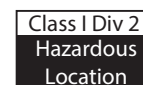# MicroSmart FC6A Plus PLC

## CPU Module Specifications



## PRODUCT DESCRIPTION

This next-generation IDEC MicroSmart FC6A Plus PLC performs beyond micro PLC limits. With its 2,060 I/O capacity, it can control large machines or entire small-scale manufacturing facilities, providing more capabilities for the most demanding applications.

In addition, to give the user flexibility, IDEC offers push-in terminal blocks for quick and reliable connectivity.

## KEY FEATURES

- EtherNet/IP
- MQTT and BACnet/IP
- Modbus TCP and RTU
- Dual Ethernet Ports
- iOS & Android App
- Bluetooth Communication
- -25 to 65ºC Operating Temperature
- Screw, Push-in or MIL Connection Terminals

## FC6A PLUS CPU MODULES

| Part No. | High-speed Counter & Pulse Output | Power | Input | Output | Interface | I/O Points |
|---|---|---|---|---|---|---|
| FC6A-D16R*CEE | | | | Relay Output 2A (240V AC-2A, 30V DC-2A) | | |
| FC6A-D16P*CEE | • High-speed counter Maximum input frequency: 100kHz | | | Transistor Source Output 0.5A | | 16 points (8/8) |
| FC6A-K16K*CEE | | 24V DC | 24V DC (Sink/Source) | Transistor Sink Output 0.5A | Port 1 (USB) Port 2 (Ethernet) Port 3 (Ethernet) | |
| FC6A-D32P*CEE | • Pulse output (*1) Maximum output frequency: 100kHz | | | Transistor Source Output 0.1A | | 32 points (16/16) |
| FC6A-D32K*CEE | | | | Transistor Sink Output 0.1A | | |

For the 16 point CPU, in place of *, specify the type of terminals. 1 = Screw or 4 = Push-in
For 32 point CPU, in place of *, specify the type of terminals. 3 = MIL Connector or 4 = Push-in

## SPECIFICATIONS

| Part No. | FC6A-D16R*CEE FC6A-D16P*CEE FC6A-D16K*CEE | FC6A-D32P*CEE FC6A-D32K*CEE |
|---|---|---|
| Rated Power Voltage | 24V DC | |
| Allowable Voltage Range | 20.4 to 28.8V DC (including ripple) | |
| Maximum Power Consumption (CPU module) | FC6A-D16R*CEE: 2.88W (24V DC) FC6A-D16P*CEE: 2.88W (24V DC) FC6A-D16K*CEE: 2.88W (24V DC) FC6A-D32P*CEE: 3.36W (24V DC) FC6A-D32K*CEE: 3.36W (24V DC) | |
| Inrush Current | 35A maximum | |
| Allowable Momentary Power Interruption | 10ms (at rated voltage) | |
| Operating Temperature | −25 to +65ºC (no freezing) | |
| Storage Temperature | −25 to + 70ºC (no freezing) | |
| Relative Humidity | Level RH1 (IEC 61131-2) 10 to 95% (no condensation) | |
| Altitude | Operation: 0 to 2,000m, 795 to 1,013hPa, Transport: 0 to 3,000m, 701 to 1,013hPa | |
| Pollution Degree | 2 (IEC 60664-1) | |
| Corrosion Immunity | Free from corrosive gases | |
| Dielectric Strength | Between power and FE terminals: 500V AC, 1 minute Between transistor output and FE terminals: 500V AC, 1 minute Between power and input terminals: 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 | Between input and FE terminals: 500V AC, 1 minute Between relay output and FE terminals: 2,300V AC, 1 minute Between power and transistor output terminals: 500V AC, 1 minute Between input and transistor output terminals: 500V AC, w 1 minute |

For the 16 point CPU, in place of *, specify the type of terminals. 1 = Screw or 4 = Push-in
For 32 point CPU, in place of *, specify the type of terminals. 3 = MIL Connector or 4 = Push-in

