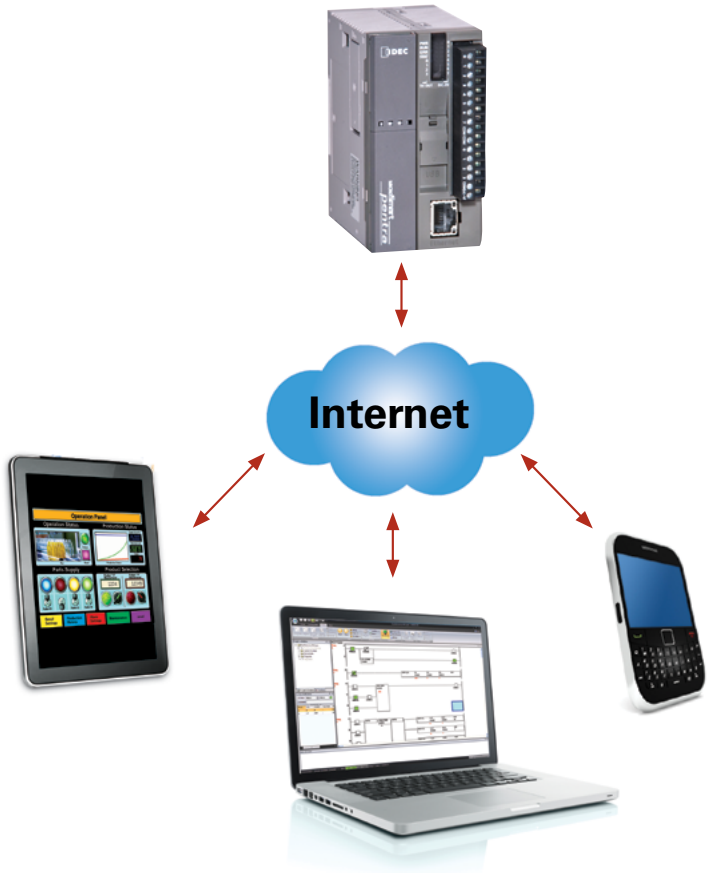
MicroSmart Pentra Performance

Embedded Ethernet Port



Remote Access and Control
The new MicroSmart Pentra PLC with an embedded Ethernet port, you can configure the MicroSmart Pentra PLC for remote monitoring and control. Using WindLDR software, you can remotely monitor or update the PLC programs without having to be near the PLC.

Web Server Functions
Using standard web browsers like Internet Explorer or Firefox, you can remotely log-in and access web pages that are stored directly on the MicroSmart Pentra PLC. Up to 1 MB of memory is dedicated for web page storage! Use the built-in web pages or create your own using an HTML editor.

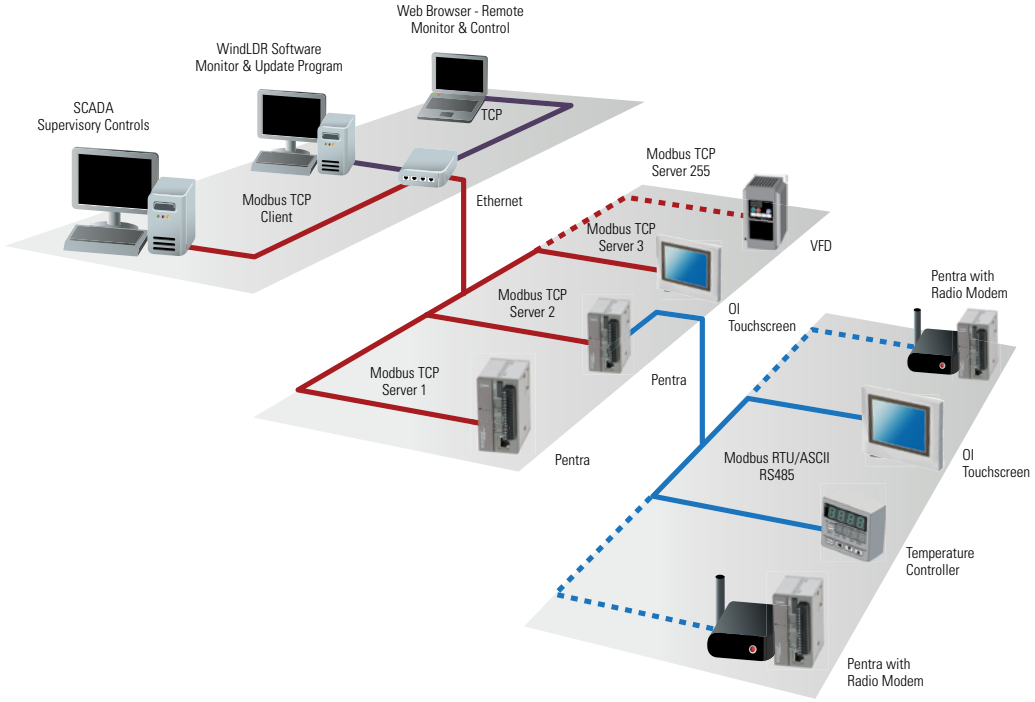
14 Simultaneous Connections
The new embedded Ethernet Pentra supports up to 14 simultaneous connections through its Ethernet port. Through the Ethernet port, the embedded Ethernet Pentra can be configured to communicate to WindLDR for maintenance communications, to an Operator Interface touchscreen, and to VFD using Modbus TCP communications, all simultaneously.

Embedded USB Maintenance Port

The new MicroSmart Pentra PLC with an embedded Ethernet PLC port also has an embedded mini-B USB port for maintenance.

You can now easily connect your PC to this PLC using a standard USB cable.

Modbus TCP, RTU and ASCII



Using intuitive WindLDR software, you can configure the MicroSmart Pentra to be a Master or Slave device on a Modbus network. All MicroSmart Pentra PLCs support Modbus RTU/ASCII protocols and our CPU with embedded Ethernet port also supports Modbus TCP protocol.

Email and Text Message

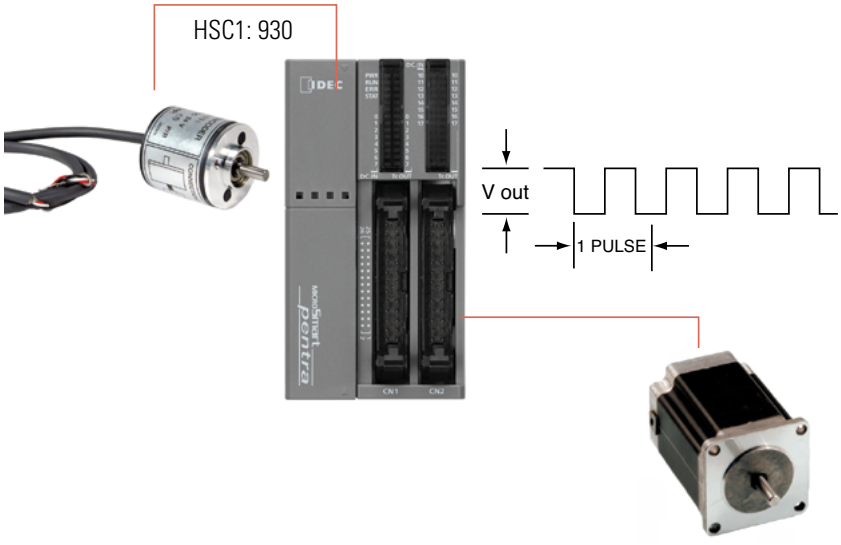
Easily configure the MicroSmart Pentra PLCs to send out system status and alarms to your email or mobile phone. Data registers values in the PLC can also be incorporated in the body of the email. It also supports email login authentication so third party email server like Yahoo can be used. Up to 255 email templates can be configured with multiple recipients can be included.

User Web Pages

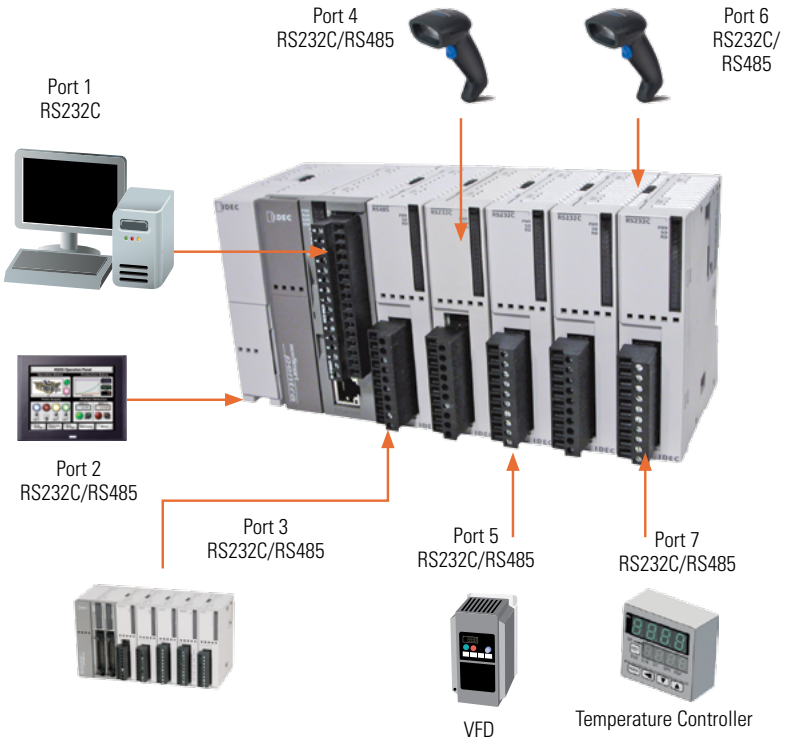
With IDEC MicroSmart Pentra, users do not need to know JAVA programming to embed dynamic values and parts on their PLC web pages. Even novice HTML programmer can take full advantage of the integrated IDEC system library of numerical display/input, horizontal and vertical bar graphs, trend chart, ON/OFF pilot lights and pushbuttons. Up to 1MB of memory is reserved for user web pages.

Integrated 100KHz Fast Inputs and Outputs

Configure up to four high-speed inputs from high-speed output devices such as rotary encoders or proximity switches at a maximum frequency of 100KHz, independent of the scan time. Up to three high-speed outputs can be used for simple positioning controls for stepper or servo motors.

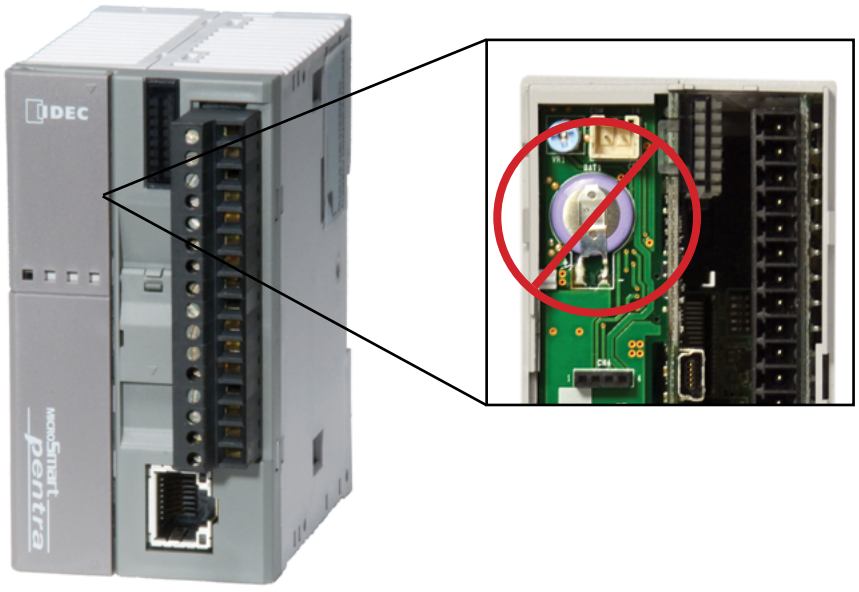


Maximum 7 Communication Ports



With MicroSmart Pentra PLCs, you don't have to worry about limited communication capabilities. It doesn't matter if you're just starting out or a current user expanding your MicroSmart Pentra PLC, you can rest assured that these communication modules will provide reliable and seamless communication. If RS485 modules are used for all six ports, up to 186 RS485 slave devices can be connected with as high as a 115K baud rate available for fast transmission.

Battery-less CPUs

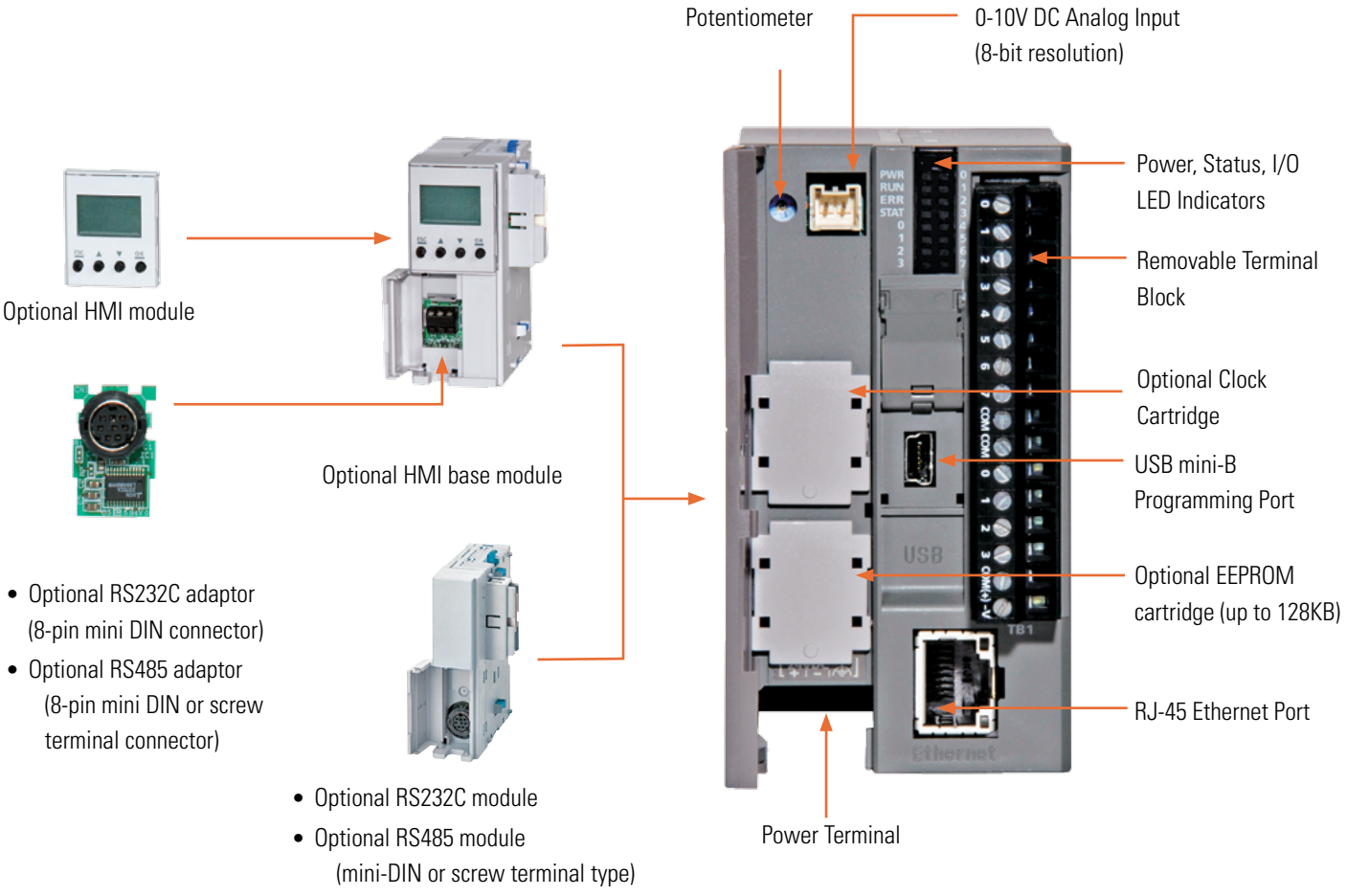


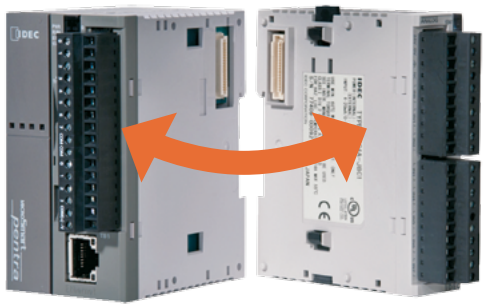
With most PLCs, dynamic values are stored and backed up by a rechargeable lithium battery. In most instances, this battery can only back up data for up to 30 days when the PLC is not powered, otherwise all data will be reset. Not only that, but most lithium battery only last up to 5 years. In that case the battery needs to be replaced or in some cases the entire unit.

