



# MicroSmart Pentra 12V DC CPU Module

New  
12V DC  
Model

## Features

- 3 CPUs to choose from  
-10 I/O, 16 I/O, 24 I/O
- Fast processing speed
- Built-in Modbus RTU, ASCII and TCP/IP
- Support 32-bit and floating point math
- Four built-in high speed inputs  
-1pt: 50kHz single/dual phase  
-3pts: 5kHz single phase
- Field upgradeable firmware

## Applications

- Solar industry  
-solar traffic control & lighting  
-remote solar pumping stations (oil & gas industry)  
-remote solar injection systems (oil & gas industry)  
-solar water pumping stations  
-solar trackers
- Vehicle/automotive  
-handicap lifts, garbage trucks, bus/train lighting & signage, cement truck mixers



## Specifications

### General Specifications

Part Number	FC5A-C10R2D	FC5A-C16R2D	FC5A-C24R2D
Rated Power Voltage	12V DC		
Allowable Voltage Range	10.2 to 18.0V DC		
Maximum Power Consumption	28W	3.4W	4.2W
Allowable Momentary Power Interruption	10 ms (at rated power voltage)		
Dielectric Strength	Between power and ⚡ terminals: 1,500V AC, 1 minute		
	Between I/O and ⚡ terminals: 1,500V 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	20A maximum		
Power Supply Wire	UL1015 AWG22, UL1007 AWG18		
Operating Temperature	0 to +55°C		
Storage Temperature	-25 to +70°C (no freezing)		
Relative Humidity	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		
Grounding Wire	UL1007 AWG16		
Vibration Resistance	When mounted on a DIN rail or panel surface: 5 to 9 Hz amplitude 3.5 mm, 9 to 150 Hz acceleration 9.8 m/s <sup>2</sup> (1G), 2 hours per axis on each of three mutually perpendicular axes (IEC61131-2)		
	147 m/s <sup>2</sup> (15G), 11 ms duration, 3 shocks per axis on three mutually perpendicular axes (IEC61131-2)		
Shock Resistance	147 m/s <sup>2</sup> (15G), 11 ms duration, 3 shocks per axis on three mutually perpendicular axes (IEC61131-2)		
Weight	240g	260g	310g

### Communication Port (RS232C, port1)

Standards	EIA RS232C
Maximum Baud Rate	57600 bps (maintenance communication)
Maintenance Communication	Possible
User Communication	Possible
Data Link Communication	Impossible
Cable	FC2A-KC4C, FC2A-KP1C, FC4A-KC2CA
Isolation between Internal Circuit and Communication Port	Not isolated

#### Notes:

1. Port 1 is modbus slave.
2. Port 2 is modbus master/slave.
3. **12V DC CPUs are not expandable.**

### Function Specifications

Part Number	FC5A-C10R2D	FC5A-C16R2D	FC5A-C24R2D
Control System	Stored program system		
Instruction Words	42 basic		
	103 advanced	130 advanced	115 advanced
Program Capacity *1	13.8 KB (2,300 steps)	27 KB (4,500 steps)	54 KB (9,000 steps)
User Program Storage	EEPROM (10,000 times rewritable)		
Processing Time	Basic Instruction	1.16 ms (1,000 steps)	
	END Processing *2	0.64 ms	
Max. I/O Points *3	Input	6	9
	Output	4	7
Internal Relay	2,048 points		
Shift Register	128 points		
Timer	256 points (1-sec, 100-ms, 10-ms, 1-ms)		
Counter	256 points (adding, reversible)		
Data Register	2,000 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-hour charging and 15-hour discharging	
	Replaceability	Not possible to replace battery	
Self-diagnostic Function	Keep data check, user program EEPROM sum check, user program RAM sum check, timer/counter preset value sum check, user program syntax, WDT check, user program writing, power failure, watchdog timer, data link connection		
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)	
	Counting Range	0 to 65535 (16 bits)	
	Operation Mode	Rotary encoder mode, adding counter mode	
	Quantity	1 point	2 points
Analog Potentiometer	Data Range	0 to 255	
	Port 1	RS232C – maintenance communication, user communication, Modbus slave communication	
Port 2 Communication Adapter (option) *4	Possible	Possible	Possible
Clock Cartridge (option)	Possible	Possible	Possible
Memory Cartridge (option)	Possible	Possible	Possible
HMI Module (option)	Possible	Possible	Possible

\*1. 1 step equals 6 bytes.

\*2. Not including clock function processing time, data link processing time, and interrupt processing time.

\*3. Not expandable with expansion I/O modules.

