/Importing the Script Programs

Script programs can be exported/imported as text files, enabling easy programming with the program editor of your choice.



Import/export enables program editing by the editor of your choice.

Automation Organizer WindO/I-NV3 OITouchscreen Programming Software

WindO/I-NV3 enables programming and also control program editing of the SmartAXIS Touch. Set HMI and control functions in just a few clicks!

1. Ladder/function block program

Download configuration and control programs from WindO/I-NV3.

Start WindLDR easily from WindO/I-NV3. Programs, ladder programs/edits are saved and downloaded as one file, making program management easy.

Double-click to start WindLDR

Note: Simulation is not available with WindO/I-NV3 V5.0.

2. Design screens using the object list

No.	Name	Type	Device	Trigger Type	Trigger Condition
48	Bitmap	Bitmap			
49	NumInput1	Numeric	LDR 002	3 Always ON	
50	MultiCommand1	Multi Co.	LDR 000	0 Rising ed.	[LSM 01]
51	MultiCommand1	Multi Co.	LDR 010	6 While sat.	100 > [LDR 010]
52	NumInput1	Numeric	LDR 1000	3 Always ON	
53	ScreenButton	Goto Scr.	100	3 Always ON	
54	PrintButton1	Print But.	LDR 1000 = 0	3 Always ON	
55	ScreenSwitch3	Goto Scr.	1	3 Always ON	
56	ScreenSwitch3	Goto Scr.	1	3 Always ON	
57	WordCommand1	Word Wi.	LSD 051	3 Always ON	
58	ScreenSwitch3	Goto Scr.	1	3 Always ON	
59	ScreenSwitch3	Goto Scr.	2	3 Always ON	
60	ScriptCommand1	Script Co.	5	7 Fixed P.	

Device, operating conditions, and type of command can be read from the object list. During debugging, data stored in the device is shown in popups, and operating conditions can be distinguished via color.

3. Graphic library with extensive collection of images

Vivid and clear 7000 graphic images can be selected from the library tool.

4. Easy programming

Operating conditions for buttons and lamps can be programmed easily in the property settings. Ladder program and scripting are also available.

5. Create multi-language screens easily

Switch to any of the supported languages by using the text manager within the same project. Up to 16 different languages can be programmed for one project. Translation is easy as Unicode format files can be imported/exported.

ID	Font	Color	Message
1	Windows	255	STOP
2	Windows	000	START
3	Windows	028	MENU
4	Windows	000	Running

6. Central control of device addresses

Device addresses used in the project can be easily identified by using the tag name editor and cross-references. Changes in tag name editor is reflected to the ladder, lamp, and switch.

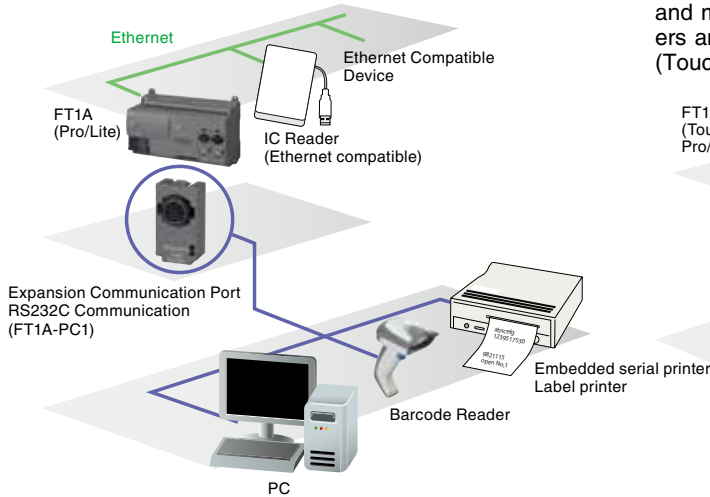
Address	Tag Name	Comment
M0000	Start	Main Pow
M0001	Stop	Main Pow
M0002	Switch01	Input01
M0003	Switch02	Input02

Various Networks for a Wide Variety of Applications

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

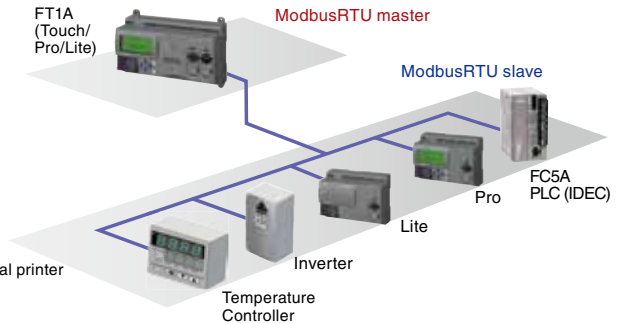
User Communication

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



Modbus RTU Communication

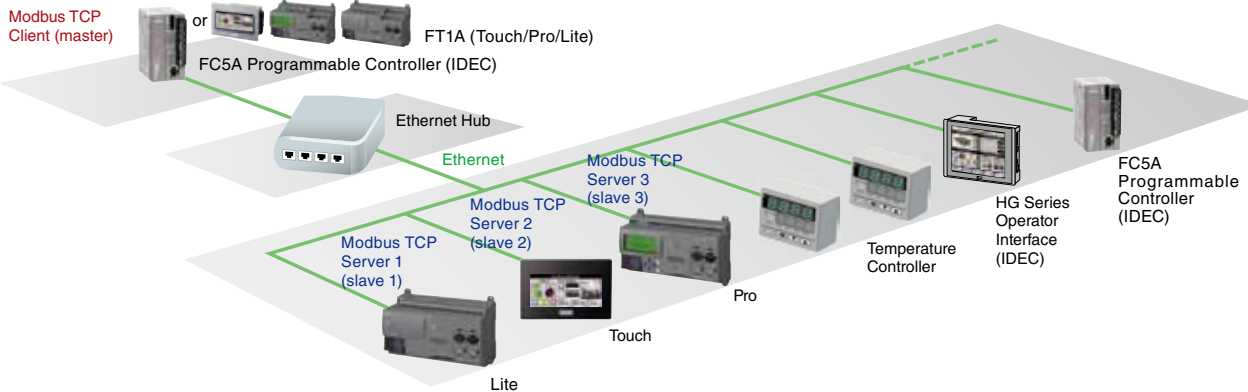
The SmartAXIS is compliant with Modbus protocol and can be used as either a Modbus communication master or slave. When used as a Modbus master, the SmartAXIS can monitor and modify data of Modbus compliant devices such as inverters and temperature controllers using Modbus communication (Touch can be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