Now, thanks to the MRAM memory designed into our new FC5A controllers, these limitations are a thing of the past! Values can be stored permanently to eliminate the hassle and worry of losing dynamic and preloaded data. This makes them ideal for applications that need to retain critical data permanently

Choose a CPU for every application

With three controller types to choose from, MicroSmart Pentra PLCs offer the features you need for your applications. Built to allow you the flexibility to expand when you need to, MicroSmart Pentra PLCs are the best way to get everything you need in just one controller.

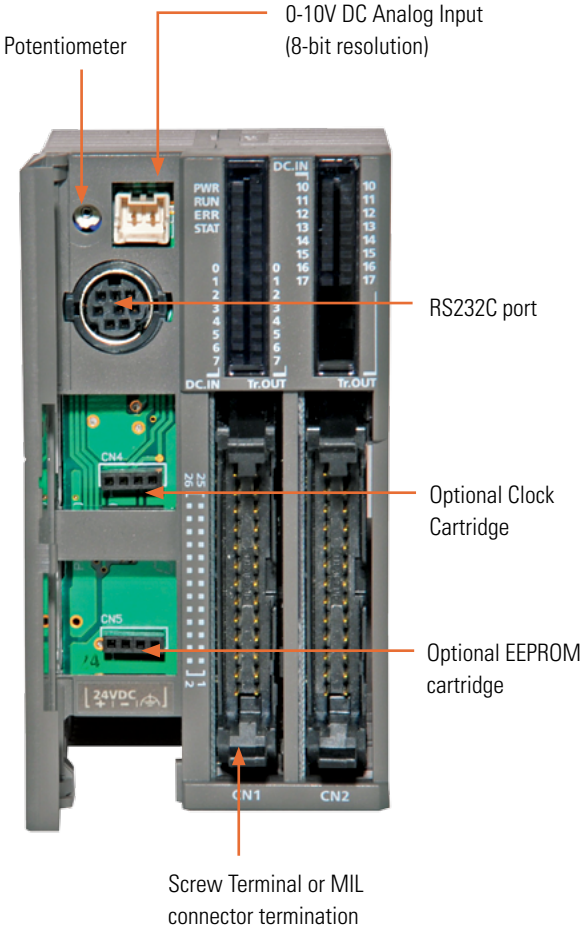


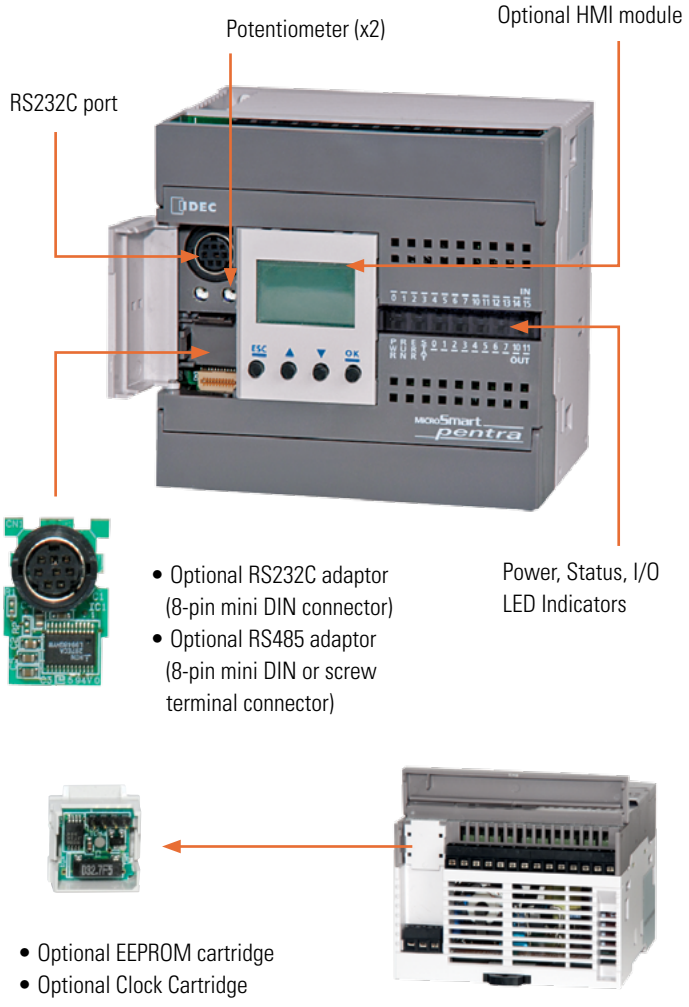


Modules snap together easily without the need for additional tools.

Slim CPU with Ethernet Port

The perfect design when you need Ethernet capability, this slim CPU with embedded Ethernet port is available with 24V DC power and equipped with eight DC inputs and four transistor outputs (sink or source). Up to seven functional modules, including analog and communication modules can be mounted on the right-hand expansion bus. Using an expansion interface module, an additional eight discrete expansion modules can be mounted.





Slim CPU

If you don't need Ethernet, but still want a high-performance CPU, the MicroSmart Pentra slim CPU is your best choice! Available with 24V DC power, this controller has all the functionalities you need in 16 and 32 I/O configurations. Each 16 I/O CPU is equipped with eight DC inputs, two transistor outputs (sink or source) and six relay outputs, while the 32 I/O CPU is equipped with 16 DC inputs and 16 transistor outputs (sink or source).

All-in-One CPU

Available with 12V DC, 24V DC and 100-240V AC power, you can choose from 10, 16 and 24 I/O configurations. The 10 I/O CPU is equipped with six DC inputs and four relay outputs, while the 16 I/O CPU is equipped with nine DC inputs and seven relay outputs. The 24 I/O CPU is equipped with 14 DC inputs and ten relay outputs. The 24 I/O CPU (24V DC and 100-240V AC models) can also be expanded with a maximum of four functional or discreet expansion modules.

MicroSmart Pentra CPU Part Numbers

Slim Base Module with Embedded Ethernet

Style	Part Number	Permanent Data Backup	Embedded I/Os	Operating Voltage	Ethernet & USB Port	Output	Maximum No. of Expansion Modules
	FC5A-D12K1E	—	12 (8in/4out)	24V DC	Yes	Transistor Sink	15 (Maximum 492 digital I/Os)
	FC5A-D12S1E					Transistor Source	
	FC5A-D12K1E-DS0838	Yes				Transistor Sink	
	FC5A-D12S1E-DS0838					Transistor Source	

Slim Base Module

Style	Part Number		Operating Voltage	Ethernet & USB Port	Output	Maximum No. of Expansion Modules
	FC5A-D16RK1	16 (8in/8out)	24V DC	—	6 Relays, 2 Trans. Sink	15 (Maximum 496 digital I/Os)
	FC5A-D16RS1				6 Relays, 2 Trans. Source	
	FC5A-D32K3	32 (16in/16out)			Transistor Sink	15 (Maximum 512 digital I/Os)
	FC5A-D32S3				Transistor Source	

All-in-One Base Module

Style	Part Number		Operating Voltage	Ethernet & USB Port	Output	Maximum No. of Expansion Modules
	FC5A-C10R2	10 (6in/4out)	120-240V AC	—	Relay	—
	FC5A-C10R2C		24V DC			
	FC5A-C10R2D		12V DC			
	FC5A-C16R2	16 (9in/7out)	120-240V AC			
	FC5A-C16R2C		24V DC			
	FC5A-C16R2D		12V DC			
	FC5A-C24R2	24 (14in/10out)	120-240V AC			4 (Maximum 88 digital I/Os)
	FC5A-C24R2C		24V DC			
	FC5A-C24R2D		12V DC			—

MicroSmart Performance

Key features:

- Available in 10, 16, 20, 24, and 40 I/O CPUs.
- PID Controls
  -Program up to 14 PID loops
- High Speed I/O
  -Built-in 4 high speed inputs
  -Single or Dual Phase
  -Max. 20KHz frequency
- Built-in 2 High speed outputs (Slim model only)
- Configure up to 264 I/O Points
- Data link up to 32 MicroSmart and Pentra CPUs
- Using RS485 communication module/port, you can create a network of up to 32 CPUs.
- Worldwide Approvals
  -cULus listed, CE marked
  -Class 1 Div. 2 for hazardous locations
  -Lloyds Registered and ABS approved for shipping industry

MicroSmart CPU Part Numbers

All-in-One

Style	Part Number	Power	I/O Points	Input	Output	Maximum No. of Expansion Modules
	FC4A-C10R2C	24V DC	10 (6 in/ 4 out)	24V DC (Sink/Source)	Relay	—
	FC4A-C10R2	100-240V AC				
	FC4A-C16R2C	24V DC	16 (9 in/ 7 out)			
	FC4A-C16R2	100-240V AC				
	FC4A-C24R2C	24V DC	24 (14 in/ 10 out)			4 (Maximum 88 digital I/Os)
	FC4A-C24R2	100-240V AC				

MicroSmart CPU Part Numbers

Slim

Style	Part Number	Power	I/O Points	Input	Output	Maximum No. of Expansion Modules
	FC4A-D20RK1	24V DC	20 (12 in/8 out)	24V DC (Sink/Source)	6 Relays, 2 Transistor Sink	7 (Maximum 244 digital I/Os)
	FC4A-D20RS1				6 Relays, 2 Transistor Source	
	FC4A-D20K3				Transistor Sink	7 (Maximum 148 digital I/Os)
	FC4A-D20S3				Transistor Source	
	FC4A-D40K3		40 (24 in/16 out)		Transistor Sink	7 (Maximum 264 digital I/Os)
	FC4A-D40S3				Transistor Source	

Digital I/O Expansion Modules

Key features:

- 15 modules to choose from
- Available with Screw or MIL connectors
- Easy snap-on
- Available 8, 16 or 32 point modules
- Up to 512 I/O can be configured in the Pentra and 264 I/O in the MicroSmart system

Input Modules

Style	Part Number	Input	Input Points	Terminal
	FC4A-N08A11	100-120V AC	8	Removable Screw Terminals
	FC4A-N08B1	24V DC		
	FC4A-N16B1		16	
	FC4A-N16B3			MIL Connector (ribbon cable)
	FC4A-N32B3		32	

Digital I/O Expansion Modules

Output Modules

Style	Part Number	Output	Output Points	Terminal
	FC4A-R081	Relay	8	Removable Screw Terminals
	FC4A-R161		16	
	FC4A-T08K1	Transistor Sink	8	
	FC4A-T16K3		16	MIL Connector (ribbon cable)
	FC4A-T32K3		32	

Digital I/O Expansion Modules

Output Modules (cont.)

Style	Part Number	Output	Output Points	Terminal
	FC4A-T08S1	Transistor Source	8	Removable Screw Terminals
	FC4A-T16S3		16	MIL Connector (ribbon cable)
	FC4A-T32S3		32	

Combination I/O Modules

Style	Part Number	Input	Output	I/O Points	Terminal
	FC4A-M08BR1	24V DC (Sink/Source)	Relay	8 (4 in/4 out)	Removable Screw Terminals
	FC4A-M24BR2			24 (16 in/ 8 out)	Wire Spring Clamp

Analog I/O Expansion Modules

Key features:

- 9 different modules to choose from
- 0-10V, 4-20mA, RTD, Thermocouple, Thermistor inputs, 0-10V DC or -10V DC to 10V DC output
- 12 or 16-bit resolution
- Fast conversion time
- Maximum of 56 I/O can be configured in the MicroSmart Pentra system
- Easy to configure using a Macro instruction in WindLDR

Modules

Style	Part Number	I/O Points	Input	Output	Resolution	Terminal
	FC4A-J8C1	8 (8 inputs)	0-10V DC, 4-20mA	–	16-bit (0-50000)	Removable Screw Terminals
	FC4A-L03A1	3 (2 inputs, 1 output)		0-10V DC, 4-20mA	12-bit (0-4095)	
	FC4A-J2A1	2 (2 inputs)		–		
	FC4A-J4CN1	4 (4 inputs)	0-10V DC, 4-20mA, RTD, Thermocouple	–	16-bit (0-50000)	
	FC4A-L03AP1	3 (2 inputs, 1 output)	RTD, Thermocouple	0-10V DC, 4-20mA	12-bit (0-4095)	

Analog I/O Expansion Modules

Modules (cont.)

Style	Part Number	I/O Points	Input	Output	Resolution	Terminal
	FC4A-J8AT1	8 (8 inputs)	Thermistor (NTC/PTC)	–	12-bit (0-4000)	Removable Screw Terminals
	FC4A-K2C1	2 (2 outputs)	–	-10 to 10V DC, 4-20mA	16-bit (0-50000)	
	FC4A-K1A1	1 (1 output)	–	0-10V DC, 4-20mA	12-bit (0-4095)	
	FC4A-K4A1	4 (4 outputs)				

Communication Modules

Web Server Module

Features:

- Easy to configure
- Comes with interface cable and Quick Start Guide

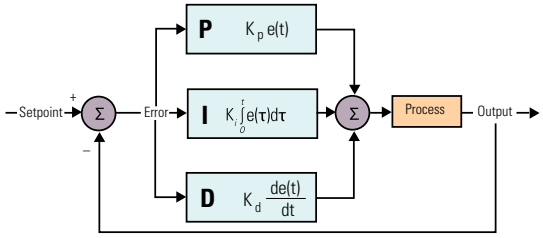
Part Numbers

Style	Part Number	Description
	FC4A-ENET	Web Server Module (includes cable and Quick Start Guide)

Style	Part Number	Description
	FC9Y-QS100-0	Quick Start Guide

Advanced PID for precision control

PID (Proportional Integral Derivative) is the most commonly used feedback control loop in industrial control systems. PID calculates an error value as the difference between a measured process variable and a desired set point. The controller then attempts to minimize the error by adjusting the process control. With MicroSmart Pentra PLCs, PID implementation can be deployed in two ways: integrated PID controls or a dedicated Process Control module, which can be mounted on the MicroSmart Pentra expansion bus.



Advanced PID Control Module

A dedicated PID Control module is available for extreme stability and complex applications. This particular module has more functionalities than you will find in any other controller on the market. Independent of CPU scan time, the PID Control module does the work, reducing PLC scan time without taking up PLC memory space.

Advanced PID Control Module Part Numbers

Style	Part Number	Description
	FC5A-F2M2	PID Control Module with 2x analog inputs and 2x 4-20mA/non-contact voltage for SSR drive
	FC5A-F2MR2	PID Controls Module with 2x analog inputs and 2x Relay Outputs

PID Control Module Highlights:

- Precise, stable and accurate PID control with less than a 0.2% error
- Available in two models:
  - Built-in 2 analog inputs, 2 x 4-20mA/ non-contact voltage for SSR drive
  - Built-in 2 analog inputs, 2 x relay outputs
- Each input individually configured to accept different signal types
- Up to seven modules can be mounted on the MicroSmart Pentra
- Maximum 14 PID loops with auto-tuning
- 14-bit resolution
- ARW (anti-reset windup)
- Accepts many different input types including:
  - Type K, J, R, S, B, E, T, C, PL-II and N thermocouples
  - RTD
  - 0-20 mA and 4-20 mA
  - 0-1V, 0-5V, 1-5V, and 0-10V DC
- Numerous control methods including:
  - Cascade
  - External set point
  - Heating and cooling control action
  - Difference input control

Communication Module

Style	Part Number	Description
	FC5A-SIF4	RS485 Communication Module for MicroSmart Pentra configure as port 3 to 7
	FC5A-SIF2	RS232 Communication Module for MicroSmart Pentra configure as port 3 to 7

Communicate with up to seven different serial devices

Only IDEC offers communication modules that enable you to configure up to seven serial devices! Now you can connect your operator interface, PC, barcode reader, RFID equipment, printer and more. Just imagine the possibilities.

Using the MicroSmart Pentra slim CPU,you can configure up to seven communication ports. Using the All-in-one MicroSmart Pentra you can communicate with up to five serial devices.

