

## MicroSmart



UL Listed  
File No. E211795

### Key features of the MicroSmart series include:

- 10, 16, or 24 I/O All-in-one type CPU modules with Sink/Source DC input and Relay Output
- 20 I/O Slim type CPU modules with Sink/Source DC input and Transistor Sink or Source Output
- 20 I/O Slim type CPU modules with Sink/Source DC input and Relay Output with high-speed Transistor Sink or Source Output
- 40 I/O Slim type CPU modules with Sink/Source DC input and Transistor Sink or Source Output
- AC Input, DC Input, Relay Output, Transistor Output, Combination I/O and Analog I/O expansion modules available
- 24 I/O All-in-one CPU expandable to 88 I/O points; 20 I/O slim types expandable up to 148 or 244 I/O; 40 I/O slim type expandable up to 264 I/O points
- Standard RS232 port, optional plug-in RS485/RS232 port
- Optional memory cartridge or real-time clock and calendar cartridge
- Data link to other MicroSmart modules, PLCs, PCs or HG series operator interfaces
- Approved for Class 1–Div. 2 hazardous locations (UL1604)
- Compact size

### Pulse Output/Trapezoidal Control

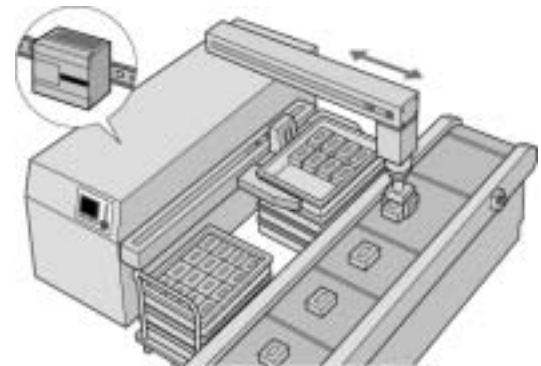
Independent dual-axis control is available with two pulse outputs. Locational values can be easily defined for precise positional (trapezoidal) control.

- Pulse output instruction
- PWM instruction (Pulse Width Modulation control)

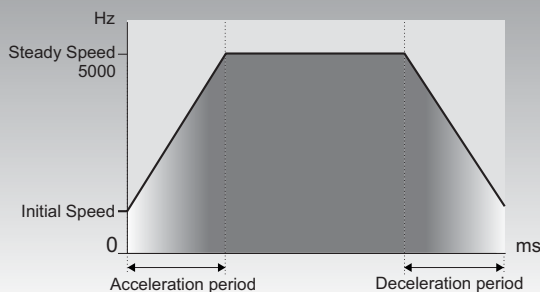
### Pulse Output Function Specifications

|                          |        |
|--------------------------|--------|
| Number of output points  | 2      |
| Maximum output frequency | 20 kHz |

\*Only one point of trapezoidal control is available.

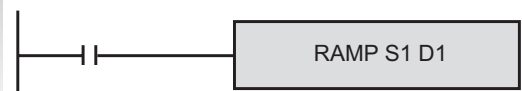


Trapezoidal Control (RAMP)



Setting the desired values enables you to precisely manage the trapezoidal control

|                                  |        |
|----------------------------------|--------|
| Operation mode (S1)              | 1      |
| Steady pulse frequency (S1 + 1)  | 50     |
| Initial pulse frequency (S1 + 2) | 10     |
| Frequency change rate (S1 + 3)   | 2      |
| Present value (S1 + 6, 7)        | 10,000 |



J Programmable Logic Controllers

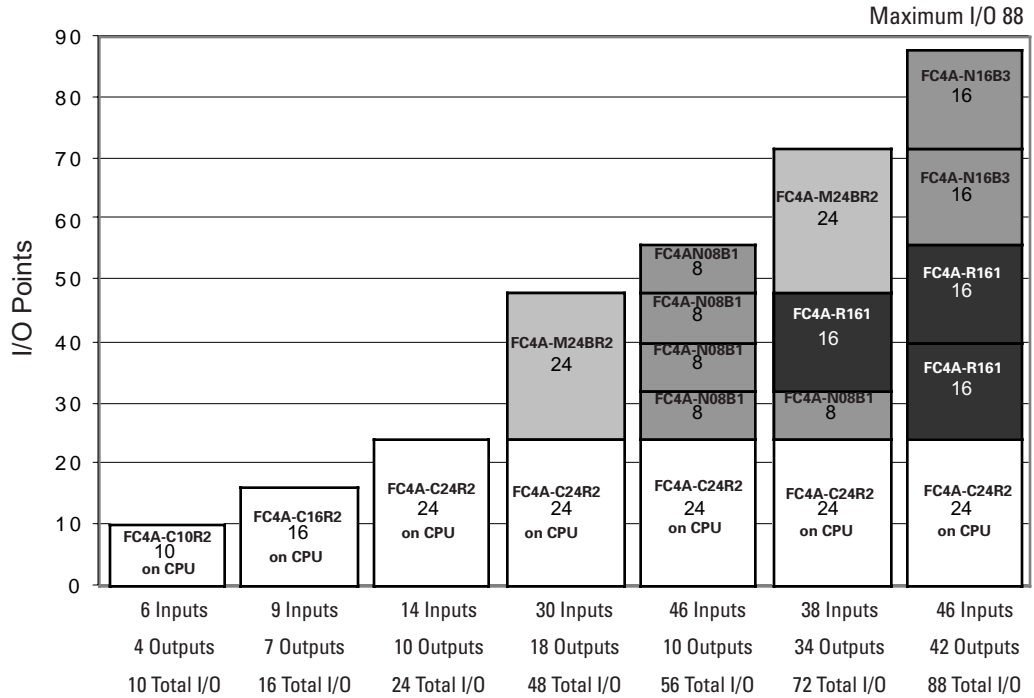
**CPU and Module Combination Examples**

**All-In-One Type**

- Attach Maximum 4 Expansion Modules
- Maximum I/O 88 points
- Only FC4A-C24R2/C24R2C CPU Module is expandable



The maximum number of relay outputs that can be turned on simultaneously is 33 points including relay outputs on the CPU module.



**Slim Type**

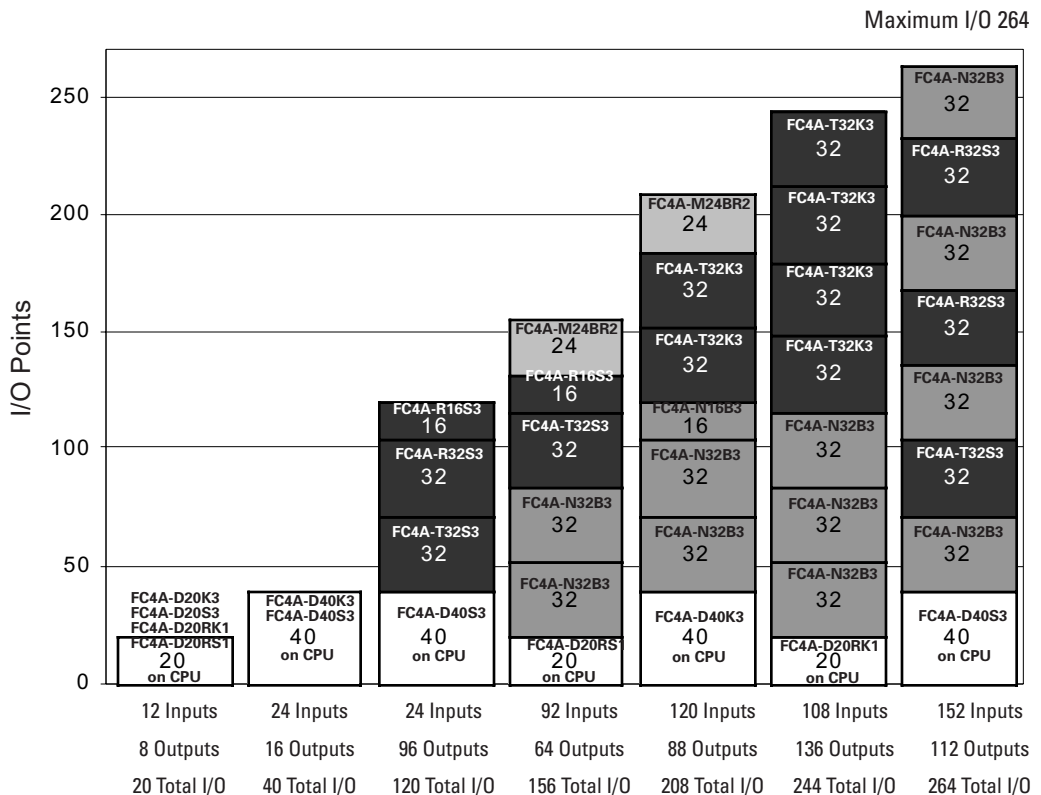


Programmable Logic Controllers

- Attach Maximum 7 Expansion Modules
- Maximum I/O
  - 148 points (D20K3, D20S3)
  - 244 points (D20RK1, D20RS1)
  - 264 points (D40K3, D40S3)