Modbus TCP

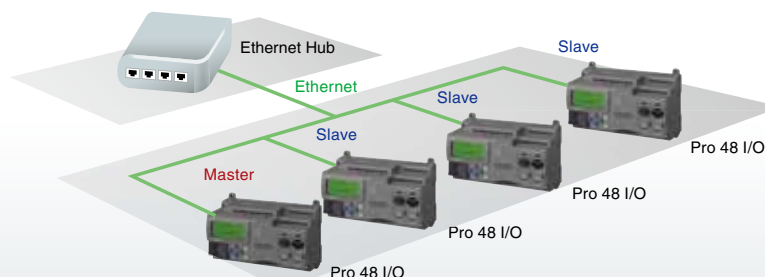
The SmartAXIS supports Modbus communications protocols. Modbus TCP protocol can also be used on the built-in Ethernet port, and can be used as a client (master) or server (slave), to monitor and change data of devices such as inverters and temperature controllers.

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).

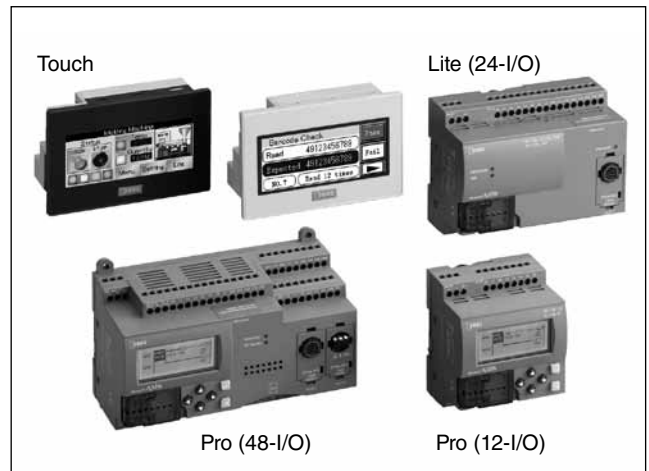


SmartAXIS Series FT1A Controller

Powerful PLC with embedded I/O.

Touch, Pro, and Lite models for flexible use in almost all applications.

- Drag & drop action of function block diagram (FBD) makes programming easy.
- Addition of scripts to WindLDR makes it easy to manage multiple processing (55 scripts total).
- Digital/analog-compatible input available for 24V DC. Convenient for systems requiring minimal analog inputs.
- 10A output relays connect directly to small motors and solenoid valves.
- Supports communication via RS232C, RS485, and Ethernet.
- USB programming port.
- User's program can be changed with the memory cartridge (Pro/Lite) or USB memory (Touch).



Touch (Display model)

- By integrating the control function (same functionality as Lite 12-I/O type) with a small display, a connected device is not needed. Wire and space-saving features offer the ideal solution for cost- and time-savings.
- Touch is an advanced small display with integrated control function.
- 400cd/m² high-contrast and 65,536 color high-resolution TFT LCD provides unparalleled visibility.
- Adjustable LED brightness function.
- Monochrome STN models are equipped with a 740 cd/m² brightness LCD and backlit with a choice of 3 colors (pink, red, white), providing practically the same brightness as the color LCD models.
- Program both the Pro and Lite models using WindLDR and the Touch model using WindO/I-INV3. Our intuitive programming software that is easy even for the first-time users.



Touch (dark gray)
(photo: FT1A-*12RA-B)



Touch (light gray)
(photo: FT1A-*12RA-W)

Pro (LCD Model) / Lite (No LCD Model)

- Parameters such as counters and timers can be adjusted using the LCD and six operations buttons (also available on Touch).
- Monitor screens on LCD show system status and settings.
 - “I/O status monitor” screen for monitoring I/O status
 - “Device monitor” screen for monitoring SmartAXIS device values
 - “Ladder Monitor” screen for monitoring the operating ladder program
 - “Status monitor” screen: also useful for confirming protection status and scan time
 The states of four operation buttons can be used as digital inputs in the user programs.
- 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 and 100 kHz/2 point pulse output. The new ARAMP instruction and enables you to program complex positioning systems easily.
- Integrated data logging function using an SD memory card. Logged data is useful for system maintenance management. (Touch: available using USB memory)
- Lite (No LCD) is available, offering more options for product selection.
- A maximum of 144 I/Os can be added using the remote I/O function with Ethernet.
(Input: 90 I/O max., Output: 54 I/O max.)



Pro
(photo: FT1A-H48KC when using communication cartridge)



Lite
(photo: FT1A-B24RA when using communication cartridge)

SmartAXIS Series FT1A Controller

FT1A

Touch (Display Models)

Package Quantity: 1

Power	I/O	Input		Output	Program Size (ladder/FBD)	Interfaces	LCD	Bezel Color	Part No.
		Digital I/O	Analog I/O (Note 1)						
24V DC	12 points (8/4)	6	2	4 points 10A relay output	Program size: 47.4/38kB 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
								Silver	FT1A-M12RA-S
							TFT color	Light gray	FT1A-C12RA-W
								Dark gray	FT1A-C12RA-B
Silver	FT1A-C12RA-S								

Pro (LCD Models)

