S P E C I F I C A T I O N S

No. ISI1218
Date. July.15, 2021
Approved by S.Yonejima
Checked by S.Yonejima
Written by T.Matsumoto

MICRO Smart Programmable Logic Controllers
All-in-One CPU Modules

FC6A-C16 □ ◇ △ E

R: Relay Output
P: Transistor Source Output
K: Transistor Sink Output

◇: A:AC Power type, C: 24V DC Power type, D: 12V DC Power type

△: Terminal style Screw fastened type(1), Push-in type (4)

1. Operating conditions

(1) Ambient Operating Temperature	-10 to +55 (no freezing)
(2) Expanded Ambient Operating Temperature	-25 to -10°C, +55 to +65°C (no freezing) (HV 200 or higher)
(3) Ambient Storage Temperature	-25 to +70°C (no freezing)
(4) Relative Humidity	10 to 95%, no condensation
(5) Storage Humidity	10 to 95%, no condensation
(6) Atmosphere	No corrosive gas
(7) Pollution Degree	2 (IEC60664-1)
(8) Altitude or Air Pressure	1,013 to 795 hPa (0 to 2,000 m) during operation、 1,013 to 701 hPa (0 to 3,000 m) during transport

2. Ratings

(1) Rated Power Voltage	AC: 100 to 240V AC, DC: 24V DC, 12V DC
(2) Allowable Voltage Range	AC: 85 to 264V AC , 24V DC: 20.4 to 28.8V DC (including ripple), 12V DC: 10.2 to 18.0V
(3) Inrush Current	AC: 40A maximum 24V DC: 35A maximum 12V DC: 35A maximum
(4) Maximum Power Consumption	FC6A-C16R◇AE:100-240VAC 33VA FC6A-C16R◇CE:24VDC 140mA 3.36W FC6A-C16P◇CE:24VDC 190mA 4.6W FC6A-C16K◇CE:24VDC 190mA 4.6W FC6A-C16R◇DE:12VDC 270mA 3.24W FC6A-C16P◇DE:12VDC 260mA 3.12W FC6A-C16K◇DE:12VDC 250mA 3.0W

3. Constructions

(1) Outside view	See attached sheet.
(2) Installation	35mm DIN rail and panel mount
(3) Degree of Protection	IP20(IEC60529)
(4) Weight	FC6A-C16R◇AE: 370g FC6A-C16R◇CE: 360g FC6A-C16P◇CE: 340g FC6A-C16K◇CE: 340g FC6A-C16R◇DE: 350g FC6A-C16P◇DE: 340g FC6A-C16K◇DE: 340g

4. General specifications

(1) Allowable Momentary Power Interruption	10 ms (rated power voltage)
(2) Vibration Resistance	5 to 8.4 Hz half amplitude 3.5 mm, 8.4 to 150 Hz, acceleration 9.8 m/s2 (1 G), each direction XYZ, 2 hours (IEC/EN 61131-2)

(3) Insulation Resistance

(a) AC power type

Between power and PE terminals	100 MΩ or higher (500V DC megger)
Between input and PE terminals	100 MΩ or higher (500V DC megger)
Between relay output and PE terminals	100 MΩ or higher (500V DC megger)
Between power and input terminals	100 MΩ or higher (500V DC megger)
Between power and relay output terminals	100 MΩ or higher (500V DC megger)
Between input and relay output terminals	100 MΩ or higher (500V DC megger)

(b) DC power type

Between power and FE terminals	100 MΩ or higher (500V DC megger)
Between input and FE terminals	100 MΩ or higher (500V DC megger)
Between transistor output and FE terminals	100 MΩ or higher (500V DC megger)
Between relay output and PE terminals	100 MΩ or higher (500V DC megger)
Between power and input terminals	100 MΩ or higher (500V DC megger)
Between power and transistor output terminals	100 MΩ or higher (500V DC megger)
Between power and relay output terminals	100 MΩ or higher (500V DC megger)
Between input and transistor output terminals	100 MΩ or higher (500V DC megger
Between input and relay output terminals	100 MΩ or higher (500V DC megger)

