

Analog I/O Specifications (Expansion Modules)

Analog I/O Module Specifications

	FC4A-L03A1	FC4A-L03AP1	FC4A-J2A1	FC4A-K1A1
Input Points	2	2	2	—
Input Signal Type	Voltage Input (0 to 10V DC) Current Input (4 to 20 mA DC)	Thermocouple Resistance Thermometer	Voltage Input (0 to 10V DC) Current Input (4 to 20 mA DC)	—
Output Points	1	1	—	1
Output Signal Type	Voltage Output (0 to 10V DC) Current Output (4 to 20 mA DC)	Voltage Output (0 to 10V DC) Current Output (4 to 20 mA DC)	—	Voltage Output (0 to 10V DC) Current Output (4 to 20 mA DC)
Rated Power Voltage	24V DC			
Allowable Voltage Range	20.4 to 28.8V DC			
Connector	On Mother Board			
	MC1.5/11-G-3.81BK (Phoenix contact)			
Internal Current Draw	Insertion/Removal Durability			
	100 times minimum			
Internal Current Draw	Internal Power	50 mA (5V DC) 0 mA (24V DC)	50 mA (5V DC) 0 mA (24V DC)	50 mA (5V DC) 0 mA (24V DC)
	External Power	40 mA (24V DC)	40 mA (24V DC)	40 mA (24V DC)
Weight	85g			

Analog Output Specifications

		FC4A-L03A1, FC4A-L03AP1, FC4A-K1A1	
		Voltage Output	Current Output
Output Signal Type		0 to 10V DC	4 to 20 mA DC
Output Range		0 to 10V DC	4 to 20 mA DC
Load Impedance		2 kΩ minimum	300Ω maximum
Applicable Load Type		Resistive load	
Setting Time		20 msec	
Total Output System Transfer Time		20 msec + 1 scan time	
Output Error	Maximum Error at 25°C	±0.2% of full scale	
	Temperature Coefficient	±0.015% of full scale/°C	
	Repeatability after Stabilization Time	±0.5% of full scale	
	Output Voltage Drop	±1% of full scale	—
	Non-linearity	±0.2% of full scale	
	Output Ripple	1 LSB maximum	
	Overshoot	0%	
	Total Error	±1% of full scale	
Data	Digital Resolution	4096 increments (12 bits)	
	Output Value of LSB	2.5 mV	4 μA
	Data Type in Application Program	0 to 4095 (12-bit data); -32768 to 32767 (optional range designation) See note on page J-21	
	Monotonicity	Yes	
Noise	Current Loop Open	—	Detectable (See note on page J-21)
	Maximum Temporary Deviation during Electrical Noise Tests	±3% max. when a 500V clamp is applied to the power and I/O wiring	
	Cable	Twisted pair shielded cable recommended for improved noise immunity	
	Crosstalk	No crosstalk because of 1 channel output	
Dielectric Strength		500V between output and power circuit	
Type of Protection		Photocoupler between output and internal circuit	
Effect of Improper Output Connection		No damage	
Selection of Analog Output Signal Type		Using software programming	
Calibration or Verification to Maintain Rated Accuracy		Impossible (approx. 10 years)	

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Analog Input Specifications (Expansion Modules)