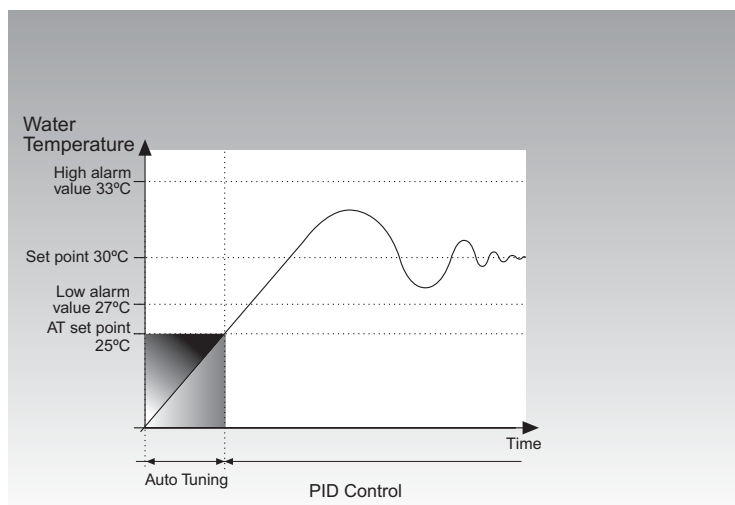


The maximum number of relay outputs that can be turned on simultaneously is 54 points including relay outputs on the CPU module.



## PID Control

To automatically maintain a target water temperature (PID control), use the auto tuning function to perform sampling. Based on the determined PID parameters, PID control is executed automatically. (Slim type CPU units only.)






|                  |    |
|------------------|----|
| Set point        | 30 |
| AT set point     | 25 |
| High alarm value | 35 |
| Low alarm value  | 27 |



## CPU Modules - All-in-One Type

### Part Numbers

|               |              |              |             |
|---------------|--------------|--------------|-------------|
| AC Power Type | FC4A-C10R2*  | FC4A-C16R2*  | FC4A-C24R2  |
| DC Power Type | FC4A-C10R2C* | FC4A-C16R2C* | FC4A-C24R2C |

|               |   |  |   |
|---------------|---|--|---|
| Item          |  |  |  |
| I/O Points    | 10 (6 in/ 4 out)  | 16 (9 in/7 out)  | 24 (14 in/10 out)   |
| Output Type   | Relay Output, 240V AC/30V DC, 2A  |  |   |
| Input Type    | 24V DC (Sink/Source)  |  |   |
| Power Voltage | AC  | 100-240V AC, 50/60 Hz  |   |
|               | DC  | 24V DC   |   |
| Memory        | 4.8KB   | 15KB   | 27KB  |
| Expandability | N/A*  | N/A  | 88 maximum I/O (up to 4 expansion I/O modules)  |









- \* I/O expansion modules not applicable to these two models.
- For specifications see page J-15 & for dimensions see page J-25.
- For options see J-11 & for accessories see J-12.

**J**

Programmable Logic Controllers

CPU Modules - Slim Type

| Part Number   | FC4A-D20K3  | FC4A-D20RK1   | FC4A-D40K3  |
|---------------|---|---|---|
| Item          |  |  |  |
| I/O Points    | 20 (12 in/ 8 out)*  | 20 (12 in/ 8 out)   | 40 (24 in/16 out)**   |
| Output Type   | Transistor Sink Output 0.3A   | Relay Output, 240V AC/30V DC, 2A*<br>Sink Output 0.3A*                            | Transistor Sink Output 0.3A   |
| Input Type    | 24V DC (Sink/Source)  |   |   |
| Power Voltage | 24V DC  |   |   |
| Memory        | 27KB  | 31.2KB  | 31.2KB  |
| Expandability | 148 maximum I/O (up to 7 expansion modules)                                       | 244 maximum I/O (up to 7 expansion modules)                                       | 264 maximum I/O (up to 7 expansion modules)   |

| Part Number   | FC4A-D20S3  | FC4A-D20RS1   | FC4A-D40S3  |
|---------------|---|---|---|
| Item          |  |  |  |
| I/O Points    | 20 (12 in/ 8 out)*  | 20 (12 in/ 8 out)   | 40 (24 in/16 out)**   |
| Output Type   | Transistor Source Output 0.3A   | Relay Output, 240V AC/30V DC, 2A*<br>Transistor, Source Output 0.3A*                | Transistor Source Output 0.3A   |
| Input Type    | 24V DC (Sink/Source)  |   |   |
| Power Voltage | 24V DC  |   |   |
| Memory        | 27KB  | 31.2KB  | 31.2KB  |
| Expandability | 148 maximum I/O (up to 7 expansion modules)   | 244 maximum I/O (up to 7 expansion modules)   | 264 maximum I/O (up to 7 expansion modules)   |








1. \* Transistor output 2 points and relay output 6 points.
2. \*\*For MIL connector type modules, see page J-12 for cables and breakout modules.
3. For specifications see page J-15 & for dimensions see page J-25.
4. For options see J-11 & for accessories see J-12.

J

Programmable Logic Controllers









## Input Modules - 5 Types

| 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-19 & for dimensions see page J-25.
2. For options see J-11 & for accessories see J-12.
3. \*For MIL connector type modules, see page J-12 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-19 & for dimensions see page J-25.
2. For options see J-11 & for accessories see J-12.
3. \*For MIL connector type modules, see page J-12 for cables and breakout modules.





## 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-21 & for dimensions see page J-25.
2. For options see J-11 & for accessories see J-12.

## Analog I/O Modules - 4 Types

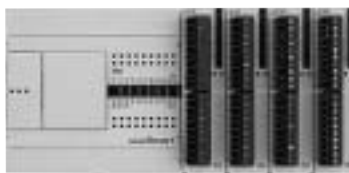
| Part Number | FC4A-K1A1  | FC4A-J2A1  | FC4A-L03AP1  | FC4A-L03A1  |
|-------------|--|--|--|---|
| Item        |  |  |  |  |
| I/O Points  | 1 Analog Output  | 2 Analog Inputs  | 2 Analog Inputs, 1 Analog Output   | 2 Analog Inputs, 1 Analog Output  |
| Output Type | Voltage (0-10V DC)<br>Current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



1. For specifications see page J-22 & for dimensions see page J-25.
2. For options see J-11 & for accessories see J-12.
3. New analog modules available Fall '05. See page J-4 for details.

## Expansion Module Examples

Example 1





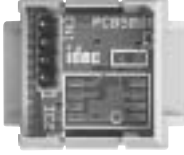
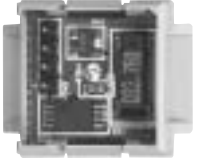
| Module       | Type No.   | Input     | Output    |
|--------------|------------|-----------|-----------|
| CPU          | FC4A-C24R2 | 14        | 10        |
| DC Input     | FC4A-N16B1 | 16        | 0         |
| DC Input     | FC4A-N16B1 | 16        | 0         |
| Relay Output | FC4A-R161  | 0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

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         |
| <b>Total</b>           |             | <b>26</b> | <b>30</b> |




## Optional Modules

| Part Number | FC4A-HPH1   | FC4A-PH1  | FC4A-PM32<br>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-24.





## 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-24.  
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-24.  
2. \*FC4A-AS62M is compatible with CPUs: FC4A-D20RK1, FC4A-D20RS1, FC4A-D40K3, and FC4A-D40S3. (See Communication & Networking Section M for more information.)  
3. New web server module available Fall '05. See page J-3 for details.