Optional Modules

Style	Part Number	Description	Usage
	FC4A-HPH1	HMI Base Module	For mounting HMI module and communication ports with slim model CPU module (HMI module is not included)
	FC4A-PH1	HMI Module	For displaying and changing operands
	FC4A-PM32	EEPROM memory cartridge	32KB EEPROM memory cartridge
	FC4A-PM64	EEPROM memory cartridge	64KB EEPROM memory cartridge
	FC4A-PM128	EEPROM memory cartridge	128KB EEPROM memory cartridge
	FC4A-PT1	Clock cartridge	Real-time clock cartridge

Communication Ports

Style	Part Number	Description	Terminal
	FC4A-PC1	RS232C	Mini DIN
	FC4A-PC2	RS485	Mini DIN
	FC4A-PC3	RS485	Screw Terminal

Communication Module — for Slim CPU

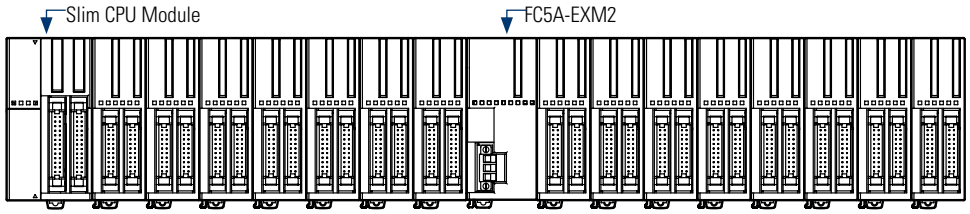
Style	Part Number	Description	Terminal
	FC4A-HPC1	RS232C	Mini DIN
	FC4A-HPC2	RS485	Mini DIN
	FC4A-HPC3	RS485	Screw Terminal

Expansion Power Supply Module

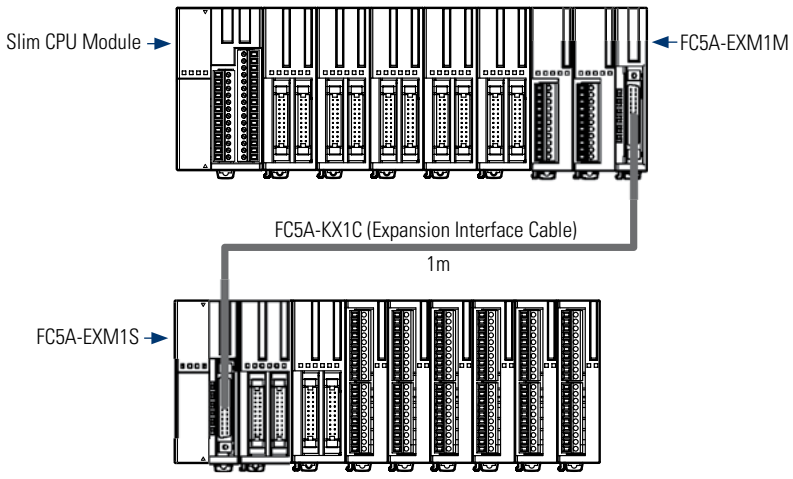
Style	Part Number	Description
	FC5A-EXM1M	Master Expansion Power Supply For MicroSmart Pentra
	FC5A-EXM1S	Slave Expansion Power Supply For MicroSmart Pentra
	FC5A-EXM2	Expansion Power Supply For MicroSmart Pentra

Expansion Power Supply System Configuration

FC5A-EXM2 (Expansion Interface Module)



FC5A-EXM1M and FC5A-EXM1S (Expansion Interface Master & Salve Modules)



Cables

Communication Cables

Appearance	Part Number	Length	Expanded Description
	FC4A-KC4CA	5ft. (1.53m)	Programming cable (Maintenance/User Communication Mode selectable)
	FC4A-USB	6ft. (1.83m)	USB to Serial Converter
	FC4A-KC3C	0.33ft. (100mm)	Web Server Module interface cable
	HG9Z-XCM2A	6ft. (1.83m)	USB programming cable for embedded Ethernet CPU

Appearance	Part Number	Length	Expanded Description
	FC2A-KM1C	9.84 Ft. (3m)	Modem cable. Used to connect a modem to the MicroSmart RS232C port.
	FC2A-KP1C	9.84 Ft. (3m)	User communication cable. Used to connect RS232C equipment to the MicroSmart RS232C port.
	FC5A-KX1C	3.28 Ft. (1m)	MicroSmart Pentra expansion power supply interface cable. Used to connect expansion interface master and expansion slave modules.

MIL Connector Cables (use with Breakout Modules)

Use with	Part Number	Model	Length
CPU Module (26-wire) BX1D-S26A, BX1D-T26A	FC9Z-H050B26	Non-shielded	1.64ft. (0.5m)
	FC9Z-H100B26		3.28ft. (1m)
	FC9Z-H200B26		6.56ft (2m)
	FC9Z-H300B26		9.85ft. (3m)
	FC9Z-H050A26	Shielded	1.64ft. (0.5m)
	FC9Z-H100A26		3.28ft. (1m)
	FC9Z-H200A26		6.56ft (2m)
	FC9Z-H300A26		9.85ft. (3m)
	FC9Z-H100C26A	Shielded Single Connectors	5ft. (1.5m)

Use with	Part Number	Model	Length
I/O Expansion Modules (20-wire) BX1D-S20A, BX1D-T20A	FC9Z-H050B20	Non-shielded	1.64ft. (0.5m)
	FC9Z-H100B20		3.28ft. (1m)
	FC9Z-H200B20		6.56ft (2m)
	FC9Z-H300B20		9.85ft. (3m)
	FC9Z-H050A20	Shielded	1.64ft. (0.5m)
	FC9Z-H100A20		3.28ft. (1m)
	FC9Z-H200A20		6.56ft (2m)
	FC9Z-H300A20		9.85ft. (3m)
	FC9Z-H100C20A	Shielded Single Connectors	5ft. (1.5m)

Breakout Modules

Use with	Part Number	Descrption
26-wire MIL connector cable 	BX1D-S26A	26-terminal breakout module
	BX1D-T26A	26-terminal touch-down terminal breakout module
20-wire MIL connector cable 	BX1D-S20A	20-terminal breakout module
	BX1D-T20A	20-terminal touch-down terminal breakout module

Accessories

Part Number	Use with	Description
FC4A-PMT13	CPU module	13-position left-side terminal block for FC4A-D20RK1/-D20RS1 CPU
FC5A-PMT13		13-position left-side terminal block for FC5A-D16RK1/-D16RS1 CPU
FC4A-PMTS16		16-position right-side terminal block for FC4A-D20RS1 and FC5A-D16RS1 CPU
FC4A-PMTK16		16-position right-side terminal block for FC4A-D20RK1 and FC5A-D16RK1 CPU
FC4A-PMT11	I/O expansion modules	11-position terminal block for 8-pt I/O expansion modules
FC4A-PMT10		10-position terminal block for 16-pt I/O expansion modules
FC4A-PMC20		20-position connector socket for MIL connector I/O expansion modules
FC4A-PMC26		26-position connector socket for MIL connector CPU modules
FC4A-PSP1		Direct mounting strips for mounting on a panel
FC4A-PMAC2		Analog voltage input cable for slim CPU
FC4A-DS824-SW14		14-pt input simulator switch for 24 I/O CPU
FC4A-DS824-SW9		9-pt input simulator switch for 16 I/O CPU
FC4A-DS824-SW6		6-pt input simulator switch for 10 I/O CPU
FC9Y-B812-0A		MicroSmart user manual
FC9Y-B1138-0		MicroSmart Pentra user manual
SW1A-W1C		Automation Organizer Software Suite

RV8 Series 6mm Interface Relays

Key Features

- Space-saving 6mm width
- Only 70mm in height from DIN rail
- Gold-plated contacts
- Pre-assembled relay and DIN mount socket
- Universal screw terminals (flat and Phillips)
- Universal AC/DC socket with built-in surge suppression and green LED
- Lever for easy locking and removal of relay
- Wide input voltage range: 6 to 240V
- High dielectric strength and impulse withstand voltages
- Sensitive coil 170mW
- Reverse Polarity protected
- 400V AC maximum switching voltage
- 1500VA maximum switching power
- RoHS compliant

(when using combination of RV1H relay and SV1H socket)

Part Numbers

Coil Voltage		Screw Terminal	Spring Clamp
DC	6V	**RV8H-L-D6**	**RV8H-S-D6**
	9V	RV8H-L-D9	RV8H-S-D9
	12V	**RV8H-L-D12**	**RV8H-S-D12**
	18V	RV8H-L-D18	RV8H-S-D18
	24V	**RV8H-L-D24**	**RV8H-S-D24**
AC/DC	12V	**RV8H-L-AD12**	**RV8H-S-AD12**
	18V	RV8H-L-AD18	RV8H-S-AD18
	24V	**RV8H-L-AD24**	**RV8H-S-AD24**
	48V	RV8H-L-AD48	RV8H-S-AD48
	60V	RV8H-L-AD60	RV8H-S-AD60
	110V - 125V	**RV8H-L-AD110**	**RV8H-S-AD110**
	220V - 240V	**RV8H-L-AD220**	**RV8H-S-AD220**

Standard stock models in bold.

Accessories

Item	Color	Part Number
Jumper (20 combs) [1]	Black	SV9Z-J20B
	Gray	SV9Z-J20W
	Blue	SV9Z-J20S
Spacer (circuit separator) [2]	-	SV9Z-SA2W
Marking plate (10 pcs)	-	SV9Z-PW10

1. Jumper combs come with 20 points, if shorter lengths are needed simply cut off the excess points.
2. Width of spacer: 2mm

Note: When using a cut jumper, please use a spacer on the cut side. For additional information see instruction sheet.

Starter Kits and Solution Packages

MicroSmart Starter Kits

Item		Part Numbers	Controller	Power Supply	Software (Prog. Cables Included)
MicroSmart		MM-SMART-10	10 I/O FC4A-C10R2 CPU	–	Automation Organizer Software Suite
		MM-SMART-16	16 I/O FC4A-C16R2 CPU	–	
		MM-SMART-20	20 I/O FC4A-D20RK1 CPU	15W	
		MM-SMART-24	24 I/O FC4A-C24R2 CPU	–	
		MM-SMART-40	40 I/O FC4A-D40K3 Slim CPU	15W	
MicroSmart Pentra		MM-PENTRA-16	16 I/Os FC5A-D16RS1 CPU	30W	
		MM-PENTRA-24	24 I/Os FC5A-C24R2 CPU	–	
		MM-PENTRA-12	12 I/Os FC5A-D12S1E Embedded Ethernet	30W	

MicroSmart Solution Packages

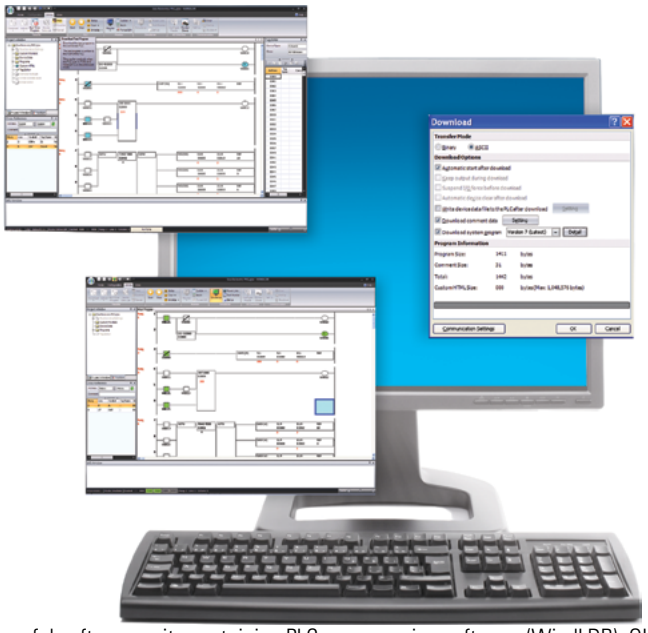
KIT-PENTRA-12-HG3G-AHP shown

Part Numbers	Operator Interface	Controller	Power Supply	Software (Prog. Cables Included)
KIT-PENTRA-24-HG1F	4.6" HG1F Mono	24 I/O FC5A-C24R2C CPU	60W	Automation Organizer Software Suite
KIT-PENTRA-12-HG1F	4.6" HG1F Mono	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	
KIT-PENTRA-24-HG2G-M	5.7" HG2G Color TFT LCD	24 I/O FC5A-C24R2C CPU	60W	
KIT-PENTRA-12-HG2G-M	5.7" HG2G Color TFT LCD	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	
KIT-PENTRA-24-HG2G-TE	5.7" HG2G Color TFT LCD	24 I/O FC5A-C24R2C CPU	60W	
KIT-PENTRA-12-HG2G-TE	5.7" HG2G Color TFT LCD	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	
KIT-PENTRA-24-HG2G-HP	5.7" HG2G Color TFT LCD	24 I/O FC5A-C24R2C CPU	60W	
KIT-PENTRA-16-HG2G-HP	5.7" HG2G Color TFT LCD	16 I/O FC5A-D16RS1 CPU	60W	
KIT-PENTRA-12-HG2G-HP	5.7" HG2G Color TFT LCD	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	
KIT-PENTRA-16-HG3G-8HP	8.4" HG3G Color TFT LCD	16 I/O FC5A-D16RS1 CPU	60W	
KIT-PENTRA-12-HG3G-8HP	8.4" HG3G Color TFT LCD	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	
KIT-PENTRA-16-HG3G-AHP	10.4" HG3G Color TFT LCD	16 I/O FC5A-D16RS1 CPU	60W	
KIT-PENTRA-12-HG3G-AHP	10.4" HG3G Color TFT LCD	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	
KIT-PENTRA-16-HG4G-HP	12.1" HG4G Color TFT LCD	16 I/O FC5A-D16RS1 CPU	60W	
KIT-PENTRA-12-HG4G-HP	12.1" HG4G Color TFT LCD	12 I/O FC5A-D12S1E Embedded Ethernet CPU	60W	

OI Touchscreens have black bezels. All packages come with Automation Organizer software suite and communication cables.

Automation Organizer Suite

Programming Software



Automation Organizer (AO) is a powerful software suite containing PLC programming software (WindLDR), OI touchscreen configuration software (WindO/I-NV2/NV3) and system configuration software (WindCFG). AO boasts a completely new graphic user interface and redesigned menu icons. AO is a one-stop automation software package for IDEC MicroSmart Pentra PLCs and IDEC OI touchscreens, and is compatible with Windows XP, Vista (32 bit) and Windows 7 and 8 (32 and 64-bit).

Automation Organizer **WindLDR**

All IDEC MicroSmart Pentra PLCs are programmable with WindLDR ladder logic software. This icon-driven programming tool combines logic and intuition with an incredibly easy-to-use interface to allow you to take advantage of MicroSmart features. Even without ladder program experience, you can use the built-in editors, shortcuts and debuggers to configure programs. WindLDR is an excellent, long-term investment for your control solutions.

Simulation Mode

WindLDR allows you to simulate ladder programs with built-in Simulation mode. You can easily test and verify functionality of your ladder program without actual hardware.

Online Editing

Shutting down your PLC for minor changes can be a major hassle, so WindLDR allows you to edit and download programs without interrupting PLC operation. You can write new values to counters, timers and registers at any time without switching between editor mode (for programming) and monitor mode.

Firmware Download

With WindLDR version 6.4 or later, you have the option to upgrade or downgrade your CPU system program. It's as simple as clicking on the checkbox in the Download dialog box. Now you can easily update your PLC system firmware with the click of a button.

FREE Upgrades

The Automation Organizer suite comes with free lifetime upgrades. Once you make the initial purchase, upgrades are absolutely free.

Automation Organizer **WindO/I-NV2**

Automation Organizer **WindO/I-NV3**

Automation Organizer **WindO/I-NV4**

WindO/I-NV2/NV3/NV4 software is the programming tool available for all IDEC OI touchscreens and FT1A Touch. It is used to create projects or programs that can display information from a PLC, process status, or can be used to input data with virtual switches or keypads to make changes to a process. The objects are extremely easy to configure with the help of step- by-step navigation. It lets you quickly create colorful graphical screens in no time using drop-down menus and intuitive drag and drop functionality for the objects. A workspace is available to help you organize and manage projects, objects and screens.

Automation Organizer **WindCFG**

WindCFG is a system layout and configuration tool for IDEC PLCs and OI touchscreens. Using WindCFG, you can create a visual layout of the system design and basic configuration of your PLC and OI touchscreens.