Analog Input Specifications

		FC4A-L03A1, FC4A-J2A1		FC4A-L03AP1		
Input Signal Type		Voltage Input	Current Input	Thermocouple	Resistance Thermometer	
Input Range		0 to 10V DC	4 to 20 mA DC	Type K (0 to 1300°C) Type J (0 to 1200°C) Type T (0 to 400°C)	Pt 100 3-wire type (-100 to 500°C)	
Input Impedance		1 MΩ minimum	10Ω	1 MΩ minimum	1 MΩ minimum	
Allowable Conductor Resistance		—	—	—	200Ω maximum	
Input Detection Current		—	—	—	1.0 mA maximum	
Sample Duration Time		16 msec maximum		50 msec maximum		
Sample Repetition Time		16 msec maximum		50 msec maximum		
Total Input System Transfer Time		32 msec + 1 scan time *		100 msec + 1 scan time *		
Type of Input		Single-ended input	Differential input			
Operating Mode		Self scan				
Conversion Method		ΣΔ type ADC				
Input Error	Maximum Error at 25°C	±0.2% of full scale		±0.2% of full scale plus reference junction compensa- tion accuracy (±4°C maximum)	±0.2% of full scale	
	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)				
	Input Value of LSB	2.5 mV	4 μA	K: 0.325°C; J: 0.300°C; T: 0.100°C	0.15°C	
	Data Type in Application Program	0 to 4095 (12-bit data); -32768 to 32767 (optional range designation) **				
	Monotonicity	Yes				
	Input Data Out of Range	Detectable #				
Noise Resistance	Maximum Temporary Deviation during Electrical Noise Tests	±3% maximum when a 500V clamp voltage is applied to the power and I/O wiring			Accuracy is not assured when noise is applied	
	Common Mode Characteristics	Common mode reject ratio (CMRR): -50 dB				
	Common Mode Voltage	16V DC				
	Input Filter	No				
	Cable	Twisted pair shielded cable recommended for improved noise immunity		—		
	Crosstalk	2 LSB maximum				
Dielectric Strength		500V between input and power circuit				
Type of Protection		Photocoupler between input and internal circuit				
Effect of Improper Input Connection		No damage				
Maximum Permanent Allowed Overload (No damage)		13V DC	40 mA DC	—		
Selection of Analog Input Signal Type		Using software programming				
Calibration or Verification to Maintain Rated Accuracy		Impossible (approx. 10 years)				

J

Programmable Logic Controllers


NOTES FOR ANALOG EXPANSION UNITS:

- * Total input system transfer time = Sample repetition time x 2 + 1 scan time
- ** The 12-bit data (0 to 4095) processed in the analog I/O module can be linear-converted to a value between -32768 and 32767. Select the optional range designations and analog I/O data minimum and maximum values by using data registers allocated to analog I/O modules.
- # When an error is detected, a corresponding error code is sorted to a data register allocated to analog I/O operating status.

Communication Adapter and Communication Module Specifications (Expansion Modules)
Communication Adapter and Communication Module Specifications

	FC4A-PC1 FC4A-HPC1	FC4A-PC2 FC4A-HPC2	FC4A-PC3 FC4A-HPC3
Standards	EIA RS232C	EIA RS485	EIA RS485
Maximum Baud Rate	19200 bps	19200 bps	Computer link: 19200 bps Data link: 38400 bps
Maintenance Communication	Possible	Possible	Possible
User Communication	Possible	Impossible	Impossible
Modem Communication	Possible	Impossible	Impossible
Data Link Communication	Impossible	Impossible	Possible
Maximum Cable Length	special cable	special cable	200m
Quantity of Slave Stations	—	—	31
Isolation between Internal Circuit and Communication Port	Not isolated		
Recommended Cable for RS485	—	—	Twisted-pair shielded cable with a minimum core wire of 0.3 mm ²
Conductor Resistance	—	—	85 Ω/km maximum
Shield Resistance	—	—	20 Ω/km maximum

Option Specifications
Optional HMI Module Specifications

	FC4A-PH1
Power Voltage	5V DC (supplied from the CPU module)
Internal Current Draw	200mA DC
Weight	20g

Optional Memory Cartridge Specifications

	FC4A-PM32	FC4A-PM64
Memory Type	EEPROM	
Accessible Memory Capacity	32 KB	64 KB
Hardware for Storing Data	CPU module	
Software for Storing Data	WindLDR	
Quantity of Store Programs	One user program can be stored on one memory cartridge	

Optional Clock Cartridge Specifications

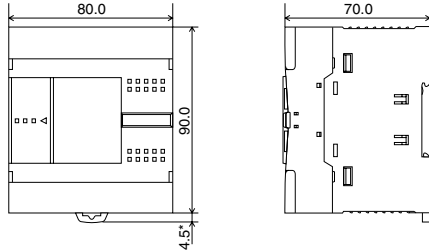
	FC4A-PT1
Accuracy	±30 sec/month (typical) at 25°C
Backup Duration	Approx. 30 days (typical) at 25°C after backup battery fully charged
Battery	Lithium secondary battery
Charging Time	Approx. 10 hours for charging from 0% to 90% of full charge
Replaceability	Impossible to replace battery