Package Quantity: 1

Power	I/O	Input		Output	High-Speed Tr. Output	Program Size (ladder/ FBD)	Interfaces					SD Memory Card	Part No.																
		Digital I/O	Analog I/O (Note 1)				USB mini-B Port	Ethernet Port	Expansion communi- cation port (Note 2)		Memory Cartridge																		
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	4 points Tr sink output							×	47.4/38 kB	×	×	—	×	—	FT1A-H40RKA									
						4 points Tr source output														FT1A-H40RSA									
	48 points (30/18)		22	8	18 points Tr sink output 18 points Tr source output	—							×							47.4/38 kB	×	×	—	×	—	FT1A-H48KA			
						—																				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	—	×	47.4/38 kB	×	×							—	×	—	FT1A-H40RC
															18 points Tr sink output														FT1A-H48KC
	48 points (30/18)		30		—								18 points Tr source output	—	×					47.4/38 kB	×	×	—	×	—				FT1A-H48SC
														—															FT1A-H48SC

Lite (No LCD Models)

Package Quantity: 1

Power	I/O	Input		Output	High-Speed Tr. Output	Program Size (ladder/ FBD)	Interfaces					SD Memory Card	Part No.																
		Digital I/O	Analog I/O (Note 1)				USB mini-B Port	Ethernet Port	Expansion communi- cation port (Note 2)		Memory Cartridge																		
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	4 points Tr sink output							×	47.4/38 kB	×	×	—	×	—	FT1A-B40RKA									
						4 points Tr source output														FT1A-B40RSA									
	48 points (30/18)		22	8	18 points Tr sink output 18 points Tr source output	—							×							47.4/38 kB	×	×	—	×	—	FT1A-B48KA			
						—																				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	—	×	47.4/38 kB	×	×							—	×	—	FT1A-B40RC
															18 points Tr sink output														FT1A-B48KC
	48 points (30/18)		30		—								18 points Tr source output	—	×					47.4/38 kB	×	×	—	×	—				FT1A-B48SC
														—															FT1A-B48SC




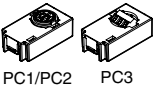
Note 1: Digital/analog-compatible input

Note 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

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 (Note 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 (Note 2)	×	—	—	FT9Z-1D3PN05	5	
Protective cover	×	—	—	FT9Z-1E3PN05	5	
Memory card 	— (Note 3)	×	×	HG9Z-XMS2	1	SD memory card (2 GB)
Memory cartridge 	—	×	×	FT1A-PM1	1	Dedicated user program save memory (1 MB)
Communication cartridge 	—	×	×	FT1A-PC1	1	RS232C, mini-DIN type
	—	×	×	FT1A-PC2	1	RS485, mini-DIN type
	—	×	×	FT1A-PC3	1	RS485, terminal block type
Rear mount adapter	×	—	—	FT9Z-1A01	1	Rear mount bracket
35-mm-wide DIN Rail	—	×	×	BAA1000PN10	10	Aluminum, 1000mm long, 200g (approx.)
	—	×	×	BAP1000PN10	10	Steel, 1000mm long, 200g (approx.)
DIN rail mounting bracket	—	×	×	BNL6PN10	10	DIN rail bracket
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	

Note 1: Upgrade from earlier version is possible on IDEC website. The following manuals in PDF can be downloaded from IDEC website.

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*) *: available soon






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

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

Note 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.

Note 5: Cannot be used for expansion with 12-I/O type.

Maintenance Parts

Name	Applicable Model			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

General Specifications

Touch (Display Model)

Part No.	FT1A-*12RA-*
Rated Power Voltage	24V DC
Allowable Voltage Range	20.4 to 28.8V DC (including ripple)
Power Consumption	9.2W maximum
Allowable Momentary Power Interruption	10 ms maximum
Dielectric Strength	1. Between power terminal and FG: 500V AC, 5 mA, 1 minute 2. Between power terminal and output terminal: 2,300V AC, 5 mA, 1 minute
EMC Immunity	IEC/EN 61131-2:2007 compliant
Inrush Current	50A maximum (5ms maximum)
Operating Temperature	0 to +50°C
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 (Panel front) (Note 1) IP20 (Rear)
Ground	Functional grounding
Protective grounding conductor	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

Note 1: 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 H12RA H12RC B12RA B12RC		24-I/O Type H24RA H24RC B24RA B24RC		40-I/O Type H40RKA H40RSA H40RC B40RKA B40RSA B40RC		48-I/O Type H48KA H48SA H48KC H48SC B48KA B48SA B48KC B48SC	
Rated Power Voltage	AC power: 100 to 240V AC DC power: 24V DC							
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 (Note)							
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						

Note: UL, c-UL Listed at 0 to +50°C (FT1A Version V110)

Function Specifications (Touch/Pro/Lite)

Part No.		Touch			Pro/Lite FT1A-																	
		FT1A-12RA-	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																				
Ladder Program	Instruction Words	Basic Instructions	42 types																			
		Advanced Instructions	97 types			99 types			107 types			DC power type: 125 types, AC power type: 111 types										
	Program Capacity		Program size: 48 kB Configuration memory capacity: 5 MB			12 kB			48 kB													
	User Program Storage		Flash ROM (100,000 times)			Built-in Flash ROM (10,000 times rewritable)																
Processing Time	Basic Instruction	1850µs/1000 steps																				
	END Processing	5 msec minimum																				
FB	FB		37 types			37 types			38 types		37 types		38 types		45 types		39 types		45 types		44 types	
	Program Capacity		Program size: 38kB Configuration memory capacity: 5MB			10kB			38kB													
	No. of FB	FB (Note 1)	1000			200			1000													
		Timer (T)	200			100			200													
Counter (C)		200			100			200														
Processing Time	Basic Instruction	4ms/100			1.3ms/100																	
	END Processing	5ms/100			2.5ms (Pro)/1ms (Lite)																	
User Program Storage		Flash ROM (100,000 times)			Flash ROM (10,000 times)																	
I/O Points	Inputs	8			8			16			24		30									
	Outputs	4			4			8			16		18									
Internal Relays		1024			256			1024														
Shift Registers		128			128			128														
Data Registers		2000			400			2000														
Special Data Registers		200			200			200														
Adding/Reversible Counters		200			100			200														
Timer (1ms, 10 ms, 10 ms, 1s)		200			100			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, 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 (Pro/Lite only)																				
Input Filter		No filter, 3 to 15 ms (selectable in increments of 1 ms)																				
Catch Input/Interrupt Input		4/4			4/4			6/6														
High-speed Counter	Maximum Counting Frequency and Points	Single/two-phase selectable	1 (5 kHz, multiple 2/4, single-phase cannot be used)			2 (Note 2)			—			2 (Note 2)		—		2 (Note 2)		—				
		Single-phase	4 (x 10 kHz)			2 (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			2			None			4		None		6		None		8		None	
	Input Range	0 to 10V DC																				
	Input Impedance	78 kΩ																				
	Digital Resolution	10-bit (0 to 1000)																				
Pulse Outputs	100 kHz	No. of outputs	—			—			—			2		—		2		—				
		Function	—			—			—			PULS, PWM, RAMP, ARAMP, ZRN		—		PULS, PWM, RAMP, ARAMP, ZRN		—				
	5 kHz	No. of outputs	—			—			—			2		—		2		—				
		Function	—			—			—			PULS, PWM		—		PULS, PWM		—				
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		×			×			×			×		×		×		×		×			
USB-A		×			—			—			—		—		—		—		—			
RS232C		×			—			× (Note 3)			× (Note 3)		× (Note 3)		× (Note 3)		× (Note 3)		× (Note 3)			
RS485/422		×			—			× (Note 3)			× (Note 3)		× (Note 3)		× (Note 3)		× (Note 3)		× (Note 3)			
Ethernet		×			—			×			×		×		×		×		×			
Expansion Communication Ports	Port 2	—			—			×			×		×		×		×		×			
	Port 3	—			—			—			—		—		×		×		×			
Memory Cartridge		—			×			×			×		×		×		×		×			
SD Memory Card		—			—			—			×		×		×		×		×			