Class I Div 2 Hazardous Location

## SPECIFICATIONS CONT.

| | |
|---|---|
| **Insulation Resistance** | Between power and FE terminals: 100MΩ or higher (500V DC megger)<br>Between transistor output and FE terminals: 100MΩ or higher (500V DC megger)<br>Between power and input terminals: 100MΩ or higher (500V DC megger)<br>Between power and relay output terminals: 100 MΩ or higher (500V DC megger)<br>Between input and relay output terminals: 100MΩ or higher (500V DC megger)<br><br>Between input and FE terminals: 100MΩ or higher (500V DC megger)<br>Between relay output and FE terminals: 100MΩ or higher (500V DC megger)<br>Between power and transistor output terminals: 100 MΩ or higher (500V DC megger)<br>Between input and transistor output terminals: 100 MΩ or higher (500V DC megger) |
| **Noise Resistance** | AC/DC power terminals: 1kV, 50ns to 1μs<br>I/O terminals (coupling clamp): 1.5kV, 50ns to 1μs coupling adapter |
| **Vibration Resistance** | 5 to 8.4Hz amplitude 3.5mm<br>8.4 to 150Hz acceleration 9.8m/s2 (1G), 2 hours per axis on each of three mutually perpendicular axes (IEC 61131-2) |
| **Shock Resistance** | 147m/s2 (15G), 11ms duration, 3 shocks per axis on three mutually perpendicular axes |
| **Degree of Protection** | IP20 (IEC 60529) |
| **Power Supply Wire** | UL1007 AWG24-16, UL2464 AWG24-16, UL1015 AWG20-16 |
| **Grounding Wire** | UL1007 AWG16 |
| **Ground** | D-type ground (Class 3 ground) |
| **Mounting** | DIN rail or panel mounting |
| **Weight (approx.)** | FC6A-D16R1CEE: 290g<br>FC6A-D16P1CEE: 275g<br>FC6A-D16K1CEE: 275g<br>FC6A-D16R4CEE: 280g<br>FC6A-D16P4CEE: 265g<br>FC6A-D16K4CEE: 265g<br><br>FC6A-D32P3CEE: 255g<br>FC6A-D32K3CEE: 255g<br>FC6A-D32P4CEE: 255g<br>FC6A-D32K4CEE: 255g |

## FUNCTION SPECIFICATIONS

| Part No. | | FC6A-D16R*CEE<br>FC6A-D16P*CEE<br>FC6A-D16K*CEE | FC6A-D32P*CEE<br>FC6A-D32K*CEE |
|---|---|---|---|
| **Control System** | | Stored program system | |
| **Instruction Words** | Basic | 42 | |
| | Advanced | 130 | |
| **Program Capacity (*1)** | | 800KB (100,000 steps) | |
| **User Program Storage** | | Serial Flash Memory (100,000 times rewritable) | |
| **Processing Time** | Basic Instruction | 21μs/1,000 steps | |
| | END Processing (*2) | 1ms maximum | |
| **I/O Points** | Input | 8 points | 16 points |
| | Output | 8 points | 16 points |
| **Expandable Modules** | | 7 modules (*3) | |
| **Expandable I/O Points with Expansion Modules** | | 224 points | |
| **Expandable Modules with Unibody Type Expansion Modules** | | 8 modules | |
| **Expandable I/O Points with Unibody Type Expansion Modules** | | 256 points | |
| **Expandable Modules with Separate Type Expansion Modules (*5)** | | 63 modules (separate type master: 1 module maximum, separate type slave: 10 modules maximum) | |
| **Expandable I/O Points with Separate Type Expansion Modules (*5)** | | 2,016 points | |
| **Internal Relay** | | 15,400 points | |
| **Special Internal Relay** | | 1,600 points | |
| **Shift Register** | | 256 points | |
| **Data Register** | | 60,000 points | |
| **Non-Retentive Data Register** | | 200,000 points | |
| **Special Data Register** | | 900 points | |
| **Counter** | | 512 points | |
| **Timer (1ms, 10ms, 100ms,1s)** | | 2,000 points | |
| **Clock** | | Clock accuracy: ±30 sec/month (typical) at 25°C | |
| **RAM Backup** | Backup Data | Internal relay, shift register, counter, data register, timer, special data register, special internal relay, clock data | |
| | Battery | Lithium primary battery (BR2032) | |
| | Battery Life | Approx. 4 years | |
| | Replaceability | Possible | |
| **Self-diagnostic Function** | | Keep data, user program sum check (serial flash memory), user program sum check (RAM), timer/counter preset value sum check, user program syntax check, user program execution check, WDT check, user program write check, power failure, clock error, data ink connection check, I/O bus initialization check | |
| **Input Filter** | | 0 ms (without filter), 3 to 15ms (selectable in increments of 1ms)<br>I14, I15, I16, I17: 3ms | |
| **Catch Input/Interrupt Input** | | Six inputs<br>I0, I1, I3, I4, I6, I7 (Minimum turn on pulse width: 5μs max./Minimum turn off pulse width: 5μs max.) | |

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For 32 point CPU, in place of *, specify the type of terminals. 3 = MIL Connector or 4 = Push-in

## USB PORT SPECIFICATIONS

| | |
|---|---|
| **USB Type** | USB mini-B |
| **USB Standard** | USB 2.0 |
| **Isolation** | Not isolated from the internal circuit |
| **Communication Function** | Maintenance communication to PC |