Accessories

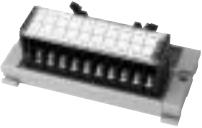
MicroSmart Options

| Item  | Description  | Length     | Part Number |
|---|--|------------|-------------|
|    | Programming cable (Loader /user mode selectable)               | 3m/9.84'   | FC4A-KC4CA  |
|   | O/I Interface Cable (MicroSmart port 1/2 RS232 to HG1B/2A)     | 1.5m/5'    | FC4A-KC1CA  |
|   | O/I Interface Cable (MicroSmart port 1/2 RS232 to HG2F/3F/4F)  |            | FC4A-KC2CA  |
|    | Modem Cable  | 3m/9.84'   | FC2A-KM1C   |
|    | User Communication Cable                                       | 2.4m/7.87' | FC2A-KP1C   |
|   | Analog Voltage Input Cables (included with slim type CPU only) | 1m/3.28'   | FC4A-PMAC2P |
|  | USB/RS232 Converter  |            | FC4A-USB    |

MIL Connector Cables (Use with Breakout Modules)

| Item  | Length | Part Number   |
|---|--------|---------------|
| <b>Non-Shielded</b><br>                 | 0.5m   | FC9Z-H050B20  |
|   | 1m     | FC9Z-H100B20  |
|   | 2m     | FC9Z-H200B20  |
|   | 3m     | FC9Z-H300B20  |
| <b>Shielded</b><br>                     | 0.5m   | FC9Z-H050A20  |
|   | 1m     | FC9Z-H100A20  |
|   | 2m     | FC9Z-H200A20  |
|   | 3m     | FC9Z-H300A20  |
| <b>Shielded Single Connectors</b><br>   | 5 ft   | FC9Z-H100C20A |
| <b>Non-Shielded</b><br>                 | 0.5m   | FC9Z-H050B26  |
|   | 1m     | FC9Z-H100B26  |
|   | 2m     | FC9Z-H200B26  |
|   | 3m     | FC9Z-H300B26  |
| <b>Shielded</b><br>                   | 0.5m   | FC9Z-H050A26  |
|   | 1m     | FC9Z-H100A26  |
|   | 2m     | FC9Z-H200A26  |
|   | 3m     | FC9Z-H300A26  |
| <b>Shielded Single Connectors</b><br> | 5 ft   | FC9Z-H100C26A |

Breakout Modules

| Item  | Description                                   | Part Number |
|---|---|-------------|
|  | 20 points (for 16 & 32 I/O expansion modules) | BX1D-S20A   |
|   | 26 points (for 20 & 40 I/O CPU modules)       | BX1D-S26A   |

J

Programmable Logic Controllers




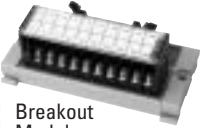







## Accessories con't





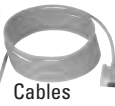








| Item  | Description   | Pkg Qty | Part Number     |
|---|---|---------|-----------------|
|    | 13-position terminal blocks for slim type CPU modules (TB1 for FC4A-D20RK1/-D20RS1)     | 2       | FC4A-PMT13P     |
|   | 16-position terminal blocks for slim type CPU modules (TB2 for FC4A-D20RS1)             | 2       | FC4A-PMTS16P    |
|    | 16-position terminal blocks for slim type CPU modules (TB2 for FC4A-D20RK1)             | 2       | FC4A-PMTK16P    |
|    | 11-position terminal blocks for I/O modules (8 point I/O modules)                       | 2       | FC4A-PMT11P     |
|    | 10-position terminal blocks for I/O module (16 point I/O modules)                       | 2       | FC4A-PMT10P     |
|    | Direct Mounting Strips (for direct mounting of slim type CPU or I/O modules on a panel) | 5       | FC4A-PSP1P      |
|   | End Clips   |         | BNL6            |
|  | DIN Rails (1m/3.28' long, 7.5mm height)   |         | BAA1000         |
|   | DIN Rails (1m/3.28' long, 10.5mm height)  |         | BNDN1000        |
|  | White IDEC screwdriver (2.5mm)  |         | FC9Z-SD2        |
|   | Blue IDEC screwdriver (3.5mm)   |         | FC9Z-SD1        |
|  | 20-position connector socket (MIL connector for I/O modules)                            | 2       | FC4A-PMC20P     |
|   | 26-position connector socket (MIL connector for Slim Type CPU)                          | 2       | FC4A-PMC26P     |
|  | 14-point input simulator switch (Use with FC4A-C24R2 & FC4A-C24R2C)                     |         | FC4A-DS824-SW14 |
|   | 9-point input simulator switch (Use with FC4A-C16R2 & FC4A-C16R2C)                      |         | FC4A-DS824-SW9  |
|   | 6-point input simulator switch (Use with FC4A-C10R2 & FC4A-C10R2C)                      |         | FC4A-DS824-SW6  |
|  | MicroSmart Users Manual   |         | FC9Y-B812-0A    |
|  | Windows-based programming software for IDEC PLCs (for more information, see page J-44). |         | WINDLDR         |

**MicroSmart Packages**

**MicroSmart Starter Kits**

| Part Number   | Includes  |   |
|---|---|---|
|  |  Input Simulator Switch<br> Screwdriver<br> Breakout Module<br> 15w Power Supply<br> HMI Display & Base Module<br> 26-Wire I/O Cable |  WindLDR Cables<br> Manuals |
| <b>MM-SMART-10</b>  | FC4A-C10R2, Input Simulator Switch, Screwdriver   | WindLDR, Cables & Manuals   |
| <b>MM-SMART-16</b>  | FC4A-C16R2, Input Simulator Switch, Screwdriver   | WindLDR, Cables & Manuals   |
| <b>MM-SMART-24</b>  | FC4A-C24R2, Input Simulator Switch, Screwdriver   | WindLDR, Cables & Manuals   |
| <b>MM-SMART-20</b>  | FC4A-D20RK1, HMI Display & Base Module, 15w Power Supply, Screwdriver   | WindLDR, Cables & Manuals   |
| <b>MM-SMART-40</b>  | FC4A-D40K3, HMI Display & Base Module, 15w Power Supply, 26-Wire I/O Cable & Breakout Module, Screwdriver   | WindLDR, Cables & Manuals   |

**MicroSmart Solution Packages**

|   | Part Number  | Micro Smart CPU | Operator Interface   | Power Supply  | Accessories  |   |
|---|--|-----------------|----------------------|---|--|---|
|   |  |                 |                      |  15W<br> 50W |  WindLDR<br> Cables<br> WindMSG<br> Manuals<br> WindO/I-NV2 |  |
|  | <b>MM-SMART-10-252</b>   | 10 I/O          | HG1X 2 line          | —   | WindLDR, WindMSG, Cables & Manuals   | —   |
|   | <b>MM-SMART-16-452</b>   | 16 I/O          | HG1X 4 line          | —   | WindLDR, WindMSG, Cables & Manuals   | —   |
|  | <b>MM-SMART-10-HG1B</b>  | 10 I/O          | HG1B RS232/485       | 15W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|   | <b>MM-SMART-16-HG1B</b>  | 16 I/O          | HG1B RS232/485       | 15W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|   | <b>MM-SMART-24-HG1B</b>  | 24 I/O          | HG1B RS232/485       | 15W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|   | <b>MM-SMART-20-HG1B</b>  | 20 I/O          | HG1B RS232/485       | 50W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|   | <b>MM-SMART-40-HG1B</b>  | 40 I/O          | HG1B RS232/485       | 50W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|  | <b>MM-SMART-16-HG2F-M</b>  | 16 I/O          | HG2F Monochrome      | 15W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|   | <b>MM-SMART-16-HG2F-C</b>  | 16 I/O          | HG2F Color           | 15W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|   | <b>MM-SMART-24-HG2F-M</b>  | 24 I/O          | HG2F Monochrome      | 15W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|   | <b>MM-SMART-24-HG2F-C</b>  | 24 I/O          | HG2F Color           | 15W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|   | <b>MM-SMART-20-HG2F-M</b>  | 20 I/O          | HG2F Monochrome      | 50W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|   | <b>MM-SMART-20-HG2F-C</b>  | 20 I/O          | HG2F Color           | 50W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|   | <b>MM-SMART-40-HG2F-M</b>  | 40 I/O          | HG2F Monochrome      | 50W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|   | <b>MM-SMART-40-HG2F-C</b>  | 40 I/O          | HG2F Color           | 50W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|  | <b>MM-SMART-24-HG3F</b>  | 24 I/O          | HG3F 10.4" TFT Color | 60W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |
|   | <b>MM-SMART-24-HG4F</b>  | 24 I/O          | HG4F 12.1" TFT Color | 60W   | WindLDR, WindO/I-NV2, Cables & Manuals   | E-Stop & Nameplate  |