Dimensions

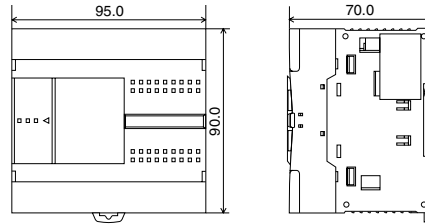
CPU Modules:

all dimensions in mm

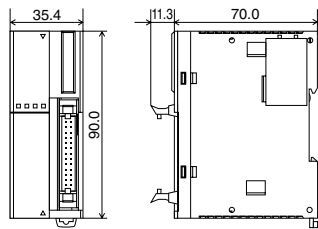
FC4A-C10R2, FC4A-C16R2
FC4A-C10R2C, FC4A-C16R2C



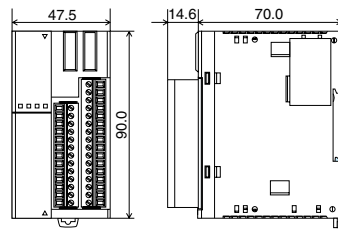
FC4A-C24R2, FC4A-C24R2C



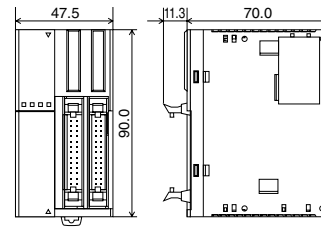
FC4A-D20K3, FC4A-D20S3



FC4A-D20RK1, FC4A-D20RS1

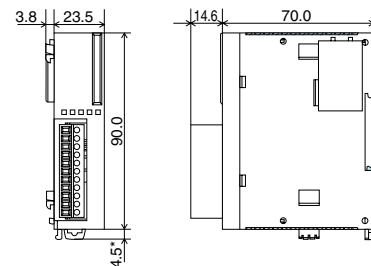


FC4A-D40K3, FC4A-D40S3

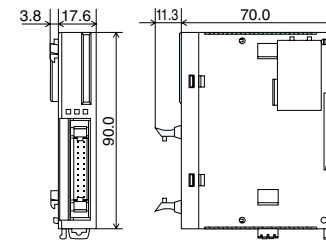


Expansion Modules:

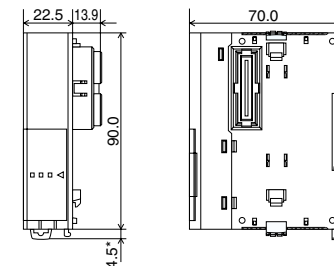
FC4A-N08B1, FC4A-N08A11, FCA-T08K1,
FC4A-M08BR1, FC4A-L03AP1, FC4A-K1A1
FC4A-R081, FC4A-T08S1, FC4A-L03A1,
FC4A-J2A1



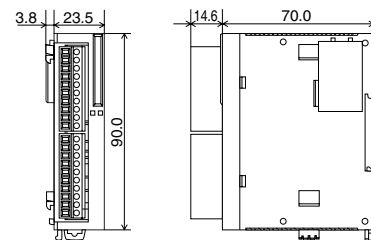
FC4A-N16B3, FC4A-T16K3, FC4A-T16S3



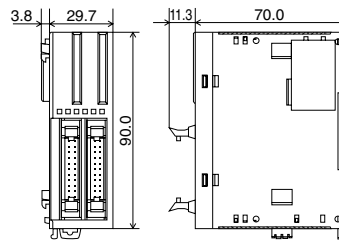
FC4A-HPC1, FC4A-HPC2, FC4A-HPC3



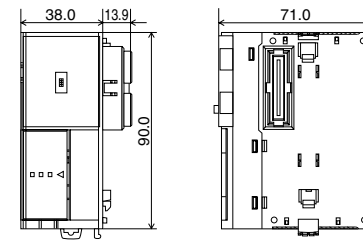
FC4A-N16B1, FC4A-R161



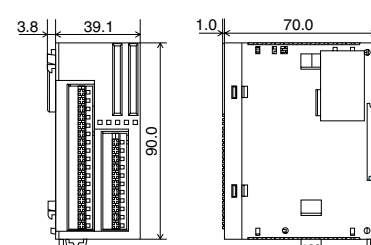
FC4A-N32B3, FC4A-T32K3, FC4A-T32S3



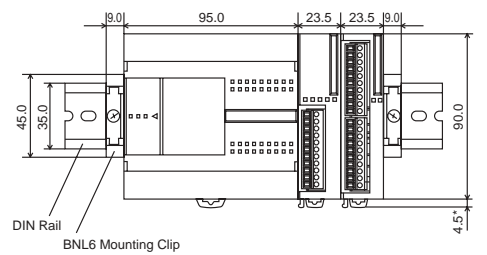
FC4A-HPH1



FC4A-M24BR2



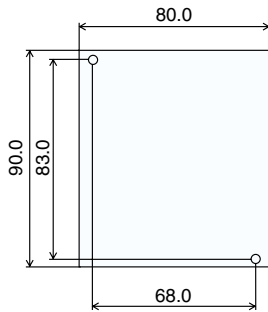
Example:
This figure illustrates a system setup with the FC4A-C24R2 All-in-one type CPU, an 8-point relay output module, and a 16-point DC input module, mounted on a 35mm DIN rail using BNL6 mounting clips.