Part Number

Part Number	Description
SW1A-W1C	Automation Organizer software suite

For more information, see page 131.

Specifications

Slim Type

Model	FC5A-D12K1E-DS0838 FC5A-D12S1E-DS0838	FC5A-D12K1E FC5A-D12S1E	FC5A-D16RK1 FC5A-D16RS1	FC5A-D32K3 FC5A-D32S3	FC4A-D20K3 FC4A-D20S3	FC4A-D20RK1 FC4A-D20RS1	FC4A-D40K3 FC4A-D40S3
Rated Power Voltage	24V DC						
Allowable Voltage Range	20.4 to 26.4V DC (including ripple)						
Maximum Input Current	700 mA (26.4V DC)[1]				560 mA (26.4V DC)[1]	700 mA (26.4V DC)[1]	
Maximum Power Consumption	19W (26.4V DC)[1]				14W (26.4V DC)[1]	17W (26.4V DC)[1]	
Allowable Momentary Power Interruption	10 ms (at 24V DC)						
Dielectric Strength	Between power and ⏚ terminals: 500V AC, 1 minute Between I/O and ⏚ terminals: 500V AC, 1 minute						
Insulation Resistance	Between power and ⏚ terminals: 10 MΩ minimum (500V DC megger) Between I/O and ⏚ terminals: 10 MΩ minimum (500V DC megger)						
Noise Resistance	DC power terminals: 1.0 kV, 50 ns to 1 µs I/O terminals (coupling clamp): 1.5 kV, 50 ns to 1 µs						
Inrush Current	50A maximum (24V DC)						
Power Supply Wire	UL1015, AWG22, UL1007 AWG18						
Operating Temperature	0 to 55°C						
Storage Temperature	–25 to +70°C (no freezing)						
Relative Humidity	Level RH1 (IEC61131-2), 10 to 95% (no condensation)						
Altitude	Operation: 0 to 2,000m, Transport: 0 to 3,000m						
Pollution Degree	2 (IEC60664-1)						
Corrosion Immunity	Free from corrosive gases						
Degree of Protection	IP20 (IEC60529)						
Grounding Wire	UL1015, AWG22, UL1007, AWG18						
Vibration Resistance	When mounted on a DIN rail or panel surface: 5 to 8.4 Hz 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 axes (IEC61131-2)						
Shock Resistance	147 m/s^2 (15G), 11 ms duration, 3 shocks per axis on three mutually perpendicular axes (IEC61131-2)						
Weight	200g		230g	190g	140g	185g	180g

1. CPU module + 7 I/O modules

All-in-One Type

Model		FC5A-C10R2 FC5A-C10R2C FC5A-C10R2D	FC5A-C16R2 FC5A-C16R2C FC5A-C16R2D	FC5A-C24R2 FC5A-C24R2C FC5A-C24R2D	FC4A-C10R2 FC4A-C10R2C	FC4A-C16R2 FC4A-C16R2C	FC4A-C24R2 FC4A-C24R2C
Rated Power Voltage		AC power type: 100 to 240V AC, DC power type: 24V DC, 12V DC					
Allowable Voltage Range		AC power type: 85 to 264V AC, 24V DC power type: 20.4 to 28.8V DC (including ripple), 12V DC type: 10.2 to 18.0V DC					
Rated Power Frequency		AC power type: 50/60 Hz (47 to 63 Hz)					
Maximum Input Current		250 mA (85V AC) 160 mA (24V DC)	300 mA (85V AC) 190 mA (24V DC)	450 mA (85V AC)[1] 360 mA (24V DC)[2]	250 mA (85V AC) 160 mA (24V DC)	300 mA (85V AC) 190 mA (24V DC)	450 mA (85V AC)[1] 360 mA (24V DC)[2]
Maximum Power Consumption	AC Power	FC5A-C10R2/FC4A-C10R2: 30VA (264V AC), 20VA (100V AC)[3] FC5A-C16R2/FC4A-C16R2: 31VA (264 V AC), 22VA (100V AC)[3] FC5A-C24R2/FC4A-C24R2: 40VA (264V AC), 33VA (100V AC)[1]					
	DC Power	FC5A-C10R2C/FC4A-C10R2C: 3.9W (24V DC) *5 FC5A-C10R2D: 2.8W (12V DC)[4] FC5A-C16R2C/FC4A-C16R2C: 4.6W (24V DC) *5 FC5A-C16R2D: 3.4W (12V DC)[4] FC5A-C24R2C/FC4A-C24R2C: 8.7W (24V DC) *3 FC5A-C24R2D: 4.2W (12V DC)[4]					
Allowable Momentary Power Interruption		10 ms (rated power voltage)					
Dielectric Strength		Between power and ⏚ or ⏢ terminals: 1,500V AC, 1 minute Between I/O and ⏚ or ⏢ terminals: 1,500V AC, 1 minute					
Insulation Resistance		Between power and ⏚ or ⏢ terminals: 10 MΩ minimum (500V DC megger) Between I/O and ⏚ or ⏢ terminals: 10 MΩ minimum (500V DC megger)					
Noise Resistance		AC power terminals: 1.5 kV, 50 ns to 1 µs DC power terminals: 1.0 kV, 50 ns to 1 µs I/O terminals (coupling clamp): 1.5 kV, 50 ns to 1 µs					
Inrush Current		FC5A-C10R2/FC5A-C10R2C/FC5A-C16R2/ FC5A-C16R2C: 35A FC5A-C10R2D/FC5A-C16R2D: 20A		FC5A-C24R2/ FC5A-C24R2C: 40A FC5A-C24R2D: 20A	35A		40A
Power Supply Wire		UL1015 AWG22, UL1007 AWG18					
Operating Temperature		0 to 55°C					
Storage Temperature		–25 to +70°C (no freezing)					
Relative Humidity		Level RH1 (IEC61131-2), 10 to 95% (no condensation)					
Altitude		Operation: 0 to 2,000m, Transport: 0 to 3,000m					
Pollution Degree		2 (IEC60664-1)					
Corrosion Immunity		Free from corrosive gases					
Degree of Protection		IP20 (IEC60529)					
Ground		Ground resistance 100Ω (max.)					
Grounding Wire		UL1007, AWG16					
Vibration Resistance		When mounted on a DIN rail or panel surface: 5 to 8.4 Hz 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 axes (IEC61131-2)					
Shock Resistance		147 m/s^2 (15G), 11 ms duration, 3 shocks per axis on three mutually perpendicular axes (IEC61131-2)					
Weight		AC type: 230g DC type: 240g	AC type: 250g DC type: 260g	AC type: 305g DC type: 310g	AC type: 230g DC type: 240g	AC type: 250g DC type: 260g	AC type: 305g DC type: 310g

1. CPU module (including 250 mA sensor power) + 4 I/O modules
2. CPU module + 4 I/O modules
3. CPU module (including 250 mA sensor power)
4. CPU module

Slim Type Function Specifications

Model	FC5A-D12K1E-DS0838 FC5A-D12S1E-DS0838	FC5A-D12K1E FC5A-D12S1E	FC5A-D16RK1 FC5A-D16RS1	FC5A-D32K3 FC5A-D32S3	FC4A-D20K3 FC4A-D20S3	FC4A-D20RK1 FC4A-D20RS1	FC4A-D40K3 FC4A-D40S3
Control System	Stored program system						
Instruction Words	42 basic, 152 advanced		126 advanced	130 advanced	35 basic, 53 advanced	72 advanced	
Program Capacity [1]	127.8 KB (21,300 steps)		62.4 KB (10,400 steps)		27 KB (4,500 steps)	31.2 KB (5,200 steps) [2]	
User Program Storage	Flash ROM (10,000 times rewritable)		EEPROM (10,000 times rewritable)				
Processing Time — Basic Instruction	83 µs (1,000 steps)				1.65 ms (1,000 steps)		
Processing Time — END Processing [3]	0.35 ms				0.64 ms		
Expandable I/O Modules	7 modules + additional 8 modules using the expansion interface module				7 modules		
I/O Points — Input	8	8	8	16	12	12	24
I/O Points — Output	4	4	8	16	8	8	16
Expansion	Expansion: 224 Additional: 256	Expansion: 224 Additional: 256	Expansion: 224 Additional: 256	Expansion: 224 Additional: 256	Expansion: 128	Expansion: 224	Expansion: 224
Internal Relay	2,048 points				1,024 points		
Shift Register	256 points				128 points		
Data Register	42,000 points		42,000 points [4]		1,300 points		
Expansion Data Register	6,000 points				—	6,000 points	
Counter	256 points				100 points		
Timer (1-sec, 100-ms, 10-ms, 1-ms)	256 points				100 points		
RAM Backup — Backup Data	Non-volatile memory (MRAM)	Internal relay, shift register, counter, data register, expansion data register					
RAM Backup — Backup Method		Battery					
RAM Backup — Backup Retension	Approx. 10 yrs without Backup Cycle	Approx. 30 days (typical) at 25°C after backup battery fully charged					
RAM Backup — Battery		Lithium secondary battery					
RAM Backup — Charging Time		Approx. 15 hours for charging from 0% to 90% of full charge					
RAM Backup — Battery Life		5 years in cycles of 9-hour charging and 15-hour discharging					
RAM Backup — Replaceability		Not possible to replace battery					
Self-diagnostic Function	Power failure, watchdog timer, data link connection, user program ROM sum check, timer/counter preset value sum check, user program RAM sum check, keep data, user program syntax, user program writing, CPU module, clock IC, I/O bus initialize, user program execution						
Input Filter	Without filter, 3 to 15 ms (selectable in increments of 1 ms)						
Catch Input/Interrupt Input	Four inputs (I2 and I5) Minimum turn on pulse width: 40 µs maximum Minimum turn off pulse width: 150 µs maximum (I3 and I4) Minimum turn on pulse width: 5 µs maximum Minimum turn off pulse width: 5 µs maximum				Four inputs (I2 through I5) Minimum turn on pulse width: 40 µs maximum Minimum turn off pulse width: 150 µs maximum		
High-speed Counter — Maximum Counting Frequency and High-speed Counter Points	Total 4 points Single/two-phase selectable: 100 kHz (2 points) Single-phase: 100 kHz (2 points)				Total 4 points Single/two-phase selectable: 20 kHz (2 points) Single-phase: 5 kHz (2 points)		
High-speed Counter — Counting Range	0 to 4,294,967,295 (32 bits)				0 to 65,535 (16 bits)		
High-speed Counter — Operation Mode	Rotary encoder mode and adding counter mode						
Analog Potentiometer — Quantity	1 point						
Analog Potentiometer — Data Range	0 to 255						
Analog Voltage Input — Quantity	1 point						
Analog Voltage Input — Input Voltage Range	0 to 10V DC						
Analog Voltage Input — Input Impedance	Approx. 100 kΩ						
Analog Voltage Input — Data Range	0 to 255 (8 bits)						
Pulse Output — Quantity	3 points		2 points	3 points	2 points		
Pulse Output — Maximum Frequency	100 kHz				20 kHz		

Note: The maximum number of relay outputs that can be turned on simultaneously is 54 including those on the CPU module. Modem communication not possible on FC5A-D12K1E/D12S1E modules.

1. 1 step equals 6 bytes.
2. Expandable up to 62.4 KB when a memory cartridge is used.
3. Not including expansion I/O service time, clock function processing time, data link processing time, and interrupt processing time.
4. Extra data registers D10000 through D49999 are enabled using WindLDR Function Area Settings, then run-time program download cannot be used.
5. Maintenance communication (change monitor device values, upload/download user programs, download system program)
6. Maintenance communication, user communication, modem communication, data link, Modbus ASCII/RTU master/slave communication (FC5A only).

Slim Type Function Specifications (con't)

Model		FC5A-D12K1E-DS0838 FC5A-D12S1E-DS0838	FC5A-D12K1E FC5A-D12S1E	FC5A-D16RK1 FC5A-D16RS1	FC5A-D32K3 FC5A-D32S3	FC4A-D20K3 FC4A-D20S3	FC4A-D20RK1 FC4A-D20RS1	FC4A-D40K3 FC4A-D40S3
Ethernet Port	Ethernet Specifications	Electrical Characteristics: Complies with IEEE802.3 Transmission Speed: 10BASE-T/100BASE-TX		—				
	Ethernet Interface	RJ45						
	User Web Page Area	1 MB						
	Compliant Browser	Internet Explorer 7 and 8, Firefox 3						
	Protocol	Data Link Layer: IP, ARP Network Layer: UDP, TCP, ICMP Application Layer: SMTP, DHCP, HTTP, NBNS, DNS, SNTP						
	Function (see table next page)	Web server, Send email, PING, Maintenance com-mnunication server, Modbus TCP server/client, User communication server/client, SNTP						
Port 1		USB mini-B (CDC class) Maintenance Communication[5]		RS232C – maintenance communication, user communications, Modbus slave ASCII/RTU communication (FC5A only)				
Port 2 Communication Adapter/ Module (option)[6]		Possible						
Clock Cartridge (option)		Possible						
Memory Cartridge (option)		Possible						
HMI Module (option)		Possible						

Note: The maximum number of relay outputs that can be turned on simultaneously is 54 including those on the CPU module. Modem communication not possible on FC5A-D12K1E/D12S1E modules.

1. 1 step equals 6 bytes.
2. Expandable up to 62.4 KB when a memory cartridge is used.
3. Not including expansion I/O service time, clock function processing time, data link processing time, and interrupt processing time.
4. Extra data registers D10000 through D49999 are enabled using WindLDR Function Area Settings, then run-time program download cannot be used.
5. Maintenance communication (change monitor device values, upload/download user programs, download system program)
6. Maintenance communication, user communication, modem communication, data link, Modbus ASCII/RTU master/slave communication (FC5A only).

All-in-One Type Function Specifications

Model			FC5A-C10R2 FC5A-C10R2C FC5A-C10R2D	FC5A-C16R2 FC5A-C16R2C FC5A-C16R2D	FC5A-C24R2 FC5A-C24R2C FC5A-C24R2D		FC4A-C10R2 FC4A-C10R2C	FC4A-C16R2 FC4A-C16R2C	FC4A-C24R2 FC4A-C24R2C	
Control System			Stored program system							
Instruction Words			42 basic				35 basic			
			103 advanced	103 advanced	115 advanced		38 advanced	40 advanced	48 advanced	
Program Capacity [1]			13.8 KB (2,300 steps)	27 KB (4,500 steps)	54 KB (9,000 steps)		4.8 KB (800 steps)	15 KB (2,500 steps)	27 KB (4,500 steps)	
User Program Storage			EEPROM (10,000 times rewritable)							
Processing Time	Basic Instruction		1.16 ms (1,000 steps)				1.65 ms (1,000 steps)			
	END Processing [2]		0.64 ms				0.64 ms			
Expandable I/O Module			—		4 modules		—		4 modules	
I/O Points	Input		6	9	14	Expansion: 64 [3]	6	9	14	Expansion: 64
	Output		4	7	10		4	7	10	
Internal Relay			2,048 points				256 points	1,024 points		
Shift Register			128 points				64 points	128 points		
Data Register			2,000 points				400 points	1,300 points		
Expansion Data Register			—				—			
Counter			256 points				32 points	100 points		
Timer (1-sec, 100-ms, 10-ms, 1-ms)			256 points				32 points	100 points		
RAM Backup	Backup Data		Internal relay, shift register, counter, data register							
	Backup Duration		Approx. 30 days (typical) at 25°C after backup battery fully charged							
	Battery		Lithium secondary battery							
	Charging Time		Approx. 15 hours for charging from 0% to 90% of full charge							
	Battery Life		5 years in cycles of 9-hours charging and 15-hours discharging							
	Replaceability		Not possible to replace battery							
Self-diagnostic Function			Power failure, watchdog timer, data link connection, user program EPPROM sum check, timer/counter preset value sum check, user program RAM sum check, keep data, user program syntax, user program writing, CPU module, clock IC, I/O bus initialize, user program execution							
Input Filter			Without filter, 3 to 15 ms (selectable in increments of 1 ms)							
Catch Input/Interrupt Input			Four inputs (I2 through I5) Minimum turn on pulse width: 40 µs maximum Minimum turn off pulse width: 150 µs maximum							
High-speed Counter	Maximum Counting Frequency and High-speed Counter Points		Total 4 points Single/two-phase selectable: 50 kHz (1 point) Single-phase: 5 kHz (3 points)				Total 4 points Single/two-phase selectable: 20 kHz (1 point) Single-phase: 5 kHz (3 points)			
	Counting Range		0 to 65,535 (16 bits)							
	Operation Mode		Rotary encoder mode and adding counter mode							
Analog Potentiometer	Quantity		1 point		2 points		1 point		2 points	
	Data Range		0 to 255							
Analog Voltage Input	Quantity Input Voltage Range Input Impedance Data Range		—							
Pulse Output	Quantity Max. Frequency		—							
Sensor Power Supply (AC Power Type Only)	Output Voltage/Current		24V DC (+10% to –15%), 250 mA							
	Overload Detection		Not available							
	Isolation		Isolated from the internal circuit							
Port 1			RS232C – maintenance communication, user communications, Modbus ASCII/RTU slave communication (FC5A only)							
Port 2 Communication Adapter (option) [4]			Possible	Possible	Possible		—	Possible	Possible	
Clock Cartridge (option)			Possible	Possible	Possible		Possible	Possible	Possible	
Memory Cartridge (option)			Possible	Possible	Possible		Possible	Possible	Possible	
HMI Module (option)			Possible	Possible	Possible		Possible	Possible	Possible	

1. 1 step equals 6 bytes.
2. Not including expansion I/O service time, clock function processing time, data link processing time, and interrupt processing time.
3. Expansion modules cannot be connected to FC5A-C24R2D.
4. Maintenance communication, user communication, Modem communication, data link, Modbus ASCII/RTU master/slave communication (FC5A only).