\*4. Maintenance communication, user communication, modem communication, data link, Modbus master/slave communication

# Specifications con't

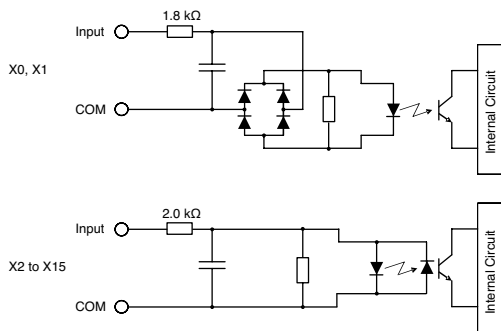
## Input Specifications

Part Number	FC5A-C10R2D	FC5A-C16R2D	FC5A-C24R2D
Input Points	6 (6/1 common)	9 (9/1 common)	14 (14/1 common)
Rated Input Voltage	12V DC sink/source input signal		
Input Voltage Range	10.2 to 18V DC		
Rated Input Current	I0 and I1: 6 mA I2 to I7, I10 to I15: 6 mA		
Input Impedance	I0 and I1: 1.8 kΩ I2 to I7, I10 to I15: 2.0 kΩ		
Turn ON Time	I0 and I1: 2 μs + filter value I2 to I5: 35 μs + filter value I6, I7, I10 to I15: 40 μs + filter value		
Turn OFF Time	I0 and I1: 16 μs + filter value I2 to I5: 150 μs + filter value I6, I7, I10 to I15: 150 μs + filter value		
Isolation	Between input terminals: Not isolated Internal circuit: Photocoupler 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. If any input exceeding the rated value is applied, permanent damage may be caused.		
Cable Length	3m in compliance with electromagnetic immunity		

## Relay Output Specifications

Part Number	FC5A-C10R2D	FC5A-C16R2D	FC5A-C24R2D
No. of Outputs	4	7	10
Output Points per Common Line	COM0	3	4
	COM1	1	2
	COM2	—	1
	COM3	—	1
Output Type	1NO		
Maximum Load Current	2A per point 8A per common line		
Minimum Switching Load	0.1 mA/0.1V 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 θ = 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		

## Input Internal Circuit



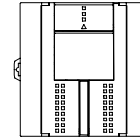
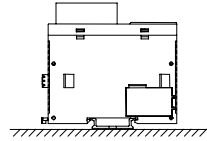
## Installation

When the CPU module is mounted in the standard upright position, all I/O points can be turned on simultaneously at up to 55°C operating temperature.

The CPU module can be installed facing upwards when the operating temperature is below 35°C or sideways when the operating temperature is below 40°C.

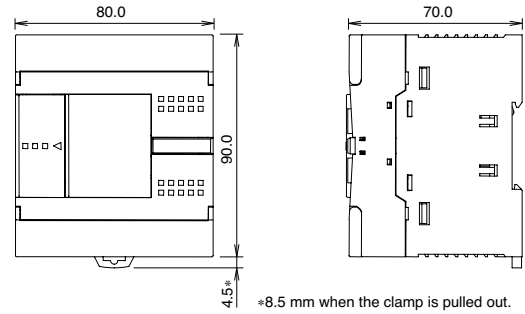
Mounting CPU Facing Up  
Operating temperature below 35°C

Mounting CPU Sideways  
Operating temperature below 40°C

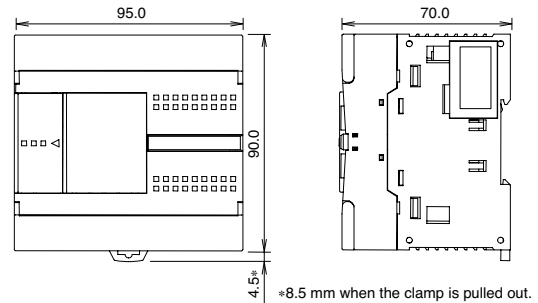


## Dimensions

### FC5A-C10R2D, FC5A-C16R2D

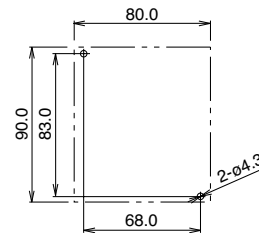


### FC5A-C24R2D

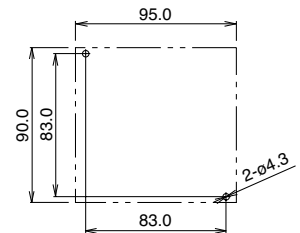


## Mounting Hole Layout

### FC5A-C10R2D, FC5A-C16R2D



### FC5A-C24R2D



All dimensions in mm.