(4) Dielectric Strength

(a) AC power type

Between power and PE terminals	1,500V AC, 1 minute
Between input and PE terminals	1,500V AC, 1 minute
Between relay output and PE terminals	2,300V AC, 1 minute
Between power and input terminals	1,500V AC, 1 minute
Between power and relay output terminals	2,300V AC, 1 minute
Between input and relay output terminals	2,300V AC, 1 minute

(b) DC power type

Between power and FE terminals	500V AC, 1 minute
Between input and FE terminals	500V AC, 1 minute
Between transistor output and FE terminals	500V AC, 1 minute
Between relay output and FE terminals	2,300V AC, 1 minute
Between power and input terminals	500V AC, 1 minute
Between power and transistor output terminals	500V AC, 1 minute
Between power and relay output terminals	2,300V AC, 1 minute
Between input and transistor output terminals	500V AC, 1 minute
Between input and relay output terminals	2,300V AC, 1 minute

(5) Shock resistance	147m/s^2, 11ms 3 shocks each in 3 axes (IEC 61131-2)

5. Characteristics

(1) Control system	Stored program system
(2) Instruction Words	Basic : 42, Advanced : 129
(3) Program Capacity	384KB (48,000 steps)/72KB (9,000 steps)* *When 72KB is selected, download function can be used during RUN.
(4) User Program Download	1,000 times

(5) Processing Time	
(a) Basic Instruction	42μs/1,000 steps
(b) END Processing	1ms maximum (Not including expansion I/O service time, counter timer processing time, data link processing time, and interrupt processing time)
(6) I/O Points	
(a) Input	9 points
(b) Output	7 points
(7) Expandable Modules	4 modules
(8) Expandable I/O Points with Expansion Modules	128 points
(9) Expandable Modules with Unibody Type Expansion Interface Modules	8 modules
(10) Expandable I/O Points with Expansion Interface Modules	256 points
(11) Clock	Clock accuracy: ±30 sec/month (typical) at 25°C
(12) RAM Backup	
(a) Backup Data	RAM (internal relay, shift register, counter, data register), clock data* *RAM backup data can be saved in a non-volatile memory using the SD card receipe function.
(b) Battery (enclosed with products)	Lithium primary battery (part number of enlosed batteries cannot be selected) Panasonic: BR2032 / CR2032A / CR2032B Murata: CR2032X / CR2032W
(c) Battery Life	1-year warranty (replacement approx. 4 years (+25°C))* *1-year warranty conditions include operating environments (temperature/humidity) during power off and power on.
(d) Replaceability	Replace within one minute after power off (recommended)* *Batteries can be replaced when power is on or replaced while power is supplied from USB bus power
(13) Internal Relay	12,400 points
(14) Data Register	54,000 points
(15) Shift Register	256 points
(16) Special Internal Relay	256 points
(17) Special Data Register	500 points
(18) Timer (1ms, 10ms, 100ms,1s)	1,024 points
(19) Counter	512 points
(20) Self-diagnostic Function	Keep data, user program (ROM) CRC check, timer/counter preset value change check, user program syntax check, user program execution check, watchdog timer check, user program download check, power failure, clock error, data link connection check, expansion bus initialization check, system check, SD memory card transfer check, SD memory card access check
(21) Input Filter	0 ms (without filter), 3 to 15ms (selectable in increments of 1ms)
(22) Catch Input/Interrupt Input	Six inputs I0, I1, I6, I7 (Minimum turn on pulse width: 5μs max., Minimum turn off pulse width: 5μs max.) I3, I4 (Minimum turn on pulse width: 35μs max., Minimum turn off pulse width: 35μs max.)
(23) High-speed Counter	
(a) Maximum Counting Frequency and Highspeed Counter Points	Total 6 points Single/two-phase selectable: 100 kHz (single-phase: 4 points, two-phase: 2 points) Single-phase: 5 kHz (2 points)