Note 1: Except for timer, counter, input FB, and output FB. Note 2: 100 kHz when single-phase, 50 kHz when two-phase, multiple 2,4. Note 3: When communication cartridge is installed. Note 4: The maximum capacity is 32 GB. DLOG/FB and TRACE/FB instructions are used to write data. For details, see pages 26 and 28.

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 [Japanese Katakana, JIS 8-bit code, ISO 8859-1 (Latin 1), ANSI 1250 (central Europe)], ANSI 1257 (Baltic), ANSI 1251 (Cyrillic)	
	1/2 Size	8 x 16 pixels [Japanese Katakana, JIS 8-bit code, ISO 8859-1 (Latin 1), 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)		16 x 16 pixels (Japanese JIS first level characters, Chinese)
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)		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, 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
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Input Specifications (Touch/Pro/Lite)

Part No.		Touch				Pro/Lite FT1A-							
		FT1A-*12RA-*	H12RA B12RA	H12RC B12RA	H24RA B24RA	H24RC B24RC	H40RKA B40RKA	H40RSA B40RSA	H40RC B40RC	H48KA B48KA	H48SA B48SA	H48KC B48KC	H48SC B48SC
Input Specification	Input Points	6	6	8	12	16	18	24	22		30		
	Input Type	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	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	No-voltage type and sink/source type: 4.3 kΩ, sink type: 5.5 kΩ, source type: 4.7 kΩ										
	Input Delay Time	OFF → ON	2.5 μs + soft filter setting		40 μs + filter value (high-speed input section: 2.5 μs + filter value)								
		ON → OFF	5 μs + soft filter setting		150 μs + filter value (high-speed input section: 5 μs + filter value)								
	Isolation	Between input terminals	Not isolated		Not isolated								
		Internal circuit	Not isolated		Contact type and sink/source type: photocoupler 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	Less than 5 VDC	No-voltage type: 18 kΩ min., sink/source type and sink type: less than 5 VDC, source type: 15 VDC min.									
		ON voltage	15 VDC min.	No-voltage type: 2 kΩ max., sink/source type and sink type: 15 VDC min., source type: less than 5 VDC									
		OFF current	Less than 0.9 mA	No-voltage type and sink/source type: less than 1.1 mA, sink type: less than 0.9 mA, source type: -1.0 mA min.									
		ON current	2.7 mA minimum	No-voltage type and sink/source type: 3.0 mA min., sink type: 2.7 mA min., source type: less than -3.0 mA									
	Analog Input	Input Points	2	2	4	4	6	6	8	8			
		Input Type	Voltage input	Voltage input		Voltage input		Voltage input		Voltage input			
		Input Range	0 to 10.0 VDC	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	2 ms + sampling time + scan time	2 ms + filtering time + scan time		2 ms + filtering time + scan time		2 ms + filtering time + scan time		2 ms + filtering time + scan time			
Resolution		10-bit (0 to 1000)	10-bit (0 to 1,000)	—	10-bit (0 to 1,000)	—	10-bit (0 to 1,000)	—	10-bit (0 to 1,000)	—			
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	— (not conforming to IEC 61131-2 digital I/O type)											
	Operation Level	OFF voltage: 5V maximum											
		ON voltage: 15V minimum											
		OFF current: 0.06mA maximum											
ON current: 0.20mA minimum													
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	—	20.4 to 26.4V DC	—	
	Output Current Capacity	—	—	—	250 mA	—	300 mA	—	300 mA	—	300 mA	—	

Output Specifications (Touch/Pro/Lite)