Programmable Logic Controllers **J**

## General Specifications (CPU Module)

|                             |  | FC4A-C10R2<br>FC4A-C10R2C  | FC4A-C16R2<br>FC4A-C16R2C      | FC4A-C24R2<br>FC4A-C24R2C      | FC4A-D20K3<br>FC4A-D20S3   | FC4A-D20RK1<br>FC4A-D20RS1 | FC4A-D40K3<br>FC4A-D40S3 |  |
|-----------------------------|--|--|--------------------------------|--------------------------------|--|----------------------------|--------------------------|--|
| CPU General Specifications  | <b>Rated Voltage</b>   | AC Power Type: 100-240V AC<br>DC Power Type: 24V DC  |                                |                                | 24V DC   |                            |                          |  |
|                             | <b>Allowable Range</b>   | AC Power Type: 85-264V AC<br>DC Power Type: 16.0 - 31.2V DC  |                                |                                | 20.4 to 26.4V DC (including ripple)  |                            |                          |  |
|                             | <b>Rated Frequency</b>   | AC Power Type: 50/60 Hz (47-63 Hz)   |                                |                                | —  |                            |                          |  |
|                             | <b>Maximum Input Current</b>   | 0.25A (85V AC or 24V DC)   | 0.30A (85V AC or 24V DC)       | 0.45A (85V AC or 24V DC) **    | 0.56A (26.4V DC) #   | 0.70A (26.4V DC) #         |                          |  |
|                             | <b>Max. Power Consumption</b>  | AC   | 30VA/264V AC *<br>20VA/100V AC | 31VA/264V AC *<br>22VA/100V AC | 40VA/264V AC **<br>33VA/100V AC  | 15W/26.4V DC #             | 19W/26.4V DC #           |  |
|                             |  | DC   | 3.8W/24V DC                    | 4.6W/24V DC                    | 8.7W/24V DC  | Not applicable             |                          |  |
|                             | <b>Allowable Momentary Power Interruption</b>  | 10 msec at the rated inputs and outputs (IEC61131)   |                                |                                | 10 msec (at 24V DC)  |                            |                          |  |
|                             | <b>Dielectric Strength</b>   | Between power and ⊕ terminal: 1500V AC, 1 min<br>Between I/O and ⊕ terminal: 1500V AC, 1 min           |                                |                                | Between power and ⊕ terminal: 500V AC, 1 min<br>Between I/O and ⊕ terminal: 1500V AC, 1 min              |                            |                          |  |
|                             | <b>Insulation Resistance</b>   | Between power and ⊕ terminal: 10 MΩ (min), 500V DC<br>Between I/O and ⊕ terminal: 10 MΩ (min), 500V DC |                                |                                | Between power and ⊕ terminal: 10 MΩ (min)<br>Between I/O and ⊕ terminal: 10 MΩ (min)                     |                            |                          |  |
|                             | <b>Noise Resistance</b>  | AC or DC power terminal: 1.5 kV, 50ns to 1μs<br>I/O terminal (coupling clamp): 1.5 kV, 50ns to 1μs     |                                |                                | DC power terminals: 1.0 kV, 50 nsec to 1μsec<br>I/O terminals (coupling clamp): 1.5 kV, 50 nsec to 1μsec |                            |                          |  |
|                             | <b>Inrush Current</b>  | 35A max.   | 35A max.                       | 40A max.                       | 50A maximum (24V DC)   |                            |                          |  |
|                             | <b>Power Supply Wire</b>   | 22 - 18AWG   |                                |                                |  |                            |                          |  |
|                             | <b>Operating Temperature</b>   | 0 to 55°C  |                                |                                |  |                            |                          |  |
|                             | <b>Storage Temperature</b>   | -25 to +70°C   |                                |                                |  |                            |                          |  |
|                             | <b>Operating Humidity</b>  | 30-95% Level RH1 (no condensation)   |                                |                                |  |                            |                          |  |
|                             | <b>Altitude</b>  | Operation: 0 to 2,000m (0 to 6,595 ft)<br>Transport: 0 to 3,000m (0 to 9,840 ft)                       |                                |                                |  |                            |                          |  |
|                             | <b>Pollution Degree</b>  | 2 (IEC60664)   |                                |                                |  |                            |                          |  |
|                             | <b>Corrosion Immunity</b>  | Free from corrosive gases  |                                |                                |  |                            |                          |  |
|                             | <b>Degree of Protection</b>  | IP20   |                                |                                |  |                            |                          |  |
| <b>Grounding Wire</b>       | 16 AWG   |  |                                | 22 AWG                         |  |                            |                          |  |
| <b>Vibration Resistance</b> | DIN rail mounted: 10 to 57Hz / amplitude 0.075mm, 57 to 150Hz / acceleration 9.8m/s <sup>2</sup> (1G)<br>Direct mounted: 2 to 25Hz / amplitude 1.6mm, 25 to 100Hz / acceleration 39.2m/s <sup>2</sup> (4B) in each of 3 axes |  |                                |                                |  |                            |                          |  |
| <b>Shock Resistance</b>     | 15G, 11ms, 3 shocks in each of 3 axes  |  |                                |                                |  |                            |                          |  |
| <b>Weight</b>               | AC   | 230g   | 250g                           | 305g                           | Not Applicable   |                            |                          |  |
|                             | DC   | 240g   | 260g                           | 310g                           | 140g   | 185g                       | 180g                     |  |



- \* CPU module power consumption includes 250 mA sensor power.
- \*\* CPU module (including 250 mA sensor power) + 4 I/O modules
- # CPU module + 7 I/O modules

### Communication Port 1 Specifications

|  |  |
|--|--|
| <b>Standards</b>   | EIA RS232C   |
| <b>Maximum Baud Rate</b>   | 19200 bps  |
| <b>Maintenance Communication</b>                                 | Possible   |
| <b>User Communication</b>  | Possible   |
| <b>Modem Communication</b>                                       | Not possible   |
| <b>Data Link Communication</b>                                   | Not possible   |
| <b>Cable</b>   | Special Cables: FC2A-KC4C, FC2A-KP1C, FC4A-KC1CA, FC4A-KC2CA |
| <b>Isolation between Internal Circuit and Communication Port</b> | Not isolated   |

## Function Specifications (CPU Module)

|   | FC4A-C10R2<br>FC4A-C10R2C   | FC4A-C16R2<br>FC4A-C16R2C  | FC4A-C24R2<br>FC4A-C24R2C                | FC4A-D20K3<br>FC4A-D20S3  | FC4A-D20RK1<br>FC4A-D20RS1               | FC4A-D40K3<br>FC4A-D40S3                  |
|---|---|--|--|---|--|---|
| <b>Control System</b>                           | Stored program system   |  |  |   |  |   |
| <b>Instruction words</b>                        | 35 basic instructions   |  |  |   |  |   |
|   | 38 advanced   | 40 advanced  | 46 advanced                              | 53 advanced   | 70 advanced                              |   |
| <b>Program Capacity</b>                         | 4,800 bytes<br>(800 steps)  | 15,000 bytes<br>(2,500 steps)                                    | 27,000 bytes<br>(4,500 steps)            | 27,000 bytes<br>(4,500 steps)   | 31,200 bytes<br>(5,200 steps)            |   |
|   | Calculated 6 bytes per step   |  |  |   |  |   |
| <b>User Program Storage</b>                     | Internal EEPROM, Memory cartridge (option: EEPROM)  |  |  |   |  |   |
| <b>Processing Time</b>                          | Basic instruction: 1.65 msec (1000 steps); END processing: 0.64 msec<br>(does not include expansion I/O service, clock function processing, data link processing and interrupt processing)  |  |  |   |  |   |
| <b>Expandable I/O Modules</b>                   | —   | —  | 4 modules                                | 7 modules   |  |   |
| <b>RAM Backup</b>                               | Backup Data: Internal relay, shift register, counter, data register<br>Backup Duration: Approx. 30 days (typical) at 25° C after backup battery fully charged<br>Battery: Lithium secondary battery<br>Charging Time: Approx. 15 hours for charging from 0% to 90% of full charge<br>Battery Life: 5 years<br>Replaceability: Impossible to replace battery |  |  |   |  |   |
| <b>I/O Points</b>                               | 6 input, 4 output   | 9 input, 7 output  | 14 input, 10 output<br>Expansion: 64 I/O | 12 input, 8 output<br>Expansion: 128 I/O  | 12 input, 8 output<br>Expansion: 224 I/O | 24 input, 16 output<br>Expansion: 224 I/O |
| <b>Internal Relay</b>                           | 256   | 1024   |  |   |  |   |
| <b>Shift Register</b>                           | 64  | 128  |  |   |  |   |
| <b>Data Register</b>                            | 400   | 1300   |  |   |  |   |
| <b>Expansion Data Register</b>                  | —   |  |  |   | 6000                                     |   |
| <b>Counter</b>                                  | 32  | 100  |  |   |  |   |
| <b>Timer (1-sec, 100-msec, 10-msec, 1-msec)</b> | 32  | 100  |  |   |  |   |
| <b>Self-Diagnostic Function</b>                 | Power failure check, watchdog timer, data link connection, user program EEPROM 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  |  |  |   |  |   |
| <b>Input Filter</b>                             | 3 to 15 msec (1-msec increments)  |  |  |   |  |   |
| <b>Catch Input/Interrupt Input</b>              | 4 input (I2 through I5) Minimum turn on pulse width: 40 µsec maximum Minimum turn off pulse width: 150 µsec maximum   |  |  |   |  |   |
| <b>High-Speed Counter</b>                       | Total 4 points: Single/two-phase selectable: 20kHz (1 point)<br>Single-phase: 5kHz (3 points)   |  |  | Total 4 points: Single/two-phase selectable: 20kHz (2 points)<br>Single-phase: 5kHz (2 points)    |  |   |
|   | Counting Range 0 to 65535 (16 bits), Operation Mode: Rotary encoder mode and adding counter mode  |  |  |   |  |   |
| <b>Analog Potentiometer</b>                     | 1 point   | 2 points   | 1 point                                  |   |  |   |
|   | Data Range: 0 to 255  |  |  |   |  |   |
| <b>Analog Voltage Input</b>                     | —   |  |  | 1 point, 0 to 10V DC Input Voltage Range, approx. 100kΩ Input Impedance, data range 0-255 (8 bit) |  |   |
| <b>Pulse Output</b>                             | —   |  |  | 2 points, max. frequency 20kHz  |  |   |
| <b>Sensor Power Supply</b>                      | 24V DC (+10% to -15%), 250 mA, no overload detection<br>Isolated from the internal circuit  |  |  | —   |  |   |
| <b>Port 1</b>                                   | RS232C Maintenance Communication, User Communication, Modem Communication   |  |  |   |  |   |
| <b>Port 2 (optional)</b>                        | —   | Possible: RS232C or RS485 (Maintenance communication, data link) |  |   |  |   |
| <b>Clock Function (optional)</b>                | Possible  |  |  | Possible<br>Year, month, day, day of week, hour, minute, second                                   |  |   |
| <b>Memory Cartridge (optional)</b>              | Select either clock or memory cartridge   |  |  | Possible  |  |   |
| <b>HMI Module (optional)</b>                    | Possible  |  |  | Possible using HMI Base Module  |  |   |