## ETHERNET PORT 1 SPECIFICATIONS

| | |
|---|---|
| **Communication Type** | IEEE802.3 compliant |
| **Communication Speed** | 10BASE-T, 100BASE-TX |
| **Connector** | RJ45 |
| **Cable** | CAT.5STP |
| **Maximum Cable Length** | 100m |
| **Isolation** | Pulse transformer isolation |
| **Communication Function** | Maintenance communication (server), user communication (server/client), user communication UDP, Modbus TCP (server/client), Email, Web Server, PING, SNTP, FTP server/client, BACnet/IP server |

## ETHERNET PORT 2 SPECIFICATIONS

| | |
|---|---|
| **Communication Type** | IEEE802.3 compliant |
| **Communication Speed** | 10BASE-T, 100BASE-TX |
| **Connector** | RJ45 |
| **Cable** | CAT.5STP |
| **Maximum Cable Length** | 100m |
| **Isolation** | Pulse transformer isolation |
| **Communication Function** | Maintenance communication (server), user communication (server/client), user communication UDP, Modbus TCP (server/client), PING |

# FUNCTION SPECIFICATIONS CONT.

| | | |
|---|---|---|
| **High-speed Counter** | Maximum Counting Frequency and High-speed Counter Points | Total 6 points  Single/two-phase selectable: 100kHz (single-phase: 6 points, two-phase: 3 points) |
| | Counting Range | 0 to 4,294,967,295 (32 bits) |
| | Operation Mode | Rotary encoder mode, adding counter mode, frequency measurement mode |
| **Analog Potentiometer** | Quantity | 1 point |
| | Data Range | 0 to 1,000 |
| **Analog Voltage Input** | Quantity | 1 point |
| | Input Voltage Range | 0 to 10V |
| | Input Impedance | Approx. 100KΩ |
| | Digital Resolution | Approx. 4,000 steps (12 bits) |
| **Pulse Output (transistor output model only)** | Quantity | 4 points |
| | Maximum Output Pulse Frequency | Q0, Q2, Q4, Q6: 100kHz |
| | Reversible Control | Single-pulse output mode: 4 axis (Q0-Q7), Dual-pulse output mode: 4 axis (Q0-Q7) |
| | PWM Output | Duty cycle 0.1 to 100.0% (increments of 0.1%), Output pulse frequency 15 to 5,000 Hz (increments of 1 Hz): 4 points (Q0, Q2, Q4, Q6) (Adjust 5µs minimum as ON time and 15µs minimum as OFF time.) |
| **USB Port** | | USB mini-B (maintenance communication) |
| **Ethernet Port 1** | | Maintenance communication (server), user communication TCP (server/client), user communication UDP, Modbus TCP (server/client), Email, Web Server, PING, SNTP, FTP server/client |
| **Ethernet Port 2** | | Maintenance communication (server), user communication TCP (server/client), user communication UDP, Modbus TCP (server/client), PING |
| **Cartridge (option)** | | Two cartridges can be added (when using FC6A–HPH1)/One cartridge can be added (when using FC6A–PH1) |
| **SD Card Slot** | | Embedded |
| **HMI Module (option)** | | Yes |

*1: 1 step equals 8 bytes.
*2: Not including expansion I/O service time, counter timer processing time, data link processing time, and interrupt processing time.
*3: A maximum of 5 modules can be connected when using the expansion interface module separate type master.
*4: Transistor output model
*5: Communication module cannot be connected.

# INPUT SPECIFICATIONS

| | | FC6A-D16R*CEE FC6A-D16P*CEE FC6A-D16K*CEE | FC6A-D32P*CEE FC6A-D32K*CEE |
|---|---|---|---|
| **Part No.** | | | |
| **Input Points** | | 8 (8/1 common) | 16 (16/1 common) |
| **Rated Input Voltage** | | 24V DC: 24V DC sink/source input signal | |
| **Input Voltage Range** | | 0 to 28.8V DC | |
| **Rated Input Current** | | High speed input port 5mA/pt, middle/normal speed input port 7mA/pt | |
| **Input Impedance** | | High speed input port 4.9kΩ, middle/normal speed input port: 3.4kΩ | |
| **Input Delay** | Turn ON Time | High speed input port: 5µs + filter value<br>Middle speed input port: 35µs + filter value<br>Normal speed input port: 35µs + filter value | |
| | Turn OFF Time | High speed input port: 5µs + filter value<br>Middle speed input port: 35µs + filter value<br>Normal speed input port: 100µs + filter value | |
| **Isolation** | | Between input terminals: Not isolated<br>Internal circuit: Optocoupler-isolated | |
| **Input Type** | | Type1 (IEC 61131-2) | |
| **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, therefore reverse connection does not cause damage.<br>If any input exceeding the rated value is applied, permanent damage may be caused. | |
| **Cable Length** | | 3m in compliance with electromagnetic immunity | |
| **Connector** | Insertion Durability | 100 times minimum | |
| | Applicable Ferrule | 1-wire: AI 0.5-8 WH (Phoenix Contact)<br>2-wire: AI-TWIN 2×0.5-8 WH (Phoenix Contact) | |