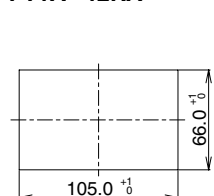
Part No.			Touch					Pro/Lite								
			FT1A- *12RA-*	H12RA B12RA	H12RC B12RC	H24RA B24RA	H24RC B24RC	H40RKA B40RKA	H40RSA B40RSA	H40RC B40RC	H48KC B48KC	H48SC B48SC	H48KA B48KA	H48SA B48SA		
Output Specification	Output Points	Transistor Sink Output						4	—		18	—	18	—		
		Transistor Source Output						—	4		—	18	—	18		
	Rated Load Voltage							24V DC			24V DC					
	Input Voltage Range							20.4 to 28.8V DC			20.4 to 28.8V DC					
	Maximum Load Current	1 point						0.3A maximum			0.3A maximum					
		1 common						1A 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)					
	Inrush Current							1A			1A					
	Leakage Current		—	—	—	—	—	0.1 mA maximum			0.1 mA maximum					
	Clamping Voltage							39V ± 1V			39V ± 1V					
	Maximum Lamp Load							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)					
	External Current Draw							100 mA maximum, 24V DC (V terminal supply power)			100 mA maximum, 24V DC (V terminal supply power)					
	Isolation	Between output terminal and internal circuit						Photocoupler isolated			Photocoupler isolated					
		Between output terminals						Same common line: Not isolated Separate common line: isolated			Same common line: Not isolated Separate common line: isolated					
	Output Delay	OFF → ON						(Note 1)			(Note 1)					
ON → OFF							(Note 1)			(Note 1)						
10A relay	Output Points		4													
	Output Type		1a contact													
	Rated Load Current		240V AC 10A, 24V DC 10A													
	Minimum Switching Load		10 mA/5V DC (reference value)													
	Initial Contact Resistance		100 mΩ maximum (1A, at 6V DC)													
2A relay	Output Points					4	4	8	8	12						
	Output Points per Common Line	COM4				4	4	4	4	4						
		COM5				—	—	4	4	4						
		COM6				—	—	—	—	4						
	Output Type		—	—	—	1a contact										
	Maximum Load Current	1 point						2A			—					
Load Current	1 common						8A maximum			—						
Minimum Switching Load							1 mA/5 VDC (reference value)			—						
Initial Contact Resistance							30 mΩ maximum (1A, at 6V DC)			—						
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														

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.

Mounting Hole Layout

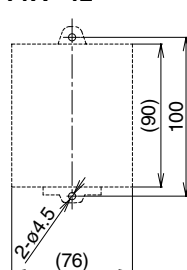
Touch

FT1A-*12RA-*

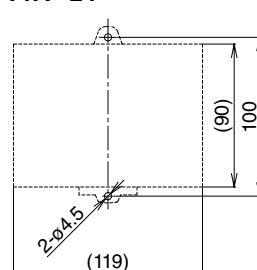


Pro/Lite

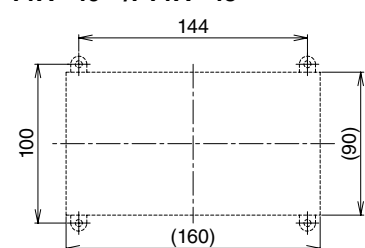
FT1A-*12**



FT1A-*24**



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

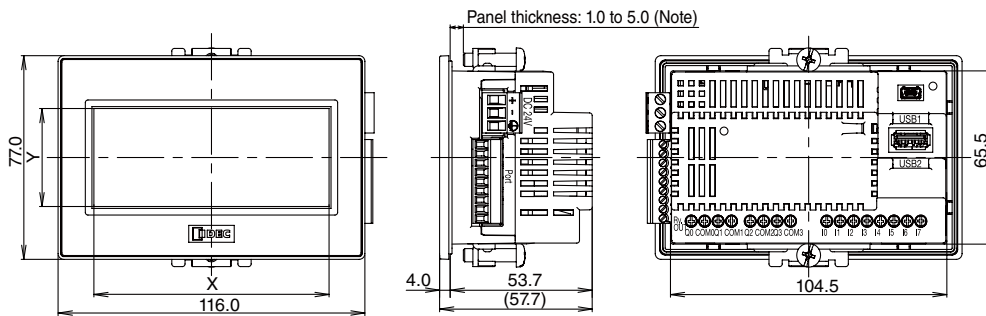


All dimensions in mm.

Dimensions

Touch (Display Model)

When using mounting bracket (HG9Z-4K2PN04)

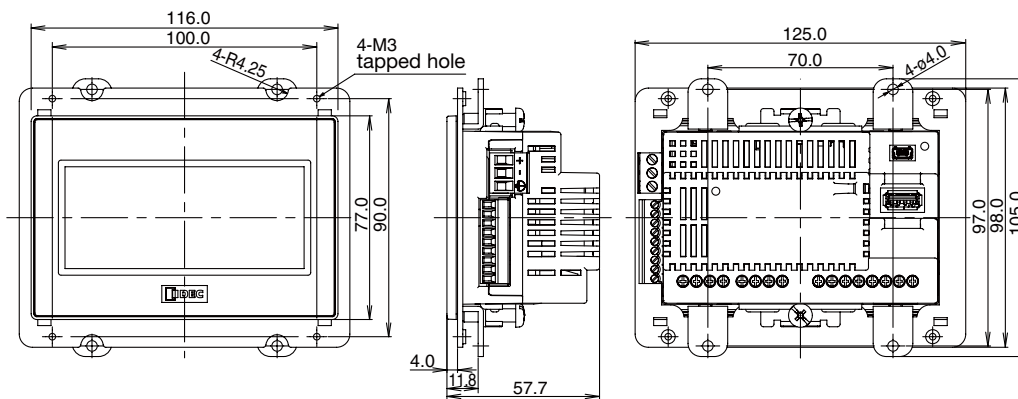


Note: Waterproof characteristic may not be obtained depending on the panel material and size.

LCD Active Area

LCD Type	X	Y
TFT	88.92	37.05
STN	87.59	35.49

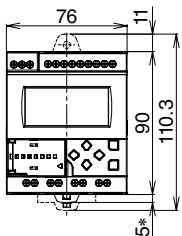
When using rear mount adapter (FT9Z-1A01)



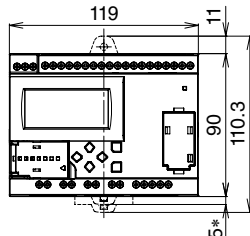
All dimensions in mm.