Note: The maximum number of relay outputs that can be turned on simulatneously is 33 including those on the CPU module.

Communication Port (Port 1) Specifications

CPU Module	FC5A-D12K1E/D12S1E	Slim CPU	All-in-One CPU
Standards	USB 2.0	EIA RS232C	
Maximum Baud Rate	USB 2.0	FC5A: 57,600 bps (maintenance communication) FC4A: 19,200 bps (maintenance communication)	
Cable	HG9Z-XCM2A	FC2A-KC4C, FC2A-KP1C, FC4A-KC1C, FC4A-KC2C	
Isolation between Internal Circuit and Communication Port	Not isolated	Not isolated	

Slim Type Input Specifications

Model		FC5A-D12K1E-DS0838 FC5A-D12S1E-DS0838	FC5A-D12K1E FC5A-D12S1E	FC4A-D20K3 FC4A-D20S3	FC5A-D16RK1 FC5A-D16RS1	FC4A-D20RK1 FC4A-D20RS1	FC5A-D32K3 FC5A-D32S3	FC4A-D40K3 FC4A-D40S3
Input Points		8 (8/1 common)	8 (8/1 common)	12 (12/1 common)	8 (8/1 common)	12 (12/1 common)	16 (8/1 common)	24 (12/1 common)
Rated Input Voltage		24V DC sink/source input signal						
Input Voltage Range		20.4 to 26.4V DC						
Rated Input Current		FC5A: I0, I1, I3, I4, I6, I7: 4.5 mA/point (24V DC); I2, I5, I10 to I17: 7 mA/point (24V DC) FC4A: I0, I1, I6, I7: 5 mA/point (24V DC); I2 to I5, I10 to I27: 7 mA/point (24V DC)						
Input Impedance		FC5A: I0, I1, I3, I4, I6, I7: 4.9 kΩ; I2, I5, I10 to I17: 3.4 kΩ FC4A: I0, I1, I6, I7: 5.7 kΩ; I2 to I5, I10 to I27: 3.4 kΩ						
Turn ON Time		FC5A: I0, I1, I3, I4, I6, I7: 5 µs + filter value; I2 and I5: 35 µs + filter value; I10 to I17: 40 µs + filter value FC4A: I0, I1, I6, I7: 35 µs + filter value; I2 to I5: 35 µs + filter value; I10 to I27: 40 µs + filter value						
Turn OFF Time		FC5A: I0, I1, I3, I4, I6, I7: 5 µs + filter value; I2 and I5: 150 µs + filter value; I10 to I17: 150 µs + filter value FC4A: I0, I1, I6, I7: 45 µs + filter value; I2 to I5: 150 µs + filter value; I10 to I27: 150 µs + filter value						
Connector	On Mother Board	MC1.5/16-G-3.81BK (Phoenix Contact)		FL26A2MA (Oki Electric Cable)	MC1.5/13-G-3.81BK (Phoenix Contact)		FL26A2MA (Oki Electric Cable)	
	Insertion Durability	100 times minimum						
Isolation		Between input terminals: Optocoupler isolated Internal circuit: Not isolated						
Input Type		Type 1 (IEC61131-2)						
External Load for I/O Interconnection		Not needed						
Single Determination Method		Static						
Effect of Improper Input Connection		Both sinking and sourcing input signals can be connected, therefore reverse connection does not cause permanent damage. If any input exceeding the rated value is applied, permanent damage may be caused.						
Cable Length		3m in compliance with electromagnetic immunity						

All-in-One Type Input Specifications

Model	FC5A-C10R2 FC5A-C10R2C FC4A-C10R2 FC4A-C10R2C	FC5A-C16R2 FC5A-C16R2C FC4A-C16R2 FC4A-C16R2C	FC5A-C24R2 FC5A-C24R2C FC4A-C24R2 FC4A-C24R2C	FC5A-C10R2D —	FC5A-C16R2D —	FC5A-C24R2D —
Input Points	6 (6/1 common)	9 (9/1 common)	14 (14/1 common)	6 (6/1 common)	9 (9/1 common)	14 (14/1 common)
Rated Input Voltage	24V DC sink/source input signal			12V DC sink/source input signal		
Input Voltage Range	20.4 to 28.8V DC			10.2 to 18.0V DC		
Rated Input Current	FC5A I0 and I1: I2 to I7, I10 to I15: FC4A I0 and I1: I2 to I7, I10 to I15:		6.4 mA/point 7 mA/point (24V DC) 11 mA 7 mA/point (24V DC)	I0 and I1: I2 to I7, I10 to I15:	6 mA 6 mA	
Input Impedance	FC5A I0 and I1: I2 to I7, I10 to I15: FC4A I0 and I1: I2 to I7, I10 to I15:		3.7 kΩ 3.4 kΩ 2.1 kΩ 3.4 kΩ	I0 and I1: I2 to I7, I10 to I15:	1.8 kΩ 2.0 kΩ	
Turn ON Time	FC5A I0 and I1: I2 to I5: I6, I7, I10 to I15: FC4A I0 and I1: I2 to I5: I6, I7, I10 to I15:		2 µs + filter value 35 µs + filter value 40 µs + filter value 35 µs + filter value 35 µs + filter value 40 µs + filter value	I0 and I1: I2 to I5: I6, I7, I10 to I15:	2 µs + filter value 35 µs + filter value 40 µs + filter value	
Turn OFF Time	FC5A I0 and I1: I2 to I5: I6, I7, I10 to I15: FC4A I0 and I1: I2 to I5: I6, I7, I10 to I15:		16 µs + filter value 150 µs + filter value 150 µs + filter value 45 µs + filter value 150 µs + filter value 150 µs + filter value	I0 and I1: I2 to I5: I6, I7, I10 to I15:	16 µs + filter value 150 µs + filter value 150 µs + filter value	
Isolation	Between input terminals: Optocoupler isolated Internal circuit: Not isolated					
Input Type	Type 1 (IEC61131-2)					
External Load for I/O Interconnection	Not needed					
Single Determination Method	Static			—		
Effect of Improper Input Connection	Both sinking and sourcing input signals can be connected, therefore reverse connection does not cause permanent damage. If any input exceeding the rated value is applied, permanent damage may be caused.					
Cable Length	3m in compliance with electromagnetic immunity					

Transistor Sink and Source Output Specifications

Model		FC5A-D12K1E-DS0838 FC5A-D12S1E-DS0838	FC5A-D12K1E FC5A-D12S1E	—	FC5A-D16RK1 FC5A-D16RS1	FC5A-D32K3 FC5A-D32S3
			—	FC4A-D20RK1 FC4A-D20RS1	—	FC4A-D40K3 FC4A-D40S3
Transistor Output Points		4 (4/1 common)	4 (4/1 common)	2 (2/1 common)	2 (2/1 common)	16 (8/1 common)
Output Type	Transistor Sink	FC5A-D12K1E/D16RK1/D32K3 FC4A-D20K3/D20RK1/D40K3				
	Transistor Source	FC5A-D12S1E/D16RS1/D32S3 FC4A-D20S3/D20RS1/D40S3				
Rated Load Voltage		24V DC				
Operating Load Voltage Range		20.4 to 28.8V DC				
Rated Load Current		0.3A per output point				
Maximum Load Current		1A per common				
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		8W				
Inductive Load		L/R = 10 ms (28.8V DC, 1 Hz)				
External Current Draw		Sink output: 100 mA maximum, 24V DC (power voltage at the +V terminal) Source output: 100 mA maximum, 24V DC (power voltage at the –V terminal)				
Isolation		Between output terminal and Internal circuit: Photocoupler isolated Between output terminals: Not isolated				
Connector on Mother Board		MC1.5/16-G-3.81BK (Phoenix Contact)		FL26A2MA (Oki Electric Cable)	MC1.5/16-G-3.81BK (Phoenix Contact)	FL26A2MA (Oki Electric Cable)
Connector Insertion/ Removal Durability		100 times minimum				
Output Delay	Turn ON Time	FC5A	Q0 to Q2: 5 µs max. Q3 to Q7, Q10 to Q17: 300 µs max.			
		FC4A	Q0, Q1: 5 µs max. Q2 to Q7, Q10 to Q17: 300 µs max.			
	Turn OFF Time	FC5A	Q0 to Q2: 5 µs max. Q3 to Q7, Q10 to Q17: 300 µs max.			
		FC4A	Q0, Q1: 5 µs max. Q2 to Q7, Q10 to Q17: 300 µs max.			

Relay Output Specifications

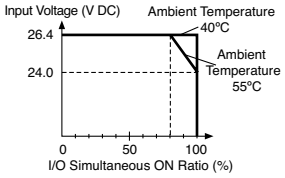
Model		FC5A-C10R2 FC5A-C10R2C FC5A-C10R2D FC4A-C10R2 FC4A-C10R2C	FC5A-C16R2 FC5A-C16R2C FC5A-C16R2D FC4A-C16R2 FC4A-C16R2C	FC5A-C24R2 FC5A-C24R2C FC5A-C24R2D FC4A-C24R2 FC4A-C24R2C	FC5A-D16RK1 FC5A-D16RS1 FC4A-D20RK1 FC4A-D20RS1
Relay Output Points		4	7	10	6
Output Points per Common Line	COM0	3	4	4	—
	COM1	1	2	4	3
	COM2	—	1	1	2
	COM3	—	—	1	1
Output Type		1NO			
Maximum Load Current		2A per point 8A per common line			
Minimum Switching Load		1 mA/ 5V DC (reference value)			
Initial Contact Resistance		30 mΩ maximum			
Electrical Life		100,000 operations minimum (rated load 1,800 operations/hour)			
Mechanical Life		20,000,000 operations minimum (no load 18,000 operations/hour)			
Rated Load		240V AC/2A (resistive load, inductive load cos ø = 0.4) 30V DC/2A (resistive load, inductive load L/R =7 ms)			
Dielectric Strength		Between output and ⏚ terminals: 1,500V AC, 1 minute Between output terminal and internal circuit: 1,500V AC, 1 minute Between output terminals (COMs): 1,500V AC, 1 minute			
Connector on Mother Board		—			*1
Connector Insertion/ Removal Durability		—			100 times minimum

1. MC1.5/16-G-3.81BK (Phoenix Contact)

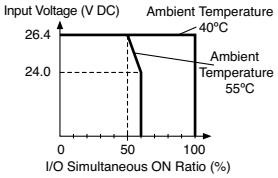
Input Usage Limits

Slim CPU

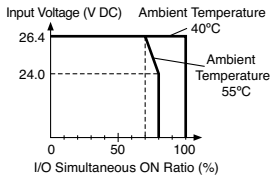
FC5A-D16RK1/D16RS1
FC5A-D12K1E/D12S1E



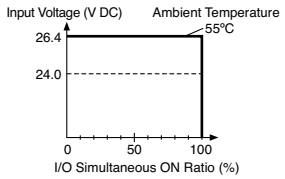
FC5A-D32K3/D32S3
FC4A-D40K3/D40S3



FC4A-D20K3/D20S3

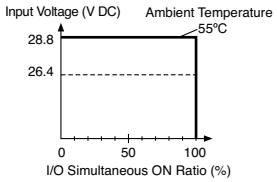


FC4A-D20RK1/D20RS1

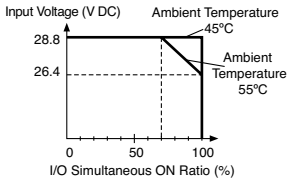


All-in-One CPU

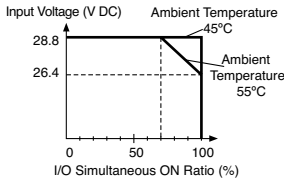
FC5A-C10R2
FC5A-C10R2C
FC4A-C10R2
FC4A-C10R2C



FC5A-C16R2
FC5A-C16R2C
FC4A-C16R2
FC4A-C16R2C



FC5A-C24R2
FC5A-C24R2C
FC4A-C24R2
FC4A-C24R2C

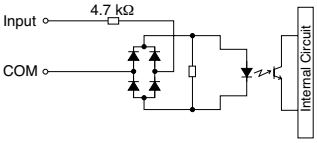


CAUTION: When using at an operating ambient temperature above 40°C, reduce the input voltage or the quantity of I/O points that turn on simultaneously.

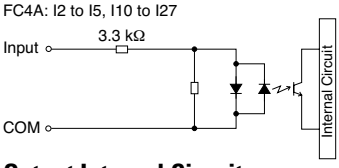
Input Internal Circuit

Slim CPU

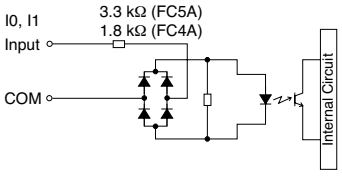
FC5A: I0, I1, I3, I4, I6, I7
FC4A: I0, I1, I6, I7

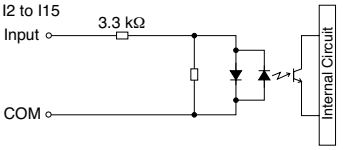


FC5A: I2, I5, I10 to I17
FC4A: I2 to I5, I10 to I27

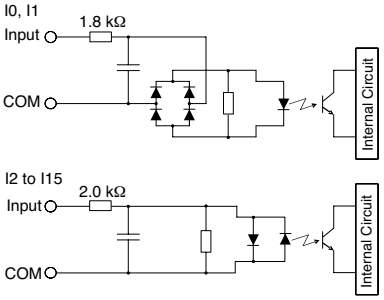


All-in-One CPU





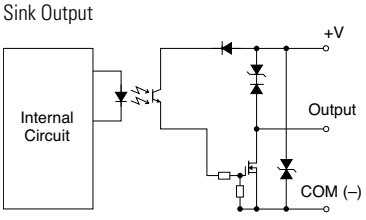
FC5A All-in-One CPU 12V DC Type



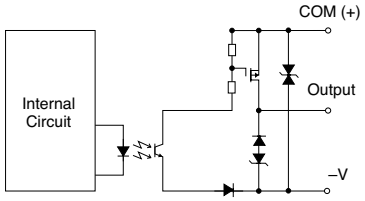
Output Internal Circuit

Slim CPU

Sink Output



Source Output



Communication Adapter/Module Specifications

Model		FC4A-PC1 FC4A-HPC1	FC4A-PC2 FC4A-HPC2	FC4A-PC3 FC4A-HPC3
Standards		EIA RS232C	EIA RS485	EIA RS485
Maximum Baud Rate		FC5A: 57,600 bps[1] FC4A: 19,200 bps	FC5A: 57,600 bps[1] FC4A: 19,200 bps	FC5A: 57,600 bps[1] FC4A: 19,200 bps (38,400 bps[2])
Maintenance Communication		Possible	Possible	Possible
User Communication		Possible	Possible[3]	Possible[3]
Data Link Communication		—	Possible	Possible
Half-duplex Communication		—	Possible	Possible
Maximum Cable Length		Special cable[4]	Special cable[5]	200m
Quantity of Slave Stations		—	31	31
Isolation between Internal Circuit and Communication Port		Not isolated		
RS485 Cable	Cable	—		Twisted-pair shielded cable with a minimum core wire of 0.3 mm²
	Conductor Resistance			85 Ω/km maximum
	Shield Resistance			20 Ω/km maximum

1. Maximum speed is 115,200 bps for FC5A-D12*1E.
2. Maximum speed when data link is used.
3. FC5A (all types), FC4A-D20RK1, FC4A-D20RS1, FC4A-D40K3, FC4A-D40S3
4. FC2A-KC4C, FC2A-KM1C, FC4A-KC1C, FC4A-KC2C, FC2A-KP1C
5. FC2A-KP1C

HMI Module Specifications

Model	FC4A-PH1
Power Voltage	5V DC (supplied from the CPU module)
Weight	20g

Memory Cartridge Specifications

Model	FC4A-PM32	FC4A-PM64[6]	FC4A-PM128[6]
Memory Type	EEPROM		
Accessible Memory Capacity	32 KB	64 KB	128 KB
Hardware for Storing Data	CPU Module		
Software for Storing Data	WindLDR		
Quantity of Stored Programs	One user program can be stored on one memory cartridge		

6. Even when using a large-capacity memory cartridge, the program capacity of the CPU module takes effect, except when using FC4A-D20RK1, FC4A-D20RS1, FC4A-D40K3, and FC4A-D40S3 CPU modules, the program capacity expands to 64KB.