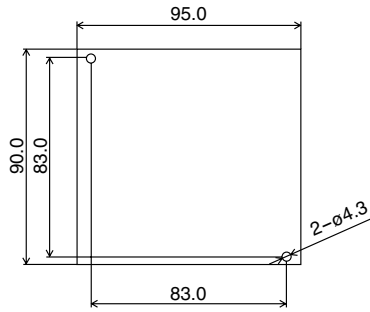
Mounting Hole Layout

CPU Modules:

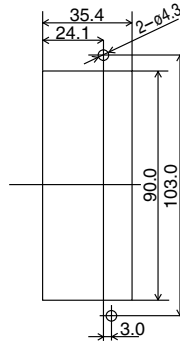
FC4A-C10R2, FC4A-C10R2C
FC4A-C16R2, FC4A-C16R2C



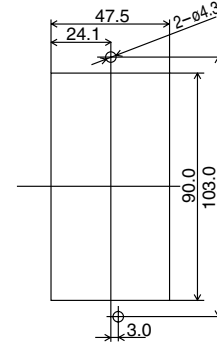
FC4A-C24R2, FC4A-C24R2C



FC4A-C20K3
FC4A-D20S3

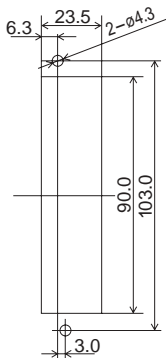


FC4A-C20RK1, FC4A-D40K3
FC4A-C20RS1, FC4A-D40S3

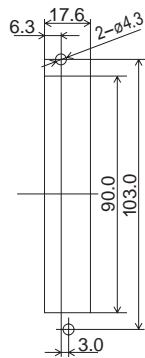


Expansion Modules:

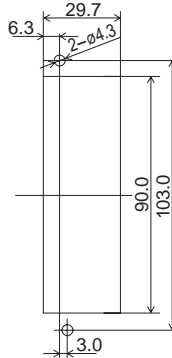
FC4A-N08B1, FC4A-N08A11,
FC4A-N16B1, FC4A-R081,
FC4A-R161, FC4A-T08K1,
FC4A-T08S1, FC4A-M08BR1,
FC4A-L03A1, FC4A-L03AP1,
FC4A-J2A1, FC4A-K1A1



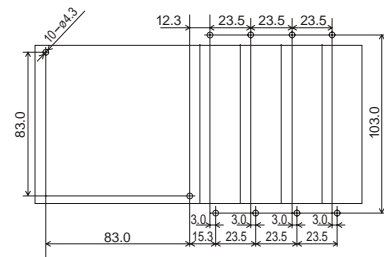
FC4A-N16B3
FC4A-T16K3
FC4A-T16S3



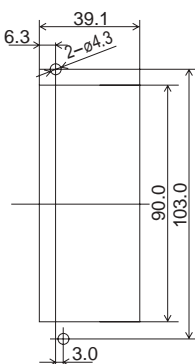
FC4A-N32B3
FC4A-T32K3
FC4A-T32S3



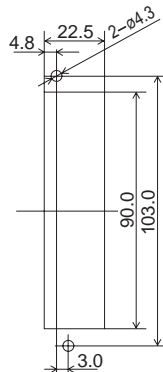
EXAMPLE:
Mounting hole layout for FC4A-C24R2 and 23.5mm-wide I/O modules.