(b) Counting Range	0 to 4,294,967,295 (32 bits)
(c) Operation Mode	Rotary encoder mode, adding counter mode, frequency measurement mode
(24) Analog Potentiometer	
(a) Quantity	1 point
(b) Data Range	0 to 1,000
(25) Analog Voltage Input	
(a) Quantity	1 point
(b) Input Voltage Range	0 to 10V
(c) Input Impedance	Approx. 100KΩ
(d) Digital Resolution	Approx. 1,000 steps (10 bits)
(26) Pulse Output (transistor output model only)	
(a) Quantity	4 points
(b) Maximum Output Pulse Frequency	Q0,Q1 : 100kHz, Q2,Q3 : 5kHz
(c) Reversible Control	Single-pulse output mode: 2 axis (Q0-Q3) Dual-pulse output mode: 1 axis (Q0-Q1)
(d) PWM Output	Duty cycle 0.1 to 100.0% (increments of 0.1%) Output pulse frequency 15 to 5,000 (increments of 1 Hz): 4 points (Q0-Q3) *Q0, Q1: Adjust 5μs minimum as ON time and 15μs minimum as OFF time. *Q2, Q3: Adjust 100μs minimum as ON/OFF time.
(27) External Power Supply for Sensor (AC only)	
(a) Output Voltage/Current	24V (+10%, –15%) / 250mA
(b) Overload Detection	Not possible
(c) Isolation from the internal circuit	Transformer-isolated * External power supplies for sensor, cartridges and HMI Modules cannot be used under the expanded ambient operating temperature (-25 to -10°C, +55 to +65°C).
(28) SD Card Slot	Embedded
(29) Cartridge (option)	One cartridge can be added on CPU module One more cartridge can be added on HMI module (FC6A-PH1)
(30) HMI Module (option)	Yes
(31) Serial Port 1	
(a) Communication Type	RS232C or RS485 selectable
(b) Maximum Baud Rate Maximum Cable Length	115,200bps , RS232C:5m, RS485:200m
(c) Connector	RJ45
(d) Communication Function	Maintenance communication, user communication, Modbus RTU (master/slave)
(e) Cable	CAT. 5 or higher STP
(f) Isolation	Not isolated from the internal circuit
(32) USB Port	
(a) USB Type	USB mini-B
(b) USB Standard	USB 2.0 full speed
(c) Isolation	Not isolated from the internal circuit
(d) Communication Function	Maintenance communication to PC

(３３) Ethernet Port 1

(a) Communication Type	IEEE802.3 compliant
(b) Data Transfer	10BASE-T, 100BASE-TX
(c) Connector	RJ45
(d) Cable	CAT. 5 or higher STP
(e) Maximum Cable Length	100m
(f) Isolation	Pulse transformer isolation
(g) Communication Function	Maintenance communication server, User communication (server/client), Modbus TCP (server/client), PING, SNTP

6. All-in-One Input

(１) Input Points	9 (9/1 common)
(２) Rated Input Voltage	AC, 24V DC power supply type: 24V DC sink/source input signal 12V DC power supply type: 12V DC sink/source input signal
(３) Input Voltage Range	AC, 24V DC power supply type: 0 to 28.8V DC 12V DC power supply type: 0 to 18.0V DC
(４) Rated Input Current	AC, 24V DC power supply type: high speed input port 5mA/pt, middle/normal speed input port 7mA/pt, 12V DC power supply type: high speed input port 5mA/pt, middle/normal speed input port 6mA/pt,
(５) Input Impedance	AC, 24V DC power supply type: high speed input port 4.9kΩ, middle/normal speed input port: 3.4kΩ 12V DC power supply type: high speed input port 1.8kΩ, middle/normal speed input port: 2.0kΩ
(６) Input Delay	
(a) Turn ON Time	High speed input port: 5μs + filter value Middle speed input port: 35μs + filter value Normal speed input port: 35μs + filter value
(b) Turn OFF Time	High speed input port: 5us + filter value Middle speed input port: 35us + filter value Normal speed input port: 100us + filter value
(７) Isolation	Between input terminals: Not isolated Internal circuit: Optocoupler-isolated
(８) Input	Type Type1 (IEC 61131-2)
(９) External Load for I/O Interconnection	Not needed
(１０) Signal Determination Method	Static
(１１) Effect of Improper Input Connection	Both sinking and sourcing input signals can be connected, therefore reverse connection does not cause damage. If any input exceeding the rated value is applied, permanent damage may be caused.
(１２) Cable Length	3m in compliance with electromagnetic immunity
(１３) Connector	Insertion, Removal Durability: 100 times