Clock Cartridge Specifications

Model	FC4A-PT1
Accuracy	±30 sec/month (typical) at 25°C
Backup Duration	Approx. 30 days (typical) at 25°C after backup battery fully charged
Battery	Lithium secondary battery
Charging Time	Approx. 10 hours for charging from 0% to 90% of full charge
Replaceability	Not possible to replace battery

Expansion Serial Communication Module General Specifications (Expansion RS232C Communication Module)

Model	FC5A-SIF2
No. of Port	1
Synchronization	Synchronization Start-stop synchronization
Electrical Characteristics	Electrical Characteristics EIA RS232C compliant
Maximum Delay in One Scan	Approx. 4 ms
Operating Temperature	0 to 55°C
Relative Humidity	10 to 95% (no condensation)
Recommended Cable Specifications	Shielded multi-core cable: 24AWG x 6 Dielectric strength: 2,000V AC/min Insulation resistance: 100 MΩ/km
Recommended Cable	KIDU-SB 24 AWG×6C (Nihon Electric Wire & Cable)
Connector on Mother Board	MC1.5/10-G-3.81BK (Phoenix Contact) Applicable terminal block: FC4A-PMT10P
Connector Insertion/Removal Durability	100 times minimum
Isolation from Internal Circuit	Transformer isolated
Quantity of Applicable Expansion RS232C Communication Modules	All-in-One 24-I/O type CPU module: 3 maximum [1] Slim type CPU module: 5 maximum
Internal Current Draw	40 mA (5V/24V DC) [5]
Weight	100g

Note: FC5A-SIF2 cannot be connected to FC4A CPU modules.

1. FC5A All-in-One 24-I/O CPU module cannot use the FC5A-SIF2/SIF4 module in combination with the function modules listed in the table on the left. When using these modules in combination with the FC5A-SIF2/SIF4 module, use the slim type CPU module.

Function Modules	Type No.
Analog Modules	FC4A-L03A1, FC4A-L03AP1, FC4A-J2A1, FC4A-K1A1, FC4A-J4CN1, FC4A-J8C1, FC4A-J8AT1, FC4A-K2C1, FC4A-K4A1
AS-Interface Master Module	FC4A-AS62M

5. 85 mA (5V DC), 0 mA (24V DC) when the communication module version is lower than V200.

(Expansion RS485 Communication Module)

Model	FC5A-SIF4
No. of Port	1
Synchronization	Synchronization Start-stop synchronization
Electrical Characteristics	Electrical Characteristics EIA RS485 compliant
Maximum Baud Rate	115,200 bps
Operating Temperature	0 to 55°C
Relative Humidity	10 to 95% (no condensation)
Recommended Cable Specifications	Shielded twisted pair cable: 22 AWG (0.3 mm2 x 2P) Conductor Resistance: 67 MΩ/km maximum (at 20°C)
Connector on Mother Board	MC1.5/10-G-3.81BK (Phoenix Contact) Applicable terminal block: FC4A-PMT10P
Connector Insertion/ Removal Durability	100 times minimum
Isolation from Internal Circuit	Transformer isolated
Quantity of Applicable Expansion RS485C Communication Modules	All-in-One 24-I/O type CPU module: 3 maximum [1] Slim type CPU module: 5 maximum
Internal Current Draw	40 mA (5V/24V DC)
Weight	100g

Note: FC5A-SIF4 cannot be connected to FC4A CPU modules.

Communication Specifications

Model	FC5A-SIF2	FC5A-SIF4
Maximum Baud Rate	1,200/2,400/4,800/9,600/19,200/38,400/57,600[4]/115,200 [4]	
Maintenance Communication	Possible[2]	
Modbus Communication	Modbus ASCII master Modbus ASCII slave Modbus RTU master Modbus RTU slave	
Data Link	-	0 [3]
Max Cable Length	10m	1,200m
Quantity of Slave Stations	1	31

2. Run-time program download is not possible.
3. Data Link can be used only on one of the communication ports.
4. Can be used when the communication module is version V200 or higher.

Specifications (I/O Modules)

Input Module Specifications

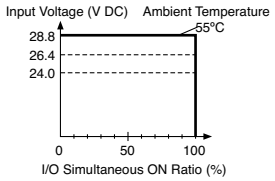
Model		FC4A-N08B1	FC4A-N16B1	FC4A-N16B3	FC4A-N32B3	FC4A-N08A11
Input Points		8 (8/1 common)	16 (16/1 common)		32 (16/1 common)	8 (4/1 common)
Rated Input Voltage		24V DC sink/source input signal				100 to 120V AC (50/60 Hz)
Input Voltage Range		20.4 to 28.8V DC				85 to 132V AC
Rated Input Current		7 mA/point (24V DC)		5 mA/point (24V DC)		17 mA/point (120V AC, 60 Hz)
Input Impedance		3.4 kΩ		4.4 kΩ		0.8 kΩ (60 Hz)
ON Voltage		15V minimum				79V minimum
OFF Voltage		5V maximum				20V maximum
ON Current		4.2 mA minimum (at 15V DC)		3.2 mA minimum (at 15V DC)		—
OFF Current		1.2 mA maximum		0.9 mA maximum		—
Turn ON Time		4 ms				25 ms
Turn OFF Time		4 ms				30 ms
Isolation		Between input terminals: Not isolated Internal circuit: Photocoupler isolated				Between input terminals in the same common: Not isolated Between input terminals in different commons: Isolated Between input terminals and internal circuits: Photocoupler isolated
External Load for I/O Interconnection		Not needed				Not needed
Single Determination Method		Static				Static
Effect of Improper Input Connection		Both sink and source input signals can be connected. If any input exceeding the rated value is applied, permanent damage may be caused.				If any input exceeding the rated value is applied, permanent damage may be caused.
Cable Length		3m in compliance with electromagnetic immunity				—
Connector on Mother Board		MC1.5/10-G-3.81BK (Phoenix Contact)		FL20A2MA (Oki Electric Cable)		MC1.5/11-G-3.81BK (Phoenix Contact)
Connector Insertion/ Removal Durability		100 times minimum				
Applicable Ferrule		1-wire: AI 0.5-8 WH (Phoenix Contact) 2-wire: AI-TWIN 2×0.5-8 WH (Phoenix Contact)		—		—
Internal Current Draw	All Inputs ON	25 mA (5V DC)	40 mA (5V DC)	35 mA (5V DC)	65 mA (5V DC)	60 mA (5V DC), 0 mA (24V DC)
	All Inputs OFF	5 mA (5V DC)	5 mA (5V DC)	5 mA (5V DC)	10 mA (5V DC)	30 mA (5V DC), 0 mA (24V DC)
Internal Power Consumption (at 24V DC while all inputs ON)		0.17W	0.27W	0.24W	0.44W	—
Weight		85g	100g	65g	100g	80g

Mixed I/O Module Specifications

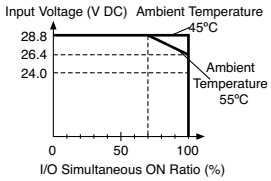
Model			FC4A-M08BR1	FC4A-M24BR2
Input Specifications	Input Points		4 (4/1 common)	16 (16/1 common)
	Rated Input Voltage		24V DC sink/source input signal	
	Input Voltage Range		20.4 to 28.8V DC	
	Rated Input Current		7 mA/point (24V DC)	
	Input Impedance		3.4 kΩ	
	ON Voltage		15V minimum	
	OFF Voltage		5V maximum	
	ON Current		4.2 mA minimum (at 15V DC)	
	OFF Current		1.2 mA maximum	
	Turn ON Time		4 ms (24V DC)	
	Turn OFF Time		4 ms (24V DC)	
	Isolation		Between input terminals: Not isolated Internal circuit: Photocoupler isolated	
	External Load for I/O Interconnection		Not needed	
	Signal Determination Method		Static	
	Effect of Improper Input Connection		Both sinking and sourcing input signals can be connected. If any input exceeding the rated value is applied, permanent damage may be caused.	
	Cable Length		3m in compliance with electromagnetic immunity	
Output Specifications	Output Points		4 (4/1 common)	8 (4/1 common)
	Output Type		1NO	
	Maximum Load Current		2A per point 7A per common	
	Minimum Switching Load		1 mA/ 5V DC (reference value)	
	Initial Contact Resistance		30 mΩ maximum	
	Electrical Life		100,000 operations minimum (rated load 1,800 operations/hour)	
	Mechanical Life		20,000,000 operations minimum (no load 18,000 operations/hour)	
	Rated Load		240V AC/2A (resistive load, inductive load cos ø = 0.4) 30V DC/2A (resistive load, inductive load L/R = 7 ms)	
	Dielectric Strength		Between output and ⏚ or ⏚ terminals: 1,500V AC, 1 minute Between output terminal and internal circuit: 1,500V AC, 1 minute Between output terminals (COMs): 1,500V AC, 1 minute	
Connector on Mother Board			MC1.5/11-G-3.81BK (Phoenix Contact)	Input: F6018-17P (Fujicon) Output: F6018-11P (Fujicon)
Connector Insertion/Removal Durability			100 times minimum	Not removable
Applicable Ferrule			1-wire: AI 0.5-8 WH (Phoenix Contact), 2-wire: AI-TWIN 2×0.5-8 WH (Phoenix Contact)	
Internal Current Draw		All I/Os ON	25 mA (5V DC), 20 mA (24V DC)	65 mA (5V DC), 45 mA (24V DC)
		All I/Os OFF	5 mA (5V DC), 0 mA (24V DC)	10 mA (5V DC), 0 mA (24V DC)
Internal Power Consumption (at 24V DC while all I/Os are ON)			0.65W	1.52W
Weight			95g	140g

Input Usage Limits

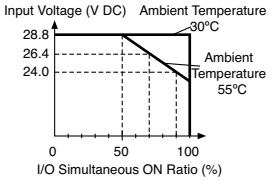
FC4A-N08B1



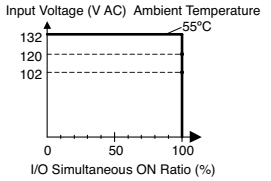
FC4A-N16B1



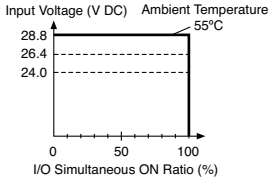
FC4A-N16B3/N32B3



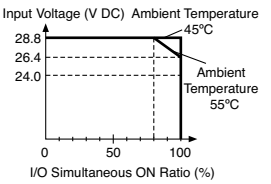
FC4A-N08A11



FC4A-M08BR1



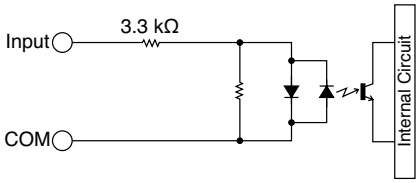
FC4A-M24BR2



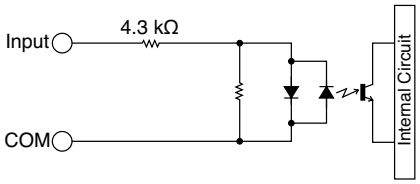
When using at an operating ambient temperature above 40°C, reduce the input voltage or the quantity of I/O points that turn on simultaneously.

Input Internal Circuit

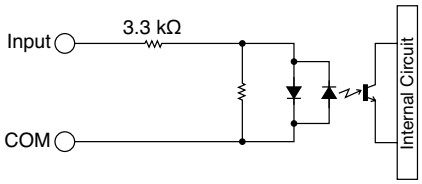
FC4A-N08B1, FC4A-N16B1



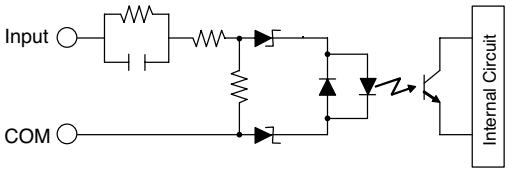
FC4A-N16B3, FC4A-N32B3



FC4A-M08BR1, FC4A-M24BR2

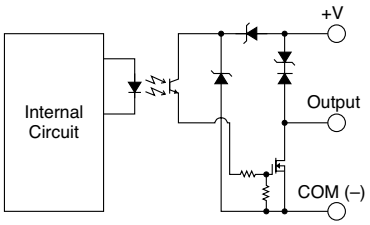


FC4A-N08A11

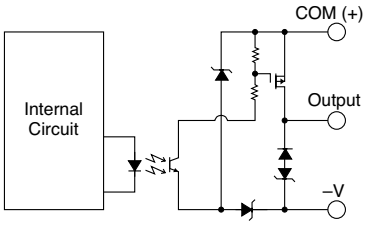


Output Internal Circuit

FC4A-T08K1, FC4A-T16K3, FC4A-T32K3



FC4A-T08S1, FC4A-T16S3, FC4A-T32S3



Specifications (Analog I/O Modules)

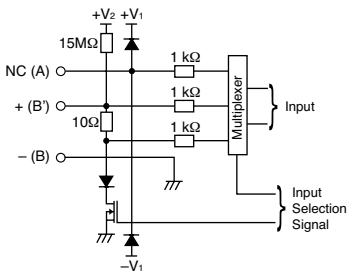
Analog I/O Module Specifications

Model	FC4A-L03A1	FC4A-L03AP1	FC4A-J2A1	FC4A-J4CN1	FC4A-J8C1	FC4A-J8AT1	FC4A-K4A1	FC4A-K1A1	FC4A-K2C1
Input Points	2	2	2	4	8	8	—	—	—
Output Points	1	1	—	—	—	—	4	1	2
Power Voltage	24V DC								
Allowable Voltage Range	20.4 to 28.8V DC								
External Current Draw * (24V DC)	45 mA	40 mA	35 mA	55 mA	50 mA	55 mA	130 mA	40 mA	85 mA
Connector on Mother Board	MC1.5/11-G-3.81BK (Phoenix Contact)			MC1.5/10-G-3.81BK (Phoenix Contact)			MC1.5/11-G-3.81BK (Phoenix Contact)		MC1.5/10-G-3.81BK (Phoenix Contact)
Connector Insertion/ Removal Durability	100 times minimum								
Applicable Ferrule	1-wire: AI 0.5-8 WH (Phoenix Contact), 2-wire: AI-TWIN 2×0.5-8 WH (Phoenix Contact)								
Internal Power Consumption (5V DC)	50 mA	50 mA	50 mA	50 mA	40 mA	45 mA	65 mA	50 mA	60 mA
Internal Power Consumption (at 24V DC while all I/Os are ON)	0.34W	0.34W	0.34W	0.34W	0.27W	0.30W	0.44W	0.34W	0.40W
Weight	85g	85g	85g	140g	140g	125g	100g	85g	110g

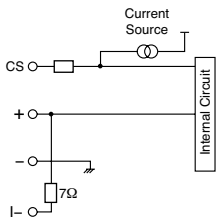
* The external current draw is the value when all the analog inputs are used and the analog output value is at 100%.