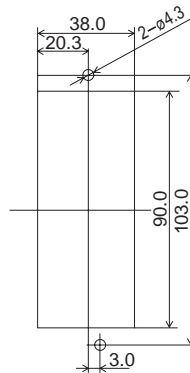
FC4A-M24BR2



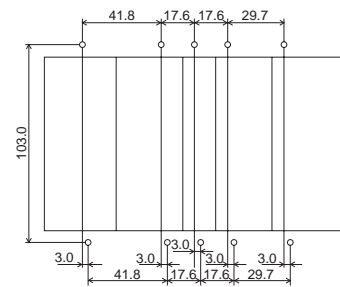
FC4A-HP1C
FC4A-HPC2
FC4A-HPC3



FC4A-HPH1



EXAMPLE:
Mounting hole layout for, from left, FC4A-HPH1, FC4A-D20K3, FC4A-N16B3, FC4A-N32B3, and FC4A-M24R2 modules.



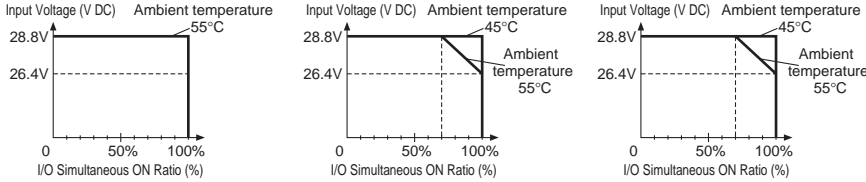
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Usage Limits

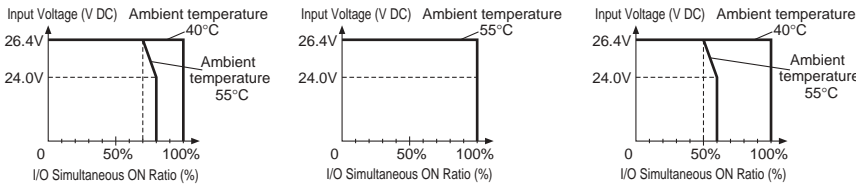
I/O Usage Limits

All-in-one Type CPU Modules:

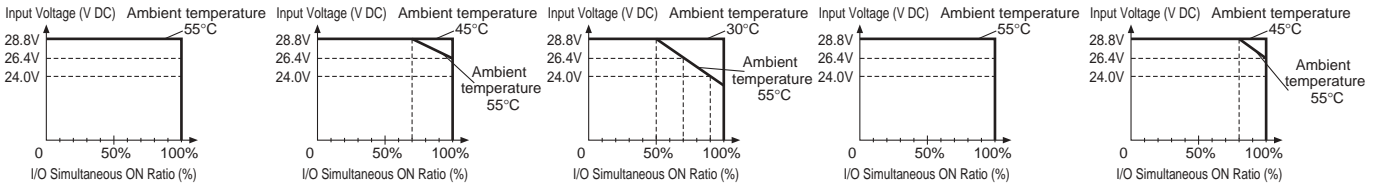


When using at an operating ambient temperature above 40°C, reduce the input voltage or the quantity of I/O points that turn on simultaneously.

Slim Type CPU Modules:



Input Usage Limits

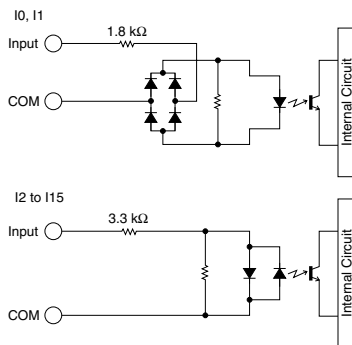


Programmable Logic Controllers

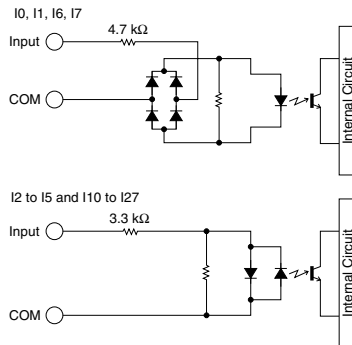
Internal Circuits

Input Internal Circuits

ALL-IN-ONE TYPE

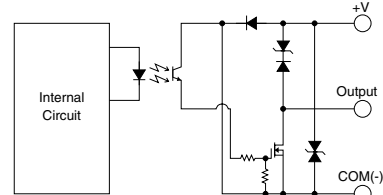


SLIM TYPE

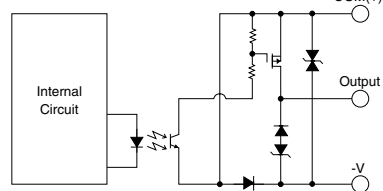


Output Internal Circuit (Slim Type)