7. Relay Output Specifications (FC6A-C16R◇AE, FC6A-C16R◇CE, FC6A-C16R◇DE)

(１) Relay Output Points	7
(２) Output Type	1NO
(３) Output Points per Common Line	COM1 : 4, COM2 : 3
(４) Maximum Load Current	Per Point: 2A Per Common: COM1 : 7A, COM2 : 6A
(５) Minimum Switching Load	1mA/5V DC (reference value)

(6) Initial Contact Resistance	30 mΩ maximum
(7) Rated Load	Resistive load: 240V AC 2A, 30V DC 2A Inductive load: 240V AC 2A (cos ø = 0.4), 30V DC 2A (L/R =7 ms)
(8) Dielectric Strength	
(a) Between output and ground terminals	2,300V AC, 1 minute
(b) Between output terminal and internal circuit	2,300V AC, 1 minute
(c) Between output terminals (COMs)	2,300V AC, 1 minute
(9) Electrical Life	100,000 operations minimum (rated resistive load 1,800 operations/hour)
(10) Mechanical Life	20,000,000 operations minimum (no load 18,000 operations/hour)
(11) Connector	Insertion/ Removal Durability: 100 times

8. Transistor Output (FC6A-C16P◇CE, FC6A-C16K◇CE, FC6A-C16P◇DE, FC6A-C16K◇DE)

(1) Transistor Output Points	7 (7/1 common)
(2) Output Type	
(a) Transistor Sink	FC6A-C16K◇CE, FC6A-C16K◇DE
(b) Transistor Source	FC6A-C16P◇CE, FC6A-C16P◇DE
(3) Rated Load Voltage	24V DC power supply type: 24V DC 12V DC power supply type: 12V DC
(4) Voltage Tolerance	24V DC power supply type: 19.2 to 28.8V DC , 12V DC power supply type: 10.2 to 18.0V DC
(5) Rated Load Current	
(a) Per Point	0.5A
(b) Per Common	3.5A
(6) Voltage Drop (ON Voltage)	1V max (voltage between COM and output terminal when output is on.)
(7) Inrush Current	1A
(8) Leakage Current	0.1mA maximum
(9) Clamping Voltage	24V DC power supply type: 39V ±1V, 12V DC power supply type: 39V ±1V
(10) Maximum Lamp Load	12W
(11) Inductive Load	24V DC power supply type: L/R=10ms (28.8V DC, 1Hz) 12V DC power supply type (FC6A-C16P◇DE, FC6A-C16K◇DE) : L/R=10ms (18.0V DC, 1Hz)
(12) Overcurrent Protection	
(a) Transistor Sink Output	No
(b) Transistor Source Output	Overcurrent is detected by current limit resistance (This overcurrent signals consist of one signal per 4 point outputs. When microprocessor gets this overcurrent signal by interrupt input, microprocessor turns off 4pt outputs of this category at fixed time (approx. 1sec).
(13) External Current Consumption	24V DC power supply type: 100mA maximum, 24V DC (power voltage at the +V terminal, -V terminal at source) 12V DC power supply type: 100mA maximum, 12V DC (power voltage at the +V terminal, -V terminal at source)
(14) Isolation	Between output terminal and Internal circuit: Optocoupler-isolated Between output terminals: Not isolated
(15) Connector	Insertion, Removal Durability: 100 times
(16) Output Delay	
(a) Turn ON Time	High speed input port: 5µs, Middle speed input port: 30µs Normal speed input port: 300µs
(b) Turn OFF Time	High speed input port: 5µs Middle speed input port: 30µs Normal speed input port: 300µs