Pro (LCD Model)

FT1A-H12*A/*C

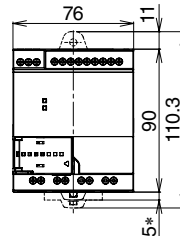


FT1A-H24*A/*C

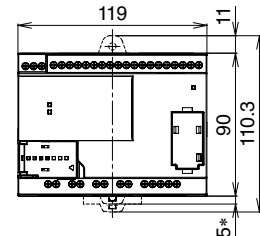


Lite (No LCD Model)

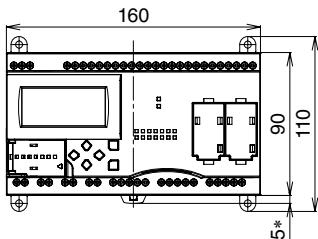
FT1A-B12*A/*C



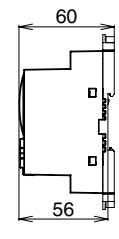
FT1A-B24*A/*C



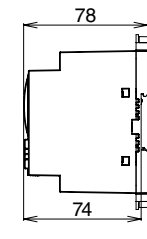
FT1A-H40*A/*C



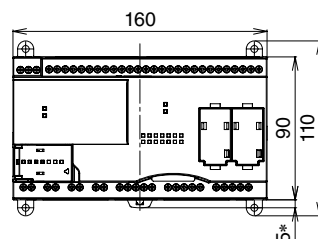
FT1A-H**A



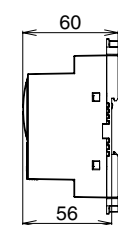
FT1A-H**C



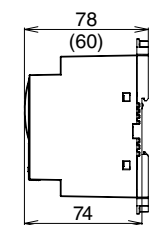
FT1A-B40*A/*C



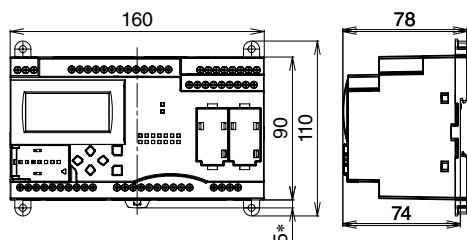
FT1A-B**A



FT1A-B**C

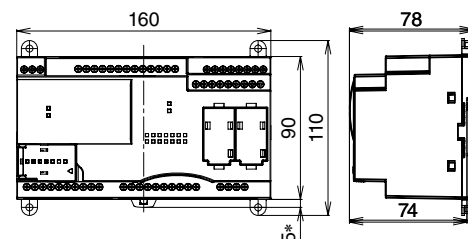


FT1A-H48*A/*C



Note: 9.3 mm when the clamp is pulled out.

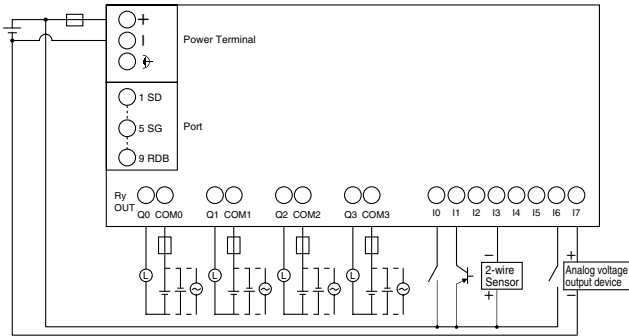
FT1A-B48*A/*C



Note: 9.3 mm when the clamp is pulled out.

Terminal Arrangement and I/O Wiring Diagram Examples

Touch (Display Model)

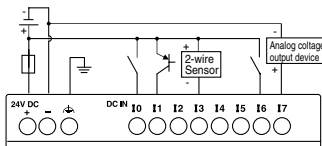


See For terminal arrangement and I/O wiring diagram, see User's Manual.

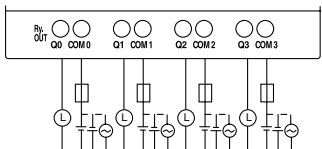
Pro/Lite (LCD/No LCD Models)

FT1A-*12RA

Input Side

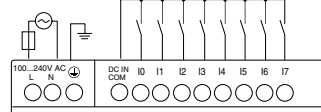


Output Side

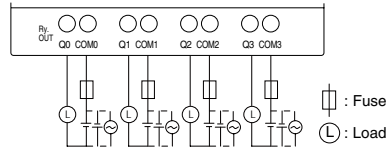


FT1A-*12RC

Input Side

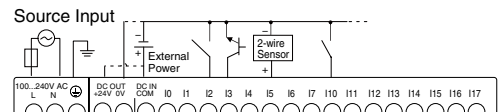


Output Side

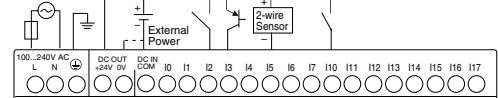


FT1A-*24RC (①)

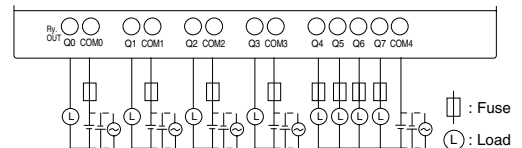
Input Side (sink/source)



Sink Input



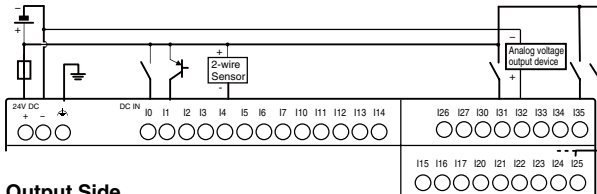
Output Side



FT1A-*48SA (②)

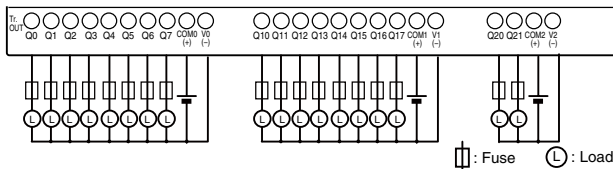
Input Side

Sink Input



Output Side

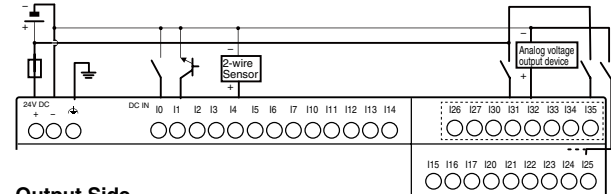
Source Output



FT1A-*48KA (③)

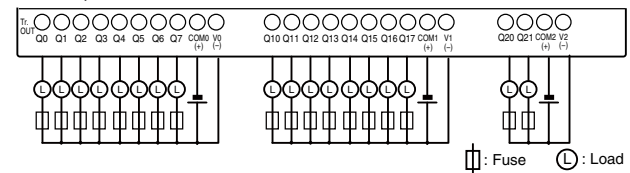
Input Side

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



Output Side

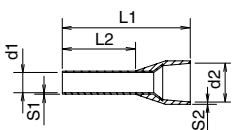
Sink Output



See ① for FT1A-*40RC, ① and ② for FT1A-*40RSA, and ① and ③ for FT1A-*40RKA.