Input Circuit

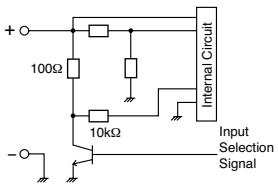
FC4A-L03A1, FC4A-L03AP1
FC4A-J2A1



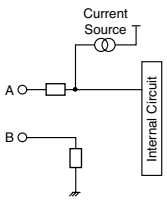
FC4A-J4CN1



FC4A-J8C1



FC4A-J8AT1



Analog Input Specifications (1)

Model		FC4A-L03A1, FC4A-J2A1		FC4A-L03AP1	
Input Signal Type		Voltage Input 0 to 10V DC	Current Input 4 to 20 mA	Resistance Thermometer Pt100 3-wire type (–100 to 500°C)	Thermocouple Type K (0 to 1,300°C) Type J (0 to 1,200°C) Type T (0 to 400°C)
Input Impedance		1 MΩ minimum	10Ω	1 MΩ minimum	1 MΩ minimum
Input Detection Current		—	—	1.0 mA maximum	—
AD Conversion	Sampling Duration Time	10 ms maximum		20 ms maximum	10 ms maximum
	Sampling Repetition Time	20 ms maximum		40 ms maximum	20 ms maximum
	Total Input System Transfer Time	60 ms + 1 scan time		80 ms + 1 scan time	60 ms + 1 scan time
	Type of Input	Single-ended input	Differential input		
	Operating Mode	Self-scan			
	Conversion Method	∑ Δ type ADC			
Input Error	Maximum Error at 25°C	±0.2% of full scale			±0.2% of full scale plus cold junction compensation error (±4°C maximum)
	Temperature Coefficient	±0.006% of full scale /°C			
	Repeatability after Stabilization Time	±0.5% of full scale			
	Non-linearity	±0.2% of full scale			
	Maximum Error	±1% of full scale			
Data	Digital Resolution	4096 increments (12 bits)		6,000 increments (14 bits)	Type K: 13,000 increments (14 bits) Type J: 12,000 increments (14 bits) Type T: 4,000 increments (14 bits)
	Input Value of LSB	2.5 mV	4 µA	0.1°C	Type K: 0.1°C Type J: 0.1°C Type T: 0.1°C
	Data Type in Application Program	Default: 0 to 4,095 Optional: –32,768 to 32,767 (selectable for each channel)[1]			
	Monotonicity	Yes			
	Input Data Out of Range	Detectable [2]			
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	±3% maximum when a 500V clamp voltage is applied to the power supply and I/O lines [3]			
	Input Filter	No			
	Recommended Cable for Noise Immunity	Twisted pair shielded cable		—	
	Crosstalk	2 LSB maximum			
Isolation		Between input and power circuit: Isolated Between input and internal circuit: Photocoupler-isolated			
Effect of Improper Input Connection		No damage			
Maximum Permanent Allowed Overload (No Damage)		13V DC	40 mA	—	
Selection of Analog Input Signal Type		Using programming software			
Calibration or Verification to Maintain Rated Accuracy		Impossible			

1: The data processed in the analog I/O module can be linear-converted to a value between –32,768 and 32,767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.
2: When an error is detected, a corresponding error code is stored to a data register allocated to analog I/O operating status.
3: The accuracy of the thermocouple input is not guaranteed when noise is applied.

Analog Input Specifications (2)

Model		FC4A-J4CN1, FC4A-J8C1		FC4A-J4CN1		FC4A-J8AT1	
Input Signal Type		Voltage Input	Current Input	Thermocouple	Resistance Thermometer	NTC Thermistor	PTC Thermistor
Input Range		0 to 10V DC	4 to 20 mA	Type K (0 to 1,300°C) Type J (0 to 1,200°C) Type T (0 to 400°C)	Pt100, Pt1000 3-wire type (–100 to 500°C) Ni100, Ni1000 3-wire type (–60 to 180°C)	–50 to 150°C	
Input Impedance		1 MΩ	7 Ω (FC4A-J4CN1) 100Ω (FC4A-J8C1)	1 MΩ	—	—	
Input Detection Current		—	—	—	0.1 mA	0.1 mA	
AD Conversion	Sampling Duration Time	2 ms maximum					
	Sampling Repetition Time	FC4A-J4CN1: 10 ms maximum FC4A-J8C1: 2 ms maximum		30 ms maximum	10 ms maximum	2 ms × channels	
	Total Input System Transfer Time	FC4A-J4CN1: 50 ms × channels + 1 scan time FC4A-J8C1: 8 ms × channels + 1 scan time		85 ms × channels + 1 scan time	50 ms × channels + 1 scan time	10 ms × channels + 1 scan time	
	Type of Input	Single-ended input					
	Operating Mode	Self-scan					
	Conversion Method	∑ Δ type ADC (FC4A-J4CN1), Successive approximation register method (FC4A-J8C1, FC4A-J8AT1)					
Input Error	Maximum Error at 25°C	±0.2% of full scale		±0.2% of full scale +cold junction compensation error (±3°C maximum)	Pt100, Ni100: ±0.4% of full scale Pt1000, Ni1000: ±0.2% of full scale	±0.2% of full scale	
	Cold Junction Compensation Error	—	—	±3°C maximum	—	—	
	Temperature Coefficient	±0.005% of full scale/°C					
	Repeatability after Stabilization Time	±0.5% of full scale					
	Non-linearity	±0.04% of full scale				Non-linear	
	Maximum Error	±1% of full scale					
Data	Digital Resolution	50,000 increments (16 bits)		Type K: Approx. 24,000 increments (15 bits) Type J: Approx. 33,000 increments (15 bits) Type T: Approx. 10,000 increments (14 bits)	Pt100: Approx. 6,400 increments (13 bits) Pt1000: Approx. 64,000 increments (16 bits) Ni100: Approx. 4,700 increments (13 bits) Ni1000: Approx. 47,000 increments (16 bits)	Approx. 4,000 increments (12 bits)	
	Input Value of LSB	0.2 mV	0.32 µA	Type K: 0.058°C Type J: 0.038°C Type T: 0.042°C	Pt100: 0.086°C Pt1000: 0.0086°C Ni100: 0.037°C Ni1000: 0.0037°C	0.05°C	
	Data Type in Application Program	Default: 0 to 50,000 Optional: –32,768 to 32,767 (selectable for each channel) [1]				Default: 0 to 4,000 Optional: –32,768 to 32,767 (selectable for each channel) [1] Resistance: 0 to 10,000	
						Temperature: °C, °F	—
	Monotonicity	Yes					
	Input Data Out of Range	Detectable[2]					

1: The data processed in the analog I/O module can be linear-converted to a value between –32,768 and 32,767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.

Analog Input Specifications (2) con't on next page.

Analog Input Specifications (2), con't

Model		FC4A-J4CN1, FC4A-J8C1	FC4A-J4CN1		FC4A-J8AT1
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	±3% maximum (when a 500V clamp voltage is applied to the power supply and I/O lines)		Not assured	±3% maximum (when a 500V clamp voltage is applied to the power supply and I/O lines)
	Input Filter	Software			
	Recommended Cable for Noise Immunity	Twisted pair cable	—		
	Crosstalk	2 LSB maximum			
Isolation		Between input and power circuit: Isolated Between input and internal circuit: Optocoupler-isolated			
Effect of Improper Input Connection		No damage			
Maximum Permanent Allowed Overload (No Damage)		11V DC	22 mA DC	—	
Selection of Analog Input Signal Type		Using programming software			
Calibration or Verification to Maintain Rated Accuracy		Impossible			

Analog Ouput Specifications

Model			FC4A-K4A1	FC4A-L03A1	FC4A-L03AP1	FC4A-K1A1	FC4A-K2C1
Output Range		Voltage	0 to 10V DC				–10 to 10V DC
		Current	4 to 20 mA				
Load	Impedance		Voltage output: 1 kΩ minimum Current output: 300Ω maximum				
	Load Type		Resistive load				
DA Conversion	Settling Time		2 ms/ch	10 ms	10 ms	10 ms	1 ms/ch
	Total Output System Transfer Time		2 ms/ch + 1 scan time	10 ms + 1 scan time	10 ms + 1 scan time	10 ms + 1 scan time	1 ms × channels + 1 scan time
Output Error	Maximum Error at 25°C		±0.2% of full scale				
	Temperature Coefficient		±0.015% of full scale/°C				±0.005% of full scale/°C
	Repeatability after Stabilization Time		±0.5% of full scale				
	Output Voltage Drop		±1% of full scale				
	Non-lineality		±0.2% of full scale				
	Output Ripple		20 mV maximum				±0.1% of full scale
	Overshoot		0%				
	Total Error		±1% of full scale				
Data	Digital Resolution		4096 increments (12 bits)				50,000 increments (16 bits)
	Output Value of LSB	Voltage	2.5 mV				0.4 mV
		Current	4 µA				0.32 µA
	Data Type in Application Program		Default: 0 to 4,095 (voltage, current)				–25,000 to 25,000 (voltage) 0 to 50,000 (current)
			Optional: –32,768 to 32,767 (selected for each channel)[1]				
	Monotonicity		Yes				
	Current Loop Open		Undetectable				

1: The data processed in the analog I/O module can be linear-converted to a value between –32,768 and 32,767. The optional range designation, and analog I/O data minimum and maximum values can be selected using data registers allocated to analog I/O modules.

Analog Input Specifications con't on next page.

Analog Ouput Specifications, con't

Model		FC4A-K4A1	FC4A-L03A1	FC4A-L03AP1	FC4A-K1A1	FC4A-K2C1
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	±3% maximum when a 500V clamp voltage is applied to the power and I/O lines				
	Recommended Cable for Noise Immunity	Twisted pair shielded cable				Twisted pair cable
	Crosstalk	2LSB maximum	None			2 LSB maximum
Isolation	Between output and power circuit	Isolated				
	Between output and internal circuit	Photocoupler-isolated				
Effect of Improper Output Connection		No damage				
Selection of Analog Output Signal Type		Using software programming				
Calibration or Verification to Maintain Rated Accuracy		Impossible				

PID Module Specifications

Model		FC5A-F2MR2	FC5A-F2M2
Control Mode	Independent PID Control	Possible	
	Heating/Cooling Control	Possible (overlapping deadband settings available) *	
	Difference Input Temperature Control	Possible *	
	Cascade Control	Possible *	
Input Points		2ch	2ch
Types of Inputs	Thermocouple	K, J, R, S, B, E, T, N, PL-II, C (W/Re5-26) External resistance: 100Ω maximum However, external resistance of B input: 40Ω maximum	
	Resistance Thermometer	Pt100, JPt100, 3-wire type Allowable conductor resistance (per wire): 10Ω maximum	
	Current Input	0 to 20 mA DC, 4 to 20 mA DC Input impedance: 50Ω Maximum permanent allowed overload (no damage): 50 mA maximum	
	Voltage Input	0 to 1V DC Input impedance: 1MΩ minimum Maximum permanent allowed overload (No damage): 5V DC Allowable output impedance: 2 kΩ 0 to 5V DC, 1 to 5V DC, 0 to 10V DC Input impedance: 100kΩ minimum Maximum permanent allowed overload (No damage): 15V DC maximum Allowable output impedance: 100Ω maximum	
AD Conversion	Sampling Duration Time	100 ms	
	Sampling Repetition Time	125 ms	
	Type of Input	Differential input	
	Conversion Method	∑ Δ type ADC	
Maximum Error at 25°C	Thermocouple Input	±0.2% of full scale or ±2°C (4°F), whichever is greater However, R, S inputs: 0 to 200°C (0 to 400°F): ±6°C (12°F) B input: 0 to 300°C (0 to 600°F) Accuracy is not guranteed. K, J, E, T, N inputs: Less than 0°C (32°F): ±0.4% of full scale	
	Resistance Thermometer Input	±0.1% of full scale or ±1°C (2°F), whichever is greater	
	Voltage/Current Inputs	±0.2% of full scale	
Input Accuracy (at 0 to 55°C)	Thermocouple Input	±0.7% of full scale However, R, S input,:0 to 200°C (0 to 400°F): ±6°C (12°F) B input: 0 to 300°C (0 to 600°F) Accuracy is not guranteed. K, J, E, T, N inputs: Less than 0°C (32°F): ±0.9% of full scale	
	Resistance Thermometer Input	±0.6% of full scale	
	Voltage/Current Inputs	±0.7% of full scale	

*Dual channel input is required for one loop circuit.

PID Module Specifications con't on next page.

PID Module Specifications, con't

Model		FC5A-F2MR2	FC5A-F2M2
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	Voltage input, current input ±3% maximum when a 500V clamp voltage is applied to the power supply and I/O lines Termocouple, Resistance Thermometer Not assured	
	Input Filter	None	
	Recommended Cable for Noise Immunity	Twisted pair cable	
	Cross Talk	None	
Isolation		Between input and power circuit: Transformer Isolated Between input and internal circuit: Optocoupler isolated	
Data Accuracy		Maximum error at 25°C±Minimum digital resolution of each input range	
Cold Junction Temperature Compensation Accuracy		±1°C at 0 to 55°C	
Sampling Period		125 ms	
Output Points		2ch	
Output		Relay output 1NO Rated load 5A 250V AC/30V DC (resistive load) 3A 250V AC (inductive load cos ø=0.4) Minimum open/closed load: 10 mA 5V DC Electrical life: 100,000 cycles (at the maximum rating of resistive load)	Non-contact voltage output (for SSR drive) 12V DC±15% Maximum 40 mA (short circuit protected) Leakage current: 0.3 mA maximum Analog current output 4 to 20 mA DC Maximum Error: ±0.5% Full Scale at 25°C ±1.0% Full Scale at 55°C Load resistance: 550Ω maximum Analog output digital resolution: 1,000 LSB input value: 0.016 mA
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	—	±3% maximum when a 500V clamp voltage is applied to the power supply and I/O lines
	Recommended Cable for Noise Immunity	—	Twisted pair cable
	Cross Talk	—	None
Isolation		Between output and power circuit: Transformer Isolated	Between output and power circuit: Transformer Isolated Between output and internal circuit: Optocoupler isolated
Power Voltage		24V DC (External power), 5V DC (Internal power)	
Allowable Voltage Range		20.4 to 28.8V DC	
External Power Consumption		Approx. 3.5W maximum	
Internal Power Consumption (at 24V DC while all I/Os are on)		65mA (5V DC)	
Connector on Mother Board		Input: F6018-17P (Fujicon)	Output: F6018-11P (Fujicon)
Weight (approx.)		140g	

Input Range

Input		Input Range (Digital Resolution)		Input Value of LSB
Input Type	K	-200 to 1,370°C	-328 to 2,498°F	1°C (°F)
		-200.0 to 400.0°C	-328.0 to 752.0°F	0.1°C (°F)
	J	-200 to 1,000°C	-328 to 1,832°F	1°C (°F)
	R	0 to 1,760°C	32 to 3,200°F	1°C (°F)
	S	0 to 1,760°C	32 to 3,200°F	1°C (°F)
	B	0 to 1,820°C	32 to 3,308°F	1°C (°F)
	E	-200 to 800°C	-328 to 1,472°F	1°C (°F)
	T	-200.0 to 400.0°C	-328.0 to 752.0°F	0.1°C (°F)
	N	-200 to 1,300°C	-328 to 2,372°F	1°C (°F)
	PL-II	0 to 1,390°C	32 to 2,534°F	1°C (°F)
	C (W/Re5-26)	0 to 2,315°C	32 to 4,199°F	1°C (°F)
	Pt100	-200.0 to 850.0°C	-328.0 to 1,562.0°F	0.1°C (°F)
		-200 to 850°C	-328 to 1,562°F	1°C (°F)
	JPt100	-200.0 to 500.0°C	-328.0 to 932.0°F	0.1°C (°F)
		-200 to 500°C	-328 to 932°F	1°C (°F)
	4 to 20mA DC	-2,000 to 10,000 (12,000 increments)		1.333 µA
	0 to 20mA DC	-2,000 to 10,000 (12,000 increments)		1.666 µA
	0 to 1V DC	-2,000 to 10,000 (12,000 increments)		0.083 mA
	0 to 5V DC	-2,000 to 10,000 (12,000 increments)		0.416 mA
	1 to 5V DC	-2,000 to 10,000 (12,000 increments)		0.333 mA
	0 to 10V DC	-2,000 to 10,000 (12,000 increments)		0.833 mA

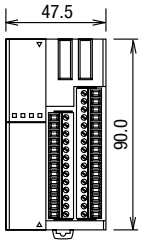
Expansion Interface Module Specifications

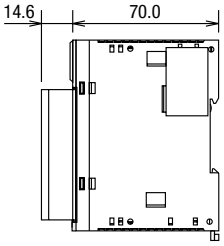
Type No.		FC5A-EXM1M (Expansion Interface Master Module)	FC5A-EXM1S (Expansion Interface Slave Module)	FC5A-EXM2 (Expansion Interface Module)
Rated Power Voltage		—	24V DC (supplied from external power)	24V DC (supplied from external power)
Allowable Voltage Range		—	20.4 to 26.4V DC (including ripple)	20.4 to 26.4V DC (including ripple)
Current Draw (Internal Power/External Power)		Internal power (supplied from CPU module): 90 mA (5V DC) 0 mA (24V DC)	Internal power (supplied from CPU module): 0 mA (5V DC) 0 mA (24V DC) External power: With I/O modules 750 mA (26.4V DC)[1]	Internal power (supplied from CPU module): 50 mA (5V DC) 0 mA (24V DC) External power: With I/O modules 750 mA (26.4V DC)[1]
Maximum Power Consumption (External Power)[1]		—	19W (26.4V DC)	19W (26.4V DC)
Allowable Momentary Power Interruption		—	10 ms minimum (24V DC)	10 ms minimum (24V DC)
I/O Expansion		Between CPU module and expansion interface module Connectable CPU modules: FC5A-D16RK1/D16RS1/D32K3/D32S3/D12K1E/D12S1E Connectable I/O modules: 7 maximum Beyond the expansion interface module Connectable I/O modules: 8 digital I/O modules maximum (AC input modules are not applicable)[2]		
Maximum I/O Refresh Time[3]		3.6 ms		2.8 ms
Communication between CPU Module and Expansion Interface Module		Asynchronous communication (I/O refresh of I/O modules on both sides of the expansion interface module is asynchronous.)		
Isolation from Internal Circuit		Only communication interface part is isolated		Not isolated
EMC Compliant Cable Length		1m (FC5A-KX1C)		—
Power Supply Connector	Connector on Mother Board	—	MKDSN1.5/3-5.08-BK (Phoenix Contact)	MSTB2.5/3-GF-5.08BK (Phoenix Contact)
	Connector Insertion/Removal Durability	—	—	100 times minimum
Expansion Cable Connector	Connector on Mother Board	FCN-365P024-AU (Fujitsu Component)		—
	Connector Insertion/Removal Durability	100 times minimum		—
Weight		70g	135g	140g

1: Power consumption by the expansion interface module and eight I/O modules.
2: The maximum number of relay outputs that can be turned on simultaneously is 54 points.
3: Maximum I/O refresh time of the expansion interface module. D8252 stores the refresh time.