# RELAY OUTPUT SPECIFICATIONS

| | | |
|---|---|---|
| **Part No.** | | FC6A-D16R*CEE |
| **Relay Output Points** | | 8 |
| **Output Points per Common Line** | COM1 | 4 |
| | COM2 | 4 |
| **Output Type** | | 1NO |
| **Maximum Load Current** | Per Point | 2A |
| | Per Common | COM1: 7A<br>COM2: 7A |
| **Minimum Switching Load** | | 1mA/5V DC (reference value) |
| **Initial Contact Resistance** | | 30mΩ maximum |

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# RELAY OUTPUT SPECIFICATIONS CONT.

| | | |
|---|---|---|
| Electrical Life | | 100,000 operations minimum (rated resistive load 1,800 operations/hour) |
| Mechanical Life | | 20,000,000 operations minimum (no load 18,000 operations/hour) |
| Rated Load | | Resistive load: 240V AC 2A, 30V DC 2A<br>Inductive load: 240V AC 2A (cos ø = 0.4), 30V DC 2A (L/R =7 ms) |
| Connector | Insertion/Removal Durability | 100 times minimum |
| | Applicable Ferrule | 1-wire: AI 0.5-8 WH (Phoenix Contact)<br>2-wire: AI-TWIN 2×0.5-8 WH (Phoenix Contact) |

# TRANSISTOR OUTPUT SPECIFICATIONS

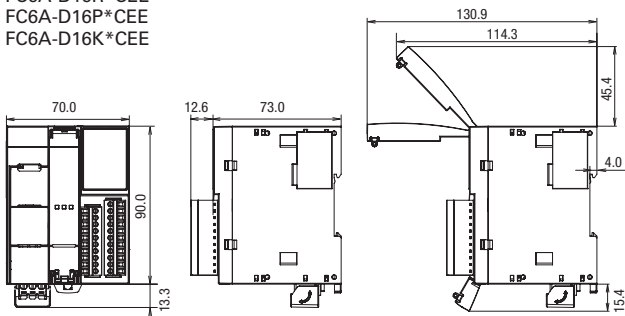| | | | |
|---|---|---|---|
| Part No. | | FC6A-D16P*CEE<br>FC6A-D16K*CEE | FC6A-D32P*CEE<br>FC6A-D32K*CEE |
| Transistor Output Points | | 8 (8/1 common) | 16 (16/1 common) |
| Output Type | Transistor Sink | FC6A-D16K1CEE/FC6A-D32K3CEE | |
| | Transistor Source | FC6A-D16P1CEE/FC6A-D32P3CEE | |
| Rated Load Voltage | | 24V DC | |
| Voltage Tolerance | | 19.2 to 28.8V DC | |
| Rated Load Current | Per Point | 0.5A | 0.1A |
| | Per Common | 4.0A | 1.6A |
| Output Delay | Turn ON Time | High speed input port: 5µs<br>Normal speed input port: 300µs | |
| | Turn OFF Time | High speed input port: 5µs<br>Normal speed input port: 300µs | |
| Isolation | | Between output terminal and Internal circuit: Optocoupler-isolated<br>Between output terminals: Not isolated | |
| Voltage Drop (ON Voltage) | | 1V max (voltage between COM and output terminal when output is on.) | |
| Inrush Current | | 1A | 0.2A |
| Leakage Current | | 0.1mA maximum | |
| Clamping Voltage | | 39V ±1V | |
| Maximum Lamp Load | | 12W | 2.4W |
| Inductive Load | | L/R=10ms (28.8V DC, 1Hz) | |
| Overcurrent Protection | | Transistor Sink Output: No<br>Transistor Source Output: Overcurrent is detected by current limit resistance. (*1) | |
| External Current Draw | | 100mA maximum, 24V DC (power voltage at the +V terminal, -V terminal at source) | |
| Connector | Insertion Durability | 100 times minimum | |
| | Applicable Ferrule | 1-wire: AI 0.5-8 WH (Phoenix Contact)<br>2-wire: AI-TWIN 2×0.5-8 WH (Phoenix Contact) | — |

*1: 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).
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# DIMENSIONS (MM)

FC6A-D16R*CEE
FC6A-D16P*CEE
FC6A-D16K*CEE



FC6A-D32P*CEE
FC6A-D32K*CEE