Recommended Ferrules for Touch/Pro/Lite

For 1-wire connection

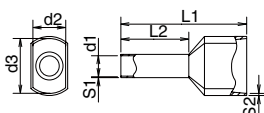


For 1-wire connection

Package Quantity: 1

Cross Section (mm ²)	Phoenix Contact Part No. (Order No.)	L1	L2	d1	S1	d2	S2
0.25	AI 0.25-8 YE (32 00 04 3)	12.5	8.0	0.8	0.15	1.8	0.25
0.5	AI 0.5-8 WH (32 00 01 4)	14.0	8.0	1.1	0.15	2.5	0.3
1.0	AI 1-8 RD (32 00 03 0)	14.5	8.0	1.5	0.15	3.0	0.3
1.5	AI 1.5-8 BK (32 00 04 3)	14.5	8.0	1.8	0.15	3.4	0.3

For 2-wire connection



For 2-wire connection

Package Quantity: 1

Cross Section (mm ²)	Phoenix Contact Part No. (Order No.)	L1	L2	d1	S1	d2	d3	S2
2 × 0.5	AI-TWIN 2 × 0.5-8 WH (32 00 93 3)	15.0	8.0	1.5	0.15	2.5	4.6	0.25
2 × 0.75	AI-TWIN 2 × 0.75-8 GY (32 00 80 7)	15.0	8.0	1.8	0.15	2.7	5.2	0.3

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)

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

Advanced Instructions (Touch/Pro/Lite continued)

Instructions	Name
DEC	Decrement
ROOT	Root
SUM	Sum
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
CVXTY	Convert X to Y
CVYTX	Convert Y to X
AVRG	Average
FIFO	FIFO Format
FIEX	First-In Execute
FOEX	First-Out Execute
NDSRC	N Data Search
SCRPT	Script
DLOG (Note 5)	Data Logging
TRACE (Note 5)	Data Trace

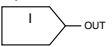
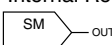
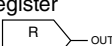
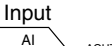
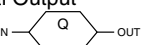
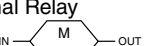

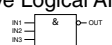
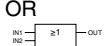
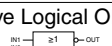
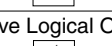
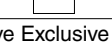

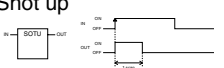

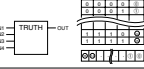



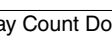
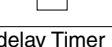


Note 1: Pro/Lite 24-I/O, 40-I/O, 48-I/O type only Note 2: Pro only

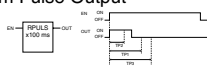
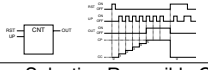

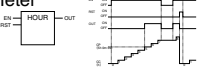
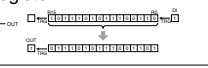
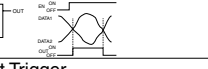
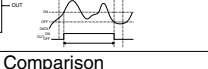

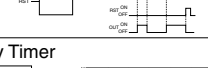
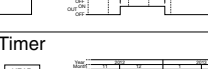
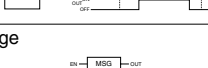
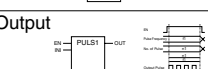
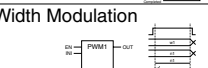
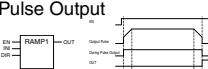
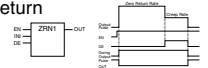
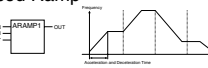
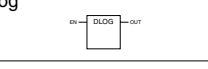
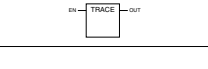
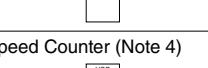
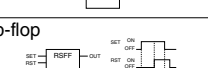
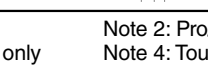

Note 3: Touch, Pro/Lite DC power type only

Note 4: Pro/Lite 40-I/O DC type and 48-I/O AC/DC type only

Note 5: Pro/Lite 40-I/O, 48-I/O only

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.

Timer	RPULS	 <p>Random Pulse Output</p>	The output is turned on for the length of random time within the configured range of time.
Counter	CNT	 <p>Adding Counter</p>	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	 <p>Up/Down Selection Reversible Counter</p>	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	 <p>Hour Meter</p>	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	 <p>Shift Register</p>	When the execution input turns on, the shift registers are shifted to the specified shift direction.
Data Comparison	CMP	 <p>Data Comparison</p>	Two inputs values are compared and the output turns on or off according to the comparison result.
	STTG	 <p>Schmitt Trigger</p>	The comparison input value and the ON/OFF thresholds are compared and the output turns on or off according to the comparison result.
	RCMP	 <p>Range Comparison</p>	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	 <p>Alternate Output</p>	Sets/resets the output.
Week Programmer	WEEK	 <p>Weekly Timer</p>	Compares the specified day of the week, ON time, and OFF time with the current time and outputs the result.
	YEAR	 <p>Yearly Timer</p>	Compares the specified date with the current date and outputs the result.
Interface (Note 1)	MSG	 <p>Message</p>	Displays data such as text and device values on the LCD on the SmartAXIS Pro.
Pulse (Note 2)	PULS	 <p>Pulse Output</p>	Outputs pulses at the specified frequency.
	PWM	 <p>Pulse Width Modulation</p>	Outputs pulses at the specified frequency and duty cycle.
	RAMP	 <p>Ramp Pulse Output</p>	Outputs pulses with the frequency change function.
	ZRN	 <p>Zero Return</p>	Outputs pulses with the different pulse frequency corresponding to the on/off state of a deceleration signal.
	ARAMP	 <p>Advanced Ramp</p>	Output pulses with the frequency change function according to the settings configured in the frequency table.
Data Logging (Note 3)	DLOG	 <p>Data Log</p>	Saves the values of the specified devices in the specified data format as a CSV file to the SD memory card.
	TRACE	 <p>Data Trace</p>	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	 <p>Script</p>	Enables you to program complicated processing with the script language that supports conditional branching, logical operations, arithmetic operations, and functions.
Special	HSC	 <p>High-speed Counter (Note 4)</p>	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	 <p>RS Flip-flop</p>	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 3: Pro/Lite 40-I/O, 48-I/O only