SINK OUTPUT



SOURCE OUTPUT

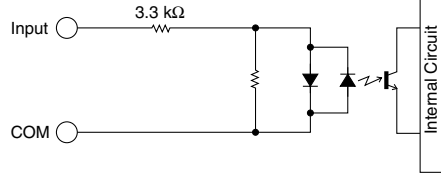


Internal Circuits

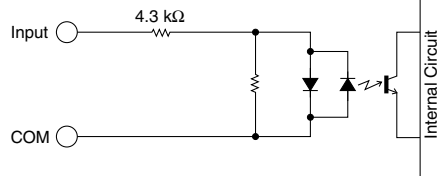
Input Internal Circuits (Expansion Modules)

Output Internal Circuits

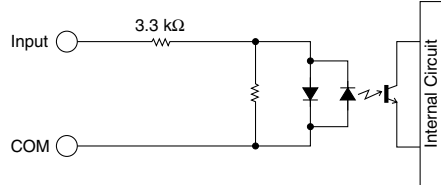
FC4A-N081, FC4A-N16B1



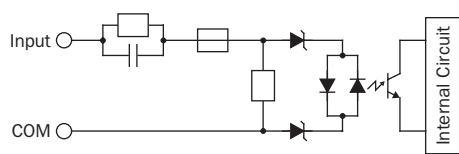
FC4A-N16B3, FC4A-N32B3



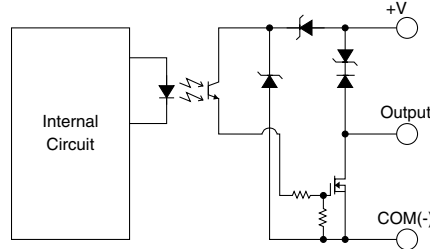
FC4A-M08BR1, FC4A-M24BR2



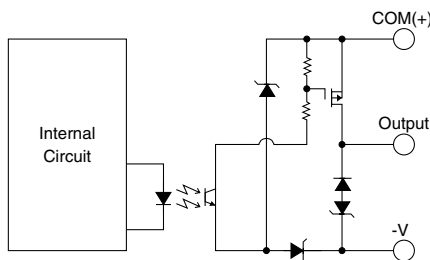
FC4A-N08A11



FC4A-T08K1, FC4A-T16K3, FC4A-T32K3



FC4A-T08S1, FC4A-T16S3, FC4A-T32S3

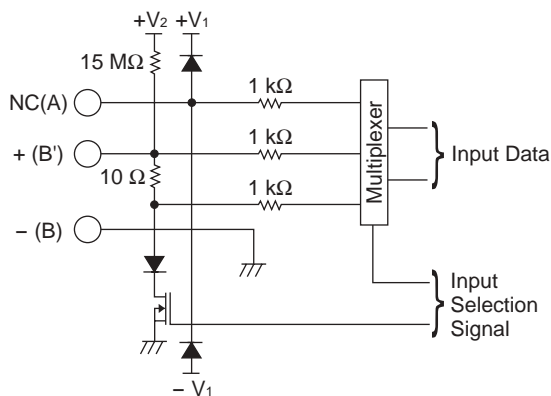


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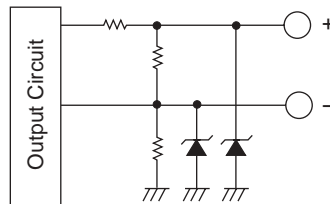
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Analog I/O Module

Input Circuit








Output Circuit



Input Modules - 5 Types

NEW for 2004!

Part Number	FC4A-N08B1	FC4A-N16B1	FC4A-N16B3	FC4A-N32B3	FC4A-N08A11
Item					
Input Points	8-point DC	16-point DC	16-point DC*	32-point DC*	8-point AC
Input Type	24V DC (Sink/Source)				100 - 120V AC
Power Voltage	24V DC				100 - 120V AC (50/60Hz)
Terminal	Removable screw terminal	Removable screw terminal	MIL connector	MIL connector	Removable screw terminal











1. For specifications see page J-17 & for dimensions see page J-23.

2. For options see J-9 & for accessories see J-10.

3. *For MIL connector type modules, see page J-10 for cables and breakout modules.