Programmable Logic Controllers CPU Function Specifications

## DC Input/Relay Output Specifications (CPU Module)

### DC Input Specifications for CPU modules

|  |                                     | FC4A-C10R2<br>FC4A-C10R2C  | FC4A-C16R2<br>FC4A-C16R2C | FC4A-C24R2<br>FC4A-C24R2C | FC4A-D20K3<br>FC4A-D20S3  | FC4A-D20RK1<br>FC4A-D20RS1             | FC4A-D40K3<br>FC4A-D40S3            |
|--|-------------------------------------|--|---------------------------|---------------------------|---|--|-------------------------------------|
| <b>Rated Input Voltage</b>                   |                                     | 24V DC sink / source input signal  |                           |                           |   |  |                                     |
| <b>Allowable Range</b>                       |                                     | 20.4 to 28.8V DC   |                           |                           | 20.4 to 26.4V DC  |  |                                     |
| <b>Rated Input Current</b>                   |                                     | I0, I1: 11mA, I2 to I7, I10 to I15: 7mA  |                           |                           | I0, I1, I6, I7: 5mA/point, I2 to I5, I10 to I27: 7mA/point                            |  |                                     |
| <b>Input Impedance</b>                       |                                     | I0, I1: 2.1kΩ, I2 to I7, I10 to I15: 3.4kΩ   |                           |                           | I0, I1, I6, I7: 5.7kΩ, I2 to I5, I10 to I27: 3.4kΩ                                    |  |                                     |
| <b>OFF/ON Time</b>                           | <b>OFF/ON</b>                       | I0 to I5: 35μsec + Filter Value<br>I6, I7, I10 to I15: 40μsec + Filter Value   |                           |                           | I0 to I7: 35μsec + Filter Value<br>I10 to I27: 40μsec + Filter Value                  |  |                                     |
|  | <b>ON/OFF</b>                       | I0, I1: 45μsec + Filter Value<br>I2 to I7, I10 to I15: 150μsec + Filter Value  |                           |                           | I0, I1, I6, I7: 45μsec + Filter Value<br>I2 to I5, I10 to I27: 150μsec + Filter Value |  |                                     |
| <b>Input Points</b>                          |                                     | 6 inputs<br>6/1 common   | 9 inputs<br>9/1 common    | 14 inputs<br>14/1 common  | 12 inputs<br>12/1 common  | 12 inputs<br>12/1 common               | 24 inputs,<br>12/1 common           |
| <b>Connector</b>                             | <b>On Mother Board</b>              | —  |                           |                           | FL26A2MA<br>(Oki Electric<br>Cable)   | MC1.5/13-G-3.81BK<br>(Phoenix Contact) | FL26A2MA<br>(Oki Electric<br>Cable) |
|  | <b>Insertion/Removal Durability</b> | —  |                           |                           | 100 times minimum   |  |                                     |
| <b>Isolation</b>                             |                                     | Between input terminals: Not isolated<br>Internal circuit: Photocoupler isolated   |                           |                           |   |  |                                     |
| <b>Input Type</b>                            |                                     | Type 1 (IEC61131)  |                           |                           |   |  |                                     |
| <b>External Load for I/O Interconnection</b> |                                     | Not needed   |                           |                           |   |  |                                     |
| <b>Signal Determination Method</b>           |                                     | Static   |                           |                           |   |  |                                     |
| <b>Effect of Improper Input Connection</b>   |                                     | Both sinking and sourcing input signals can be connected. If any input exceeding the rated value is applied, permanent damage may be caused. |                           |                           |   |  |                                     |
| <b>Cable Length</b>                          |                                     | 3m (9.84 ft)   |                           |                           |   |  |                                     |

### Relay Output Specifications for CPU modules

|   |                                     | FC4A-C10R2<br>FC4A-C10R2C   | FC4A-C16R2<br>FC4A-C16R2C | FC4A-C24R2<br>FC4A-C24R2C | FC4A-D20RK1<br>FC4A-D20RS1             |
|---|-------------------------------------|---|---------------------------|---------------------------|--|
| <b>Output Points</b>                            |                                     | 4 points  | 7 points                  | 10 points                 | 8 points                               |
| <b>Output Points per Common</b>                 | <b>COM0</b>                         | 3 points  | 4 points                  | 4 points                  | 2 points<br>(transistor output)        |
|   | <b>COM1</b>                         | 1 point   | 2 points                  | 4 points                  | 3 points                               |
|   | <b>COM2</b>                         | —   | 1 point                   | 1 point                   | 2 points                               |
|   | <b>COM3</b>                         | —   | —                         | 1 point                   | 1 point                                |
| <b>Type of Output</b>                           |                                     | 1NO   |                           |                           |  |
| <b>Maximum Load Current</b>                     | <b>Per point</b>                    | 2A  |                           |                           |  |
|   | <b>Per Common</b>                   | 8A  |                           |                           |  |
| <b>Minimum Switching Load</b>                   |                                     | 0.1mA, 0.1V DC (reference value)  |                           |                           |  |
| <b>Initial Contact Resistance</b>               |                                     | 30mΩ maximum  |                           |                           |  |
| <b>Electrical Life</b>                          |                                     | 100,000 operations (rated load) @ 1,800 operations/hr   |                           |                           |  |
| <b>Mechanical Life</b>                          |                                     | 200,000 operations (no load) @ 18,000 operations/hr   |                           |                           |  |
| <b>Rated Load Current (resistive/inductive)</b> |                                     | 240V AC/2A, 24V DC/2A (30V DC / 2A)   |                           |                           |  |
| <b>Dielectric Strength</b>                      |                                     | Between output and ⊕ terminals: 1500V AC, 1 minute<br>Between output terminals and internal circuit: 1500V AC, 1 minute<br>Between output terminals (COMs): 1500 V AC, 1 minute |                           |                           |  |
| <b>Connector</b>                                | <b>On Mother Board</b>              | —   |                           |                           | MC1.5/16-G-3.81BK<br>(Phoenix Contact) |
|   | <b>Insertion/Removal Durability</b> | —   |                           |                           | 100 times minimum                      |