Note 2: Pro/Lite 40-I/O DC type and 48-I/O AC/DC type only
Note 4: Touch, Pro/Lite DC power type only

SmartAXIS Series FT1A Controller

Scripts

Type	Format	Description			
Control statements	if if else if else if else	if ((Cond. expr.)) { (Exe. line); } if ((Cond. expr.)) { (Exe. line1); } else { (Exe. line2); } if ((Cond. expr1.)) { (Exe. line1); } else if ((Cond. expr2.)) { (Exe. line2); } else { (Exe. line3); } switch (Cond. expr.) {case constant 1: (Cond. expr1.);break; case constant2: (Cond. expr2.); break; default: (Cond. expr3.);break;} while (Cond. expr.)(Exe. line); break; return;	Execution line is executed if the conditional expression is satisfied. Execution line is executed if the value of conditional expression matches the constant. Execution line is repeatedly executed while the conditional expression is satisfied. Once the conditional expression is satisfied, it will go out of the loop by break. Script is ended.		
	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 Bit reset Bit reverse	SET (a); RST (a); REV (a);	Turns bit device (a) to 1 Turns bit device (a) to 0. Reverses the 1 and 0 of bit device (a).	
Word function	Arithmetic operation	Maximum value	MAX(a, b, c)	Returns the maximum value out of (a), (b), (c).	
		Minimum value	MIN(a, b, c)	Returns the minimum value out of (a), (b), (c).	
		Exponential function	EXP(a)	Returns exponential function of (a).	
		Natural logarithm	LOGE(a)	Returns natural logarithm (base is e) for (a).	
		Common logarithm	LOG10(a)	Returns common logarithm (base is 10) of (a).	
		Exponentiation	POW(a, b)	Returns a to the power of b.	
		Square root	ROOT(a)	Returns the square root of (a)	
		Sine	SIN(a)	Returns the sine of sine of a (-1 to +1).	
		Cosine	COS(a)	Returns the cosine of a (-1 to +1).	
		Tangent	TAN(a)	Returns the tangent of a (-1 to +1).	
		Arcsine	ASIN(a)	Returns the arcsine of (a) (-1 to +1) in radian value (-π/2 to +π/2).	
		Arccosine	ACOS(a)	Returns the arccosine of (a) (-1 to +1) n radian value (0 - π).	
		Arctangent	ATAN(a)	Returns the arctangent of (a) (-1 to +1) in radian value (-π/2 - +π/2).	
	Data type conversion	Conversion from angle to radian	RAD(a);	Converts the value of (a) from degree (°) to radian and returns the value.	
		Conversion from radian to angle	DEG(a);	Converts the value of (a) from radian to degree (°), and returns the value.	
		Conversion from BCD to Binary	BCD2BIN(a)	Returns the BCD value of (a) in binary value.	
		Conversion from binary to BCD	BIN2BCD(a)	Returns the binary value of (a) in BCD value.	
		Conversion from float32 to binary	FLOAT2BIN(a)	Returns the float32 value of (a) in binary value.	
		Conversion from binary to float32	BIN2FLOAT(a)	Binary value of is returned in float32 value. Returns the binary value of (a) in float32 value.	
		Conversion from decimal to string character	DEC2ASCII(a, b)	Converts the decimal number of (b) to a character string, and stores in order with (a) as a starting device.	
		Conversion from string character to decimal	ASCII2DEC(a)	Returns the character string (a) as decimal number value.	
		Data comparison and copy	Data comparison	MEMCMP(a, b, c)	Compares the values of of device (a) for (c) and values of device (b) for (c).
			Data copy	MEMCPY(a, b, c)	Copies the values from (a) for (c) words to (b) for (c) words respectively.
		Character string operation	Character string copy	STRCUT(a, b, c, d)	Copies character string.
			Character number count	STRLEN(a)	Returns the number of characters for character string.
			Character string concatenation	STRCAT(a, b)	Concatenates character string.
			Character string search	STRSTR(a, b)	Search character string.
Draw (Note 1)	Drawing of straight line	LINE(a, b, c, d)	Draws a straight line connecting the start coordinate and end coordinate.		
	Drawing of rectangle	RECTANGLE(a, b, c, d)	Rectangle with left top corner as start coordinate and bottom right corner as end coordinate is drawn. Draws a rectangle with left top corner as start coordinate and bottom right corner as end coordinate.		
	Drawing of circle and ellipse	CIRCLE(a, b, c, d)	Draws a circle with specified radius from the center coordinate.		
Offset	Indirect specification	OFFSET(a, b)	Specifies the device words (b) from (a).		
Bit device ↔ word device Cross Operator Functions (Note 2)	Bit device (1 word length) to bit device (1 word length)	BITS2BITS(a, b)	Copy 1 word from bit devices to bit devices.		
	Bit device (1 word length) to Word device	BITS2WORD(a, b)	Copy 1 word from bit devices to a word devices.		
	Word device to bit device (1 word length)	WORD2BITS(a, b)	Copy 1 word from a word device to bit devices.		

Note 1: Touch (NV3) only Note 2: Pro/Lite (WindLDR)

Specifications and other descriptions in this catalog are subject to change without notice.



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