Output Modules - 8 Types

Part Number	FC4A-R081	FC4A-R161	FC4A-T08K1	FC4A-T08S1
Item				
Output Points	8-point Relay	16-point Relay	8-point Transistor	8-point Transistor
Output Type	Relay Output (1NO contact), 240V AC/30V DC, 2A		Transistor sink output 0.3A	Transistor Source Output 0.3A
Terminal	Removable screw terminal			
Part Number	FC4A-T16K3	FC4A-T16S3	FC4A-T32K3	FC4A-T32S3
Item				
Output Points	16-point Transistor	16-point Transistor	32-point Transistor	32-point Transistor
Output Type	Transistor sink output 0.1A*	Transistor source output 0.1A*	Transistor sink output 0.1A*	Transistor source output 0.1A*
Terminal	MIL connector			



1. For specifications see page J-17 & for dimensions see page J-23.



2. For options see J-9 & for accessories see J-10.

3. *For MIL connector type modules, see page J-10 for cables and breakout modules.

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Programmable Logic Controllers





Combination I/O Modules - 2 Types

Part Number	FC4A-M08BR1	FC4A-M24BR2
Item		
I/O Points	8 (4 in/ 4 out)	24 (16 in/ 8 out)
Output Type	Relay Output, 240V AC/30V DC, 2A	
Input Type	24V DC (Sink/Source)	
Terminal	Removable terminal block	Wire clamp terminal



1. For specifications see page J-19 & for dimensions see page J-23.
2. For options see J-9 & for accessories see J-10.

Analog I/O Modules - 4 Types

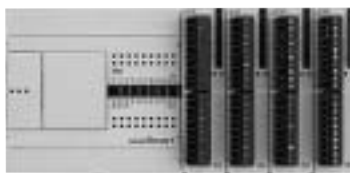
Part Number	FC4A-K1A1	FC4A-J2A1	FC4A-L03AP1	FC4A-L03A1
Item				
I/O Points	1 Analog Output	2 Analog Inputs	2 Analog Inputs, 1 Analog Output	2 Analog Inputs, 1 Analog Output
Output Type	Voltage (0-10V DC) Current (4-20mA)	–	Voltage (0-10V DC) Current (4-20mA)	Voltage (0-10V DC) Current (4-20mA)
Input Type	–	Voltage (0-10V DC) Current (4-20mA)	Thermocouple Resistance thermometer (RTD)	
Terminal	Removable terminal block			



1. For specifications see page J-20 & for dimensions see page J-23.
2. For options see J-9 & for accessories see J-10.

Expansion Module Examples

Example 1



Module	Type No.	Input	Output
CPU	FC4A-C24R2	14	10
DC Input	FC4A-N16B1	16	0
DC Input	FC4A-N16B1	16	0
Relay Output	FC4A-R161	0	16
Relay Output	FC4A-R161	0	16
Total		46	42

Example 2



Module	Type No.	Input	Output
CPU	FC4A-C24R2	14	10
DC Input	FC4A-N08B1	8	0
DC Input/Relay Output	FC4A-M08BR1	4	4
Relay Output	FC4A-R081	0	8
Transistor Sink Output	FC4A-T08K1	0	8
Total		26	30

Option Modules

Part Number	FC4A-HPH1	FC4A-PH1	FC4A-PM32 FC4A-PM64	FC4A-PT1
Item				
Type	HMI Base Module (does not come with HMI module)	HMI Module	Memory Cartridge	Clock Cartridge
Description	For mounting HMI module with slim type CPU module	For displaying and changing required operands	32KB or 64KB	–



1. For specifications see page J-22.

Communication Adapters

Part Number	FC4A-PC1	FC4A-PC2	FC4A-PC3
Item			
Type	RS232C	RS485	RS485
Terminal	Mini DIN	Mini DIN	Screw Terminal Type



1. For specifications see page J-22.

2. Used for All-In-One CPU units only, or for FC4A-HPH1 unit shown above.

Communication Modules for Slim Type CPUs

Part Number	FC4A-HPC1	FC4A-HPC2	FC4A-HPC3	FC4A-AS62M*
Item				
Type	RS232C	RS485	RS485	AS-Interface Master Module
Terminal	Mini DIN for Slim Type CPU Module	Mini DIN for Slim Type CPU Module	Screw Terminal Type for Slim Type CPU Module	–



1. For specifications see page J-22.

2. *FC4A-AS62M is compatible with CPUs: FC4A-D20RK1, FC4A-D20RS1, FC4A-D40K3, and FC4A-D40S3.
(See Communication & Networking Section M for more information.)