**Transistor Sink and Source Output Specifications (CPU Module)**
**Transistor Sink and Source Output Specifications for CPU modules**

|                                      |                                     | FC4A-D20K3<br>FC4A-D20S3  | FC4A-D20RK1<br>FC4A-D20RS1             | FC4A-D40K3<br>FC4A-D40S3         |
|--------------------------------------|-------------------------------------|---|--|----------------------------------|
| <b>Output Points and Common Line</b> |                                     | 8 points, 8/1 common  | 2 points, 2/1 common                   | 16 points, 8/1 common            |
| <b>Type of Output</b>                |                                     | FC4A-D20K3/D20RK1/D40K3 = Sink Output<br>FC4A-D20S3/D20RS1/D40S3 = Source Output                              |  |                                  |
| <b>Rated Load Voltage</b>            |                                     | 24V DC  |  |                                  |
| <b>Operating Load Voltage Range</b>  |                                     | 20.4 to 28.8V DC  |  |                                  |
| <b>Rated Load Current</b>            |                                     | 0.3A per output point   |  |                                  |
| <b>Maximum Load Current</b>          |                                     | 1A per common line  |  |                                  |
| <b>Voltage Drop (ON Voltage)</b>     |                                     | 1V maximum (voltage between COM and output terminals when output is on)                                       |  |                                  |
| <b>Inrush Current</b>                |                                     | 1A maximum  |  |                                  |
| <b>Leakage Current</b>               |                                     | 0.1 mA maximum  |  |                                  |
| <b>Clamping Voltage</b>              |                                     | 39V±1V  |  |                                  |
| <b>Maximum Lamp Load</b>             |                                     | 8W  |  |                                  |
| <b>Inductive Load</b>                |                                     | L/R = 10ms (28.8V DC, 1Hz)  |  |                                  |
| <b>External Current Draw</b>         |                                     | 100mA maximum, 24V DC (power voltage at the +V or -V terminal)  |  |                                  |
| <b>Isolation</b>                     |                                     | Between output terminal and internal circuit: Photocoupler isolated<br>Between output terminals: Not isolated |  |                                  |
| <b>Connector</b>                     | <b>On Mother Board</b>              | FL26A2MA<br>(Oki Electric Cable)  | MC1.5/16-G-3.81BK<br>(Phoenix Contact) | FL26A2MA<br>(Oki Electric Cable) |
|                                      | <b>Insertion/Removal Durability</b> | 100 times minimum   |  |                                  |
| <b>Output Delay</b>                  | <b>Turn ON time</b>                 | 5 μs (Q0, Q1), 300 μs max (Q2 to Q7, Q10 to Q17)  |  |                                  |
|                                      | <b>Turn OFF time</b>                | 5 μs (Q0, Q1), 300 μs max (Q2 to Q7, Q10 to Q17)  |  |                                  |



## Input/Relay Output Specifications (Expansion Modules)

### Input Module Specifications

|  |                                     | DC Input  |                                |                                |                                | AC Input  |
|--|-------------------------------------|---|--------------------------------|--------------------------------|--------------------------------|---|
|  |                                     | FC4A-N08B1  | FC4A-N16B1                     | FC4A-N16B3                     | FC4A-N32B3                     | FC4A-N08A11   |
| <b>Input Points</b>                          |                                     | 8 points (8/1 common)   | 16 points (16/1 common)        |                                | 32 points (16/1 common)        | 8 points (4/1 common)   |
| <b>Rated Input Voltage</b>                   |                                     | 24V DC sink/source input signal   |                                |                                |                                | 100 - 120V AC (50-60Hz)   |
| <b>Input Voltage Range</b>                   |                                     | 20.4 to 28.8V DC  |                                |                                |                                | 85 to 132V AC   |
| <b>Rated Input Current</b>                   |                                     | 7mA/point (24V DC)  |                                | 5mA/point (24V DC)             |                                | 7.5mA/pt (100V AC, 60Hz)  |
| <b>Input Impedance</b>                       |                                     | 3.4 kΩ  |                                | 4.4 kΩ                         |                                | 0.8kΩ (60Hz)  |
| <b>Input Delay Time</b>                      |                                     | ON time: 4 msec<br>OFF time: 4 msec   |                                |                                |                                | ON time: 25 msec<br>OFF time: 30 msec                           |
| <b>Isolation</b>                             | Between input terminals             | Not isolated  |                                |                                |                                | In the same commons: not isolated<br>In different commons: 500V |
|  | Internal circuit                    | Photocoupler isolated   |                                |                                |                                | 2500V (photocoupler isolated)                                   |
| <b>External Load for I/O Interconnection</b> |                                     | Not needed  |                                |                                |                                |   |
| <b>Signal Determination Method</b>           |                                     | Static  |                                |                                |                                |   |
| <b>Effect of Improper Input Connection</b>   |                                     | Both sinking and sourcing input signals can be connected.<br>If any input exceeding the rated value is applied, permanent damage may be caused. |                                |                                |                                |   |
| <b>Cable Length</b>                          |                                     | 3m (9.84 ft) in compliance with electromagnetic immunity  |                                |                                |                                |   |
| <b>Connector</b>                             | <b>On Mother Board</b>              | MC1.5/10-G-3.81BK (Phoenix contact)   |                                |                                | FL20A2MA (Oki Electric Cable)  |   |
|  | <b>Insertion/Removal Durability</b> | 100 times minimum   |                                |                                |                                |   |
| <b>Internal Current Draw</b>                 | <b>All Inputs ON</b>                | 25 mA (5V DC)<br>0 mA (24V DC)  | 40 mA (5V DC)<br>0 mA (24V DC) | 35 mA (5V DC)<br>0 mA (24V DC) | 65 mA (5V DC)<br>0 mA (24V DC) | 60mA (5V DC)<br>0mA (24V DC)                                    |
|  | <b>All Inputs OFF</b>               | 5 mA (5V DC)<br>0 mA (24V DC)   | 5 mA (5V DC)<br>0 mA (24V DC)  | 5 mA (5V DC)<br>0 mA (24V DC)  | 10 mA (5V DC)<br>0 mA (24V DC) | 30mA (5V DC)<br>0mA (24V DC)                                    |
| <b>Weight</b>                                |                                     | 85g   | 100g                           | 65g                            | 100g                           | -   |

### Relay Output Module Specifications

|   |                                     | FC4A-R081   | FC4A-R161                           |
|---|-------------------------------------|---|-------------------------------------|
| <b>Output Points and Common Lines</b>   |                                     | 8 points (4/1 common)   | 16 points (8/1 common)              |
| <b>Output Type</b>                      |                                     | 1NO   |                                     |
| <b>Maximum Load Current</b>             | <b>per point</b>                    | 2A  |                                     |
|   | <b>per common</b>                   | 7A  | 8A                                  |
| <b>Minimum Switching Load</b>           |                                     | 0.1 mA/0.1V DC (reference value)  |                                     |
| <b>Initial Contact Resistance</b>       |                                     | 30 mΩ maximum   |                                     |
| <b>Electrical Life</b>                  |                                     | 100,000 operations minimum<br>(rated load 1,800 operations/hour)  |                                     |
| <b>Mechanical Life</b>                  |                                     | 20,000,000 operations minimum<br>(no load 18,000 operations/hour)   |                                     |
| <b>Rated Load (resistive/inductive)</b> |                                     | 240V AC/2A, 30V DC/2A   |                                     |
| <b>Dielectric Strength</b>              |                                     | Between output and ⊕ terminals: 1500V AC, 1 minute<br>Between output terminals and internal circuit: 1500V AC, 1 minute<br>Between output terminals (COMs): 1500 V AC, 1 minute |                                     |
| <b>Connector</b>                        | <b>On Mother Board</b>              | MC1.5/11-G-3.81BK (Phoenix contact)   | MC1.5/10-G-3.81BK (Phoenix contact) |
|   | <b>Insertion/Removal Durability</b> | 100 times minimum   |                                     |
| <b>Internal Current Draw</b>            | <b>All Inputs ON</b>                | 30 mA (5V DC)<br>40 mA (24V DC)   | 45 mA (5V DC)<br>75 mA (24V DC)     |
|   | <b>All Inputs OFF</b>               | 5 mA (5V DC)<br>0 mA (24V DC)   | 5 mA (5V DC)<br>0 mA (24V DC)       |
| <b>Weight</b>                           |                                     | 110g  | 145g                                |



## Transistor Output Specifications (Expansion Modules)

### Transistor Output Module Specifications

|                                     |                                     | FC4A-T08K1<br>FC4A-T08S1   | FC4A-T16K3<br>FC4A-T16S3            | FC4A-T32K3<br>FC4A-T32S3      |
|-------------------------------------|-------------------------------------|--|-------------------------------------|-------------------------------|
| <b>Output Points</b>                |                                     | 8 points (8/1 common)  | 16 points (16/1 common)             | 32 points (16/1 common)       |
| <b>Output Type</b>                  |                                     | FC4A-T□K□: Transistor sink output<br>FC4A-T□S□: Transistor source output   |                                     |                               |
| <b>Rated Load Voltage</b>           |                                     | 24V DC   |                                     |                               |
| <b>Operating Load Voltage Range</b> |                                     | 20.4 to 28.8V DC   |                                     |                               |
| <b>Rated Load Current</b>           |                                     | 0.3A per output point<br>(at 28.8V DC)   | 0.1A per output point (at 28.8V DC) |                               |
| <b>Maximum Load Current</b>         | <b>per point</b>                    | 0.36A (at 28.8V DC)  | 0.12A (at 28.8V DC)                 |                               |
|                                     | <b>per common</b>                   | 3A (at 28.8V DC)   | 1A (at 28.8V DC)                    |                               |
| <b>Voltage Drop (ON Voltage)</b>    |                                     | 1V maximum (between COM and output terminals when output is on)  |                                     |                               |
| <b>Inrush Current</b>               |                                     | 1A maximum   |                                     |                               |
| <b>Leakage Current</b>              |                                     | 0.1A maximum   |                                     |                               |
| <b>Clamping Voltage</b>             |                                     | 39V ± 1V   |                                     |                               |
| <b>Maximum Clamping Load</b>        |                                     | 8W   |                                     |                               |
| <b>Inductive Load</b>               |                                     | L/R = 10 msec (DC 28.8V, 1Hz)  |                                     |                               |
| <b>External Current Draw</b>        |                                     | FC4A-T□K□: 100mA maximum, 24V DC (power voltage at the +V)<br>FC4A-T□S□: 100mA maximum, 24V DC (power voltage at the -V) |                                     |                               |
| <b>Isolation</b>                    |                                     | Between output terminal and internal circuit: Photocoupler isolated<br>Between output terminals: Not isolated            |                                     |                               |
| <b>Connector</b>                    | <b>Type (on Mother Board)</b>       | MC1.5/10-G-3.81BK<br>(Phoenix contact)   | FL20A2MA (Oki Electric Cable)       |                               |
|                                     | <b>Insertion/Removal Durability</b> | 100 times minimum  |                                     |                               |
| <b>Internal Current Draw</b>        | <b>All Inputs ON</b>                | 10mA (5V DC)<br>20mA (24V DC)  | 10mA (5V DC)<br>40mA (24V DC)       | 20mA (5V DC)<br>70mA (24V DC) |
|                                     | <b>All Inputs OFF</b>               | 5mA (5V DC)<br>0mA (24V DC)  | 5mA (5V DC)<br>0mA (24V DC)         | 10mA (5V DC)<br>0mA (24V DC)  |
| <b>Output Delay</b>                 | <b>Turn ON time</b>                 | 300µsec maximum  |                                     |                               |
|                                     | <b>Turn OFF time</b>                | 300µsec maximum  |                                     |                               |
| <b>Weight</b>                       |                                     | 85g  | 70g                                 | 105g                          |

J

Programmable Logic Controllers

## Combination I/O Specifications (Expansion Modules)

### Combination I/O Module Specifications

|                             |                                       | FC4A-M08BR1  | FC4A-M24BR2   |                                 |
|-----------------------------|---------------------------------------|--|---|---------------------------------|
| DC Input Specifications     | Input Points                          | 4 points (4/1 common)  | 16 points (16/1 common)                                   |                                 |
|                             | Rated Input Voltage                   | 24V DC sink/source input signal  |   |                                 |
|                             | Input Voltage Range                   | 20.4 to 28.8V DC   |   |                                 |
|                             | Range Input Current                   | 7 mA/point (24V DC)  |   |                                 |
|                             | Input Impedance                       | 3.4 kΩ   |   |                                 |
|                             | Turn ON Time                          | 4 msec (24V DC)  |   |                                 |
|                             | Turn OFF Time                         | 4 msec (24V DC)  |   |                                 |
|                             | Isolation                             | Between input terminals: Not isolated<br>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 (9.84 ft) in compliance with electromagnetic immunity   |   |                                 |
| Relay Output Specifications | Output Points                         | 4 points (4/1 common)  | 8 points (8/2 common)                                     |                                 |
|                             | Output Type                           | 1NO  |   |                                 |
|                             | Maximum Load Current                  | per point  | 2A  |                                 |
|                             |                                       | per common   | 7A  |                                 |
|                             | 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 (resistive/inductive)      | 240V AC/2A, 30V DC/2A  |   |                                 |
|                             | Dielectric Strength                   | Between output and ⊕ or ⊖ terminals: 1,500V AC, 1 minute<br>Between output terminal and internal circuit: 1,500V AC, 1 minute<br>Between output terminal (COMs): 1,500V AC, 1 minute |   |                                 |
| Connector                   | on Mother Board                       | MC1.5/11-G-3.81BK (Phoenix contact)  | Input: F6018-17P (Fujicon)<br>Output: F6018-11P (Fujicon) |                                 |
|                             | Insertion/Removal Durability          | 100 times minimum  | —   |                                 |
|                             | Internal Current Draw                 | All Inputs ON  | 25 mA (5V DC)<br>20 mA (24V DC)                           | 65 mA (5V DC)<br>45 mA (24V DC) |
|                             |                                       | All Inputs OFF   | 5 mA (5V DC)<br>0 mA (24V DC)                             | 10 mA (5V DC)<br>0 mA (24V DC)  |
| Weight                      | 95g                                   |  | 140g  |                                 |

**Analog I/O Specifications (Expansion Modules)**

**Analog I/O Module Specifications**

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

**Analog Output Specifications**

|   |  | <b>FC4A-L03A1, FC4A-L03AP1, FC4A-K1A1</b>  |                                    |
|---|--|--|------------------------------------|
|   |  | <b>Voltage Output</b>  | <b>Current Output</b>              |
| <b>Output Signal Type</b>                                     |  | 0 to 10V DC  | 4 to 20 mA DC                      |
| <b>Output Range</b>   |  | 0 to 10V DC  | 4 to 20 mA DC                      |
| <b>Load Impedance</b>   |  | 2 kΩ minimum   | 300Ω maximum                       |
| <b>Applicable Load Type</b>                                   |  | Resistive load   |                                    |
| <b>Setting Time</b>   |  | 20 msec  |                                    |
| <b>Total Output System Transfer Time</b>                      |  | 20 msec + 1 scan time  |                                    |
| <b>Output Error</b>   | <b>Maximum Error at 25°C</b>                                     | ±0.2% of full scale  |                                    |
|   | <b>Temperature Coefficient</b>                                   | ±0.015% of full scale/°C   |                                    |
|   | <b>Repeatability after Stabilization Time</b>                    | ±0.5% of full scale  |                                    |
|   | <b>Output Voltage Drop</b>                                       | ±1% of full scale  | —                                  |
|   | <b>Non-linearity</b>   | ±0.2% of full scale  |                                    |
|   | <b>Output Ripple</b>   | 1 LSB maximum  |                                    |
|   | <b>Overshoot</b>   | 0%   |                                    |
|   | <b>Total Error</b>   | ±1% of full scale  |                                    |
| <b>Data</b>   | <b>Digital Resolution</b>  | 4096 increments (12 bits)  |                                    |
|   | <b>Output Value of LSB</b>                                       | 2.5 mV   | 4 μA                               |
|   | <b>Data Type in Application Program</b>                          | 0 to 4095 (12-bit data); -32768 to 32767 (optional range designation)<br>See note on page J-23 |                                    |
|   | <b>Monotonicity</b>  | Yes  |                                    |
| <b>Noise</b>  | <b>Current Loop Open</b>   | —  | Detectable (See note on page J-23) |
|   | <b>Maximum Temporary Deviation during Electrical Noise Tests</b> | ±3% max. when a 500V clamp is applied to the power and I/O wiring                              |                                    |
|   | <b>Cable</b>   | Twisted pair shielded cable recommended for improved noise immunity                            |                                    |
|   | <b>Crosstalk</b>   | No crosstalk because of 1 channel output   |                                    |
| <b>Dielectric Strength</b>                                    |  | 500V between output and power circuit  |                                    |
| <b>Type of Protection</b>                                     |  | Photocoupler between output and internal circuit   |                                    |
| <b>Effect of Improper Output Connection</b>                   |  | No damage  |                                    |
| <b>Selection of Analog Output Signal Type</b>                 |  | Using software programming   |                                    |
| <b>Calibration or Verification to Maintain Rated Accuracy</b> |  | Impossible (approx. 10 years)  |                                    |

**J** Programmable Logic Controllers

## 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)<br>Type J (0 to 1200°C)<br>Type T (0 to 400°C)                      | Pt 100 3-wire type<br>(-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<br>reference junction compensa-<br>tion accuracy (±4°C maximum) | ±0.2% of full scale                              |  |
|   | Temperature Coefficient   | ±0.006% of full scale / °C   |                    |  |  |  |
|   | Repeatability after<br>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<br>Program                             | 0 to 4095 (12-bit data); -32768 to 32767 (optional range designation) **     |                    |  |  |  |
|   | Monotonicity  | Yes  |                    |  |  |  |
|   | Input Data Out of Range   | Detectable #   |                    |  |  |  |
| Noise<br>Resistance                                       | Maximum Temporary<br>Deviation during<br>Electrical Noise Tests | ±3% maximum when a 500V clamp voltage is applied to the power and I/O wiring |                    |  | Accuracy is not assured when<br>noise is applied |  |
|   | Common Mode<br>Characteristics                                  | Common mode reject ratio (CMRR): -50 dB                                      |                    |  |  |  |
|   | Common Mode Voltage   | 16V DC   |                    |  |  |  |
|   | Input Filter  | No   |                    |  |  |  |
|   | Cable   | Twisted pair shielded cable recommended for<br>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<br>Overload (No damage)         |   | 13V DC   | 40 mA DC           | —  |  |  |
| Selection of Analog Input Signal Type                     |   | Using software programming   |                    |  |  |  |
| Calibration or Verification to Maintain<br>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<br>FC4A-HPC1 | FC4A-PC2<br>FC4A-HPC2 | FC4A-PC3<br>FC4A-HPC3   |
|--|-----------------------|-----------------------|---|
| <b>Standards</b>   | EIA RS232C            | EIA RS485             | EIA RS485   |
| <b>Maximum Baud Rate</b>   | 19200 bps             | 19200 bps             | Computer link: 19200 bps<br>Data link: 38400 bps                            |
| <b>Maintenance Communication</b>                                 | Possible              | Possible              | Possible  |
| <b>User Communication</b>  | Possible              | Impossible            | Impossible  |
| <b>Modem Communication</b>                                       | Possible              | Impossible            | Impossible  |
| <b>Data Link Communication</b>                                   | Impossible            | Impossible            | Possible  |
| <b>Maximum Cable Length</b>                                      | special cable         | special cable         | 200m  |
| <b>Quantity of Slave Stations</b>                                | —                     | —                     | 31  |
| <b>Isolation between Internal Circuit and Communication Port</b> | Not isolated          |                       |   |
| <b>Recommended Cable for RS485</b>                               | —                     | —                     | Twisted-pair shielded cable with a minimum core wire of 0.3 mm <sup>2</sup> |
| <b>Conductor Resistance</b>                                      | —                     | —                     | 85 Ω/km maximum   |
| <b>Shield Resistance</b>   | —                     | —                     | 20 Ω/km maximum   |

### Option Specifications

#### Optional HMI Module Specifications

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

#### Optional Memory Cartridge Specifications

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

#### Optional Clock Cartridge Specifications

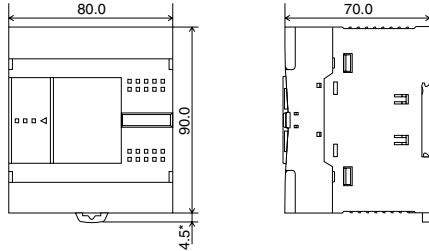
|                        | FC4A-PT1   |
|------------------------|--|
| <b>Accuracy</b>        | ±30 sec/month (typical) at 25°C                                      |
| <b>Backup Duration</b> | Approx. 30 days (typical) at 25°C after backup battery fully charged |
| <b>Battery</b>         | Lithium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

## Dimensions

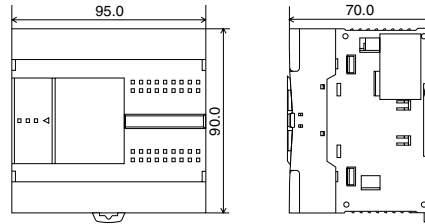
### CPU Modules:

all dimensions in mm

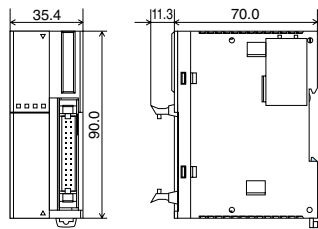
FC4A-C10R2, FC4A-C16R2  
FC4A-C10R2C, FC4A-C16R2C



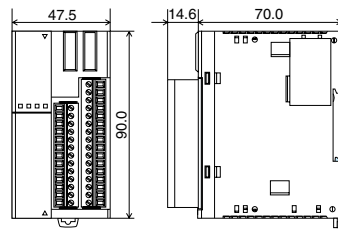
FC4A-C24R2, FC4A-C24R2C



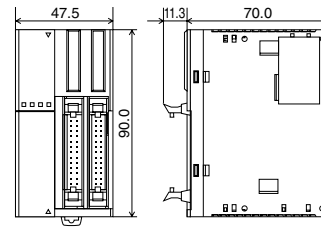
FC4A-D20K3, FC4A-D20S3



FC4A-D20RK1, FC4A-D20RS1

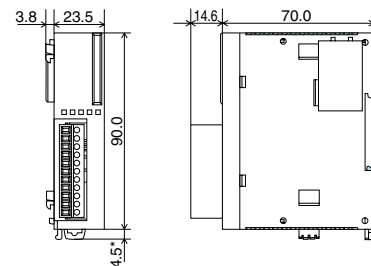


FC4A-D40K3, FC4A-D40S3

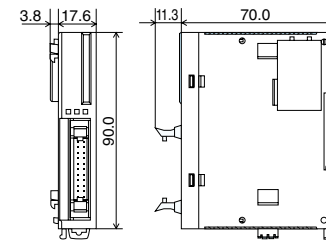


### Expansion Modules:

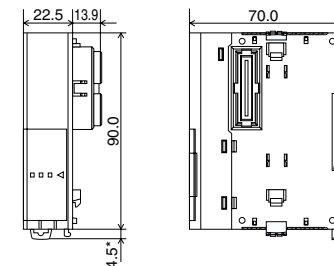
FC4A-N08B1, FC4A-N08A11, FCA-T08K1,  
FC4A-M08BR1, FC4A-L03AP1, FC4A-K1A1  
FC4A-R081, FC4A-T08S1, FC4A-L03A1,  
FC4A-J2A1



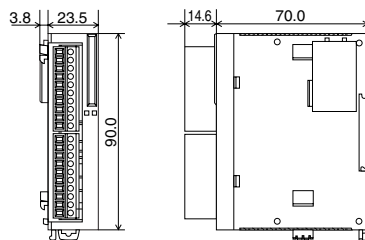
FC4A-N16B3, FC4A-T16K3, FC4A-T16S3



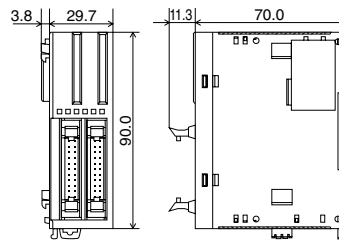
FC4A-HPC1, FC4A-HPC2, FC4A-HPC3



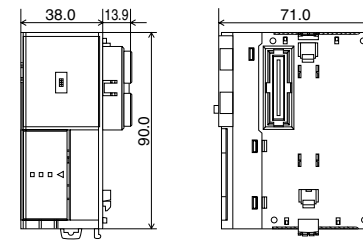
FC4A-N16B1, FC4A-R161



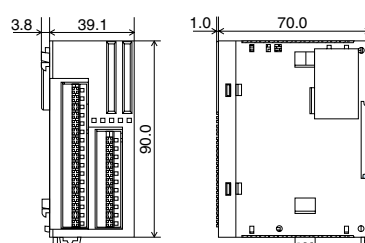
FC4A-N32B3, FC4A-T32K3, FC4A-T32S3



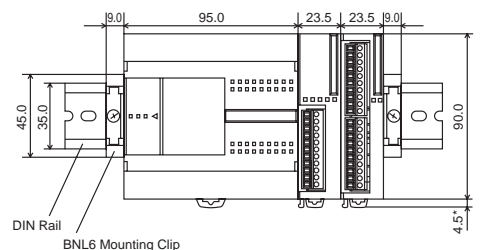
FC4A-HPH1



FC4A-M24BR2



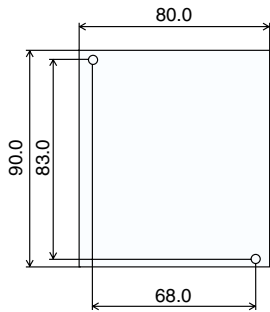
Example:  
This figure illustrates a system setup with the FC4A-C24R2 All-in-one type CPU, an 8-point relay output module, and a 16-point DC input module, mounted on a 35mm DIN rail using BNL6 mounting clips.