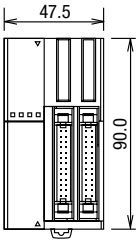
Dimensions (mm)

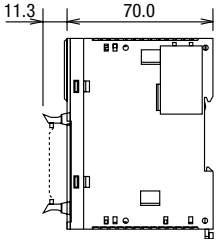
FC5A-D16RK1, FC5A-D16RS1, FC4A-D20RK1, FC4A-D20RS1



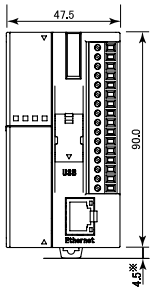


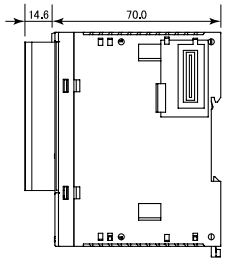
FC5A-D32K3, FC5A-D32S3, FC4A-D40K3, FC4A-D40S3



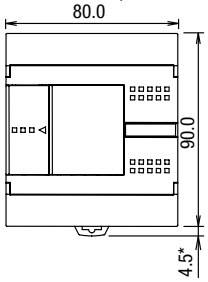


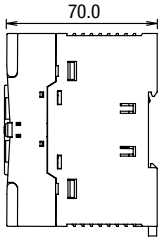
FC5A-D12K1E, FC5A-D12S1E





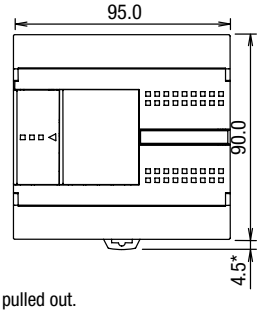
FC5A-C10R2, FC5A-C16R2, FC5A-C10R2C, FC5A-C16R2C, FC5A-C10R2D, FC5A-C16R2D, FC4A-C10R2, FC4A-C16R2, FC4A-C10R2C, FC4A-C16R2C

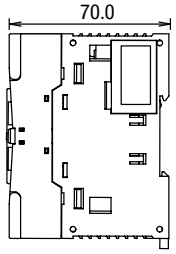




*8.5 mm when the clamp is pulled out.

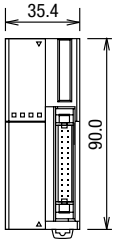
FC5A-C24R2, FC5A-C24R2C, FC5A-C24R2D, FC4A-C24R2, FC4A-C24R2C

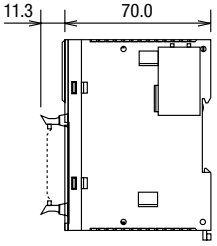




*8.5 mm when the clamp is pulled out.

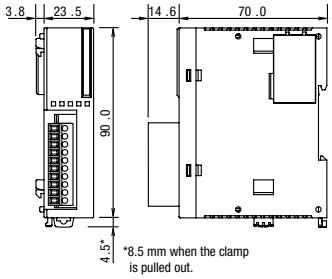
FC4A-D20K3, FC4A-D20S3





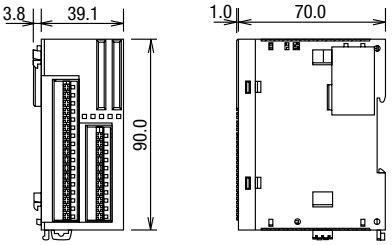
Dimensions cont. (mm)

FC5A-SIF2, FC5A-SIF4,
FC4A-AS62M, FC4A-N08A11,
FC4A-J2A1, FC4A-N08B1,
FC4A-K1A1, FC4A-R081,
FC4A-K2C1, FC4A-T08K1,
FC4A-L03A1, FC4A-T08S1,
FC4A-L03AP1, FC4A-K4A1,
FC4A-M08BR1

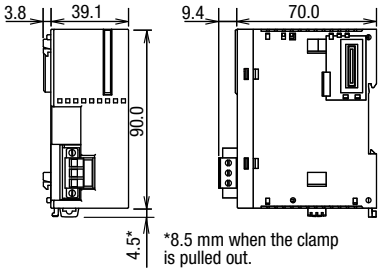


*8.5 mm when the clamp is pulled out.

FC5A-F2MR2, FC5A-F2M2, FC4A-M24BR2

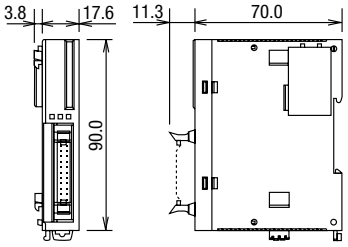


FC5A-EXM2

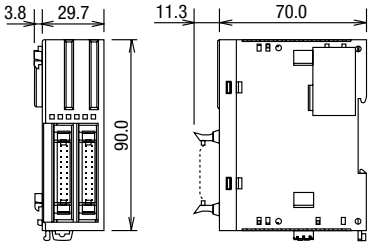


*8.5 mm when the clamp is pulled out.

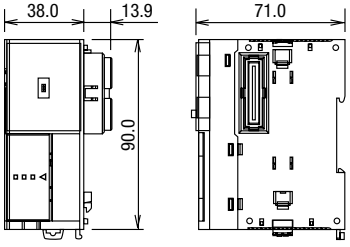
FC4A-N16B3, FC4A-T16K3, FC4A-T16S3



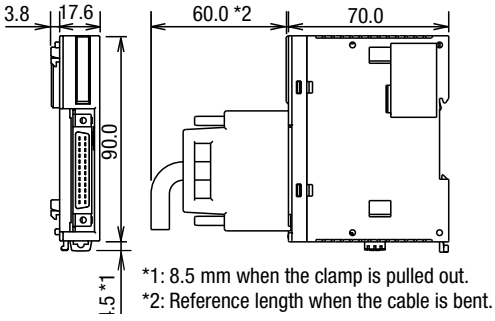
FC4A-N32B3, FC4A-T32K3, FC4A-T32S3



FC4A-HPH1

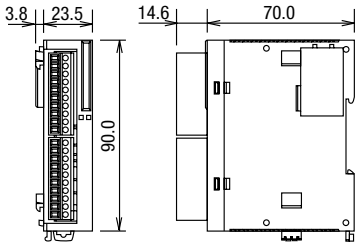


FC5A-EXM1M

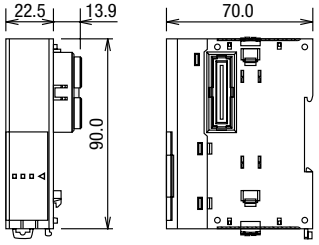


*1: 8.5 mm when the clamp is pulled out.
*2: Reference length when the cable is bent.

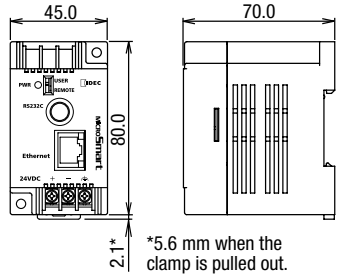
FC4A-N16B1, FC4A-R161, FC4A-J4CN1,
FC4A-J8C1, FC4A-J8AT1



FC4A-HPC1, FC4A-HPC2, FC4A-HPC3

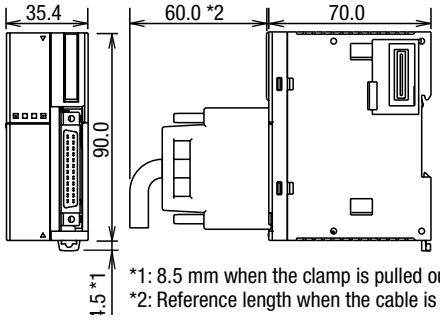


FC4A-SX5ES1E



*5.6 mm when the clamp is pulled out.

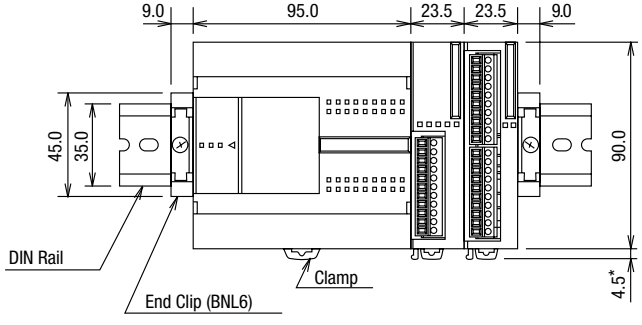
FC5A-EXM1S



*1: 8.5 mm when the clamp is pulled out.
*2: Reference length when the cable is bent.

Example

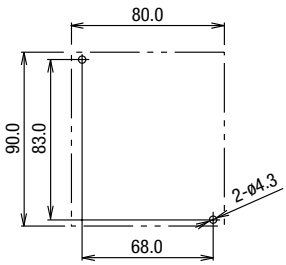
The following figure illustrates a system setup consisting of the all-in-one 24-I/O type CPU module, an 8-point relay output module, and a 16-point DC input module mounted on a 35-mm-wide-DIN rail using BNL6 end clips.



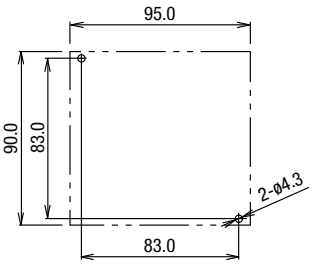
*8.5 mm when the clamp is pulled out.

Mounting Hole Layouts

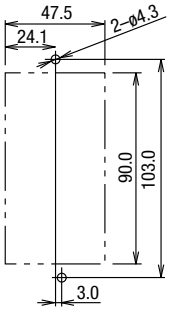
FC5A-C10R2, FC5A-C10R2C,
FC5A-C10R2D, FC5A-C16R2,
FC5A-C16R2C, FC5A-C16R2D
FC4A-C10R2, FC4A-C10R2C
FC4A-C16R2, FC4A-C16R2C



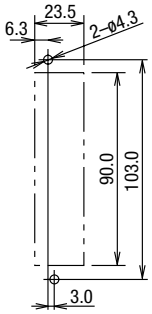
FC5A-C24R2
FC5A-C24R2C
FC5A-C24R2D
FC4A-C24R2
FC4A-C24R2C



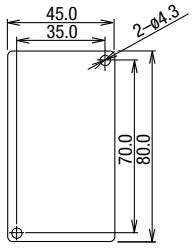
FC5A-D12K1E, FC5A-D12S1E
FC5A-D16RK1, FC5A-D16RS1
FC5A-D32K3, FC5A-D32S3
FC4A-D20RK1, FC4A-D20RS1
FC4A-D40K3, FC4A-D40S3



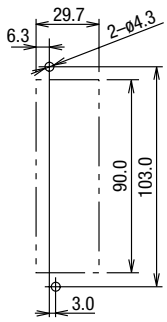
FC5A-SIF2, FC5A-SIF4
FC4A-AS62M, FC4A-N08A11,
FC4A-J2A1, FC4A-N08B1,
FC4A-J4CN1, FC4A-N16B1,
FC4A-J8AT1, FC4A-R081, FC4A-
J8C1, FC4A-R161, FC4A-K1A1,
FC4A-T08K1, FC4A-K2C1, FC4A-
T08S1, FC4A-L03A1, FC4A-K4A1,
FC4A-L03AP1, FC4A-M08BR1



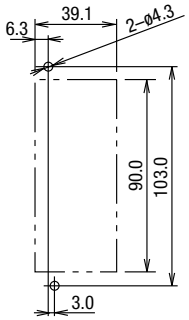
FC4A-SX5ES1E



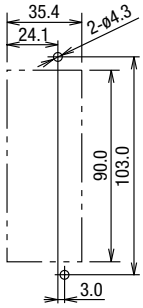
FC4A-N32B3
FC4A-T32K3
FC4A-T32S3



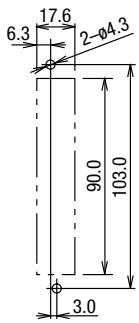
FC5A-F2MR2
FC5A-F2M2
FC5A-EXM2
FC4A-M24BR2



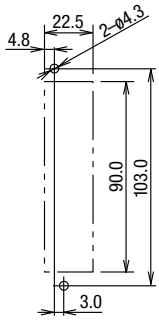
FC5A-EXM1S
FC4A-D20K3
FC4A-D20S3



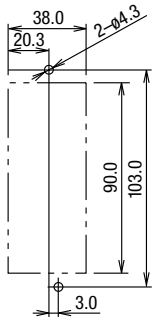
FC5A-EXM1M
FC4A-N16B3
FC4A-T16K3
FC4A-T16S3



FC4A-HPC1
FC4A-HPC2
FC4A-HPC3

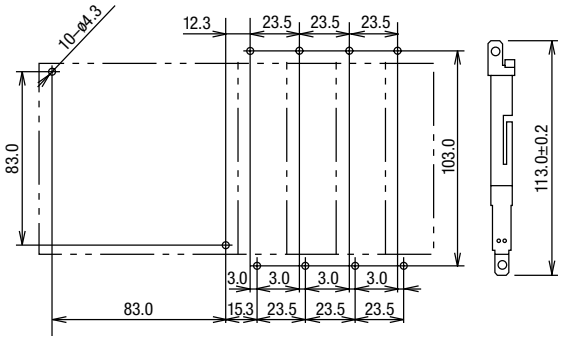


FC4A-HPH1



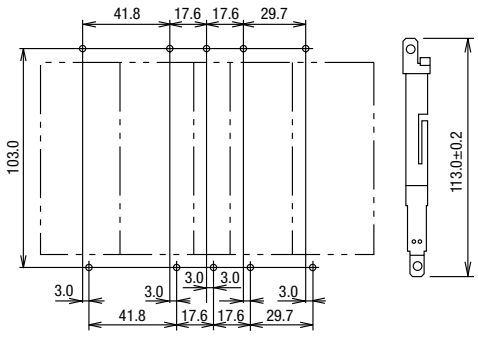
Example

Mounting hole layout for FC5A-C24R2 or FC4A-C24R2 and four 23.5mm-wide I/O modules



Example

Mounting hole layout from left, FC4A-HPH1, FC4A-D20K3, FC4A-N16B3, FC4A-N32B3, and FC4A-M24R2 modules



All dimensions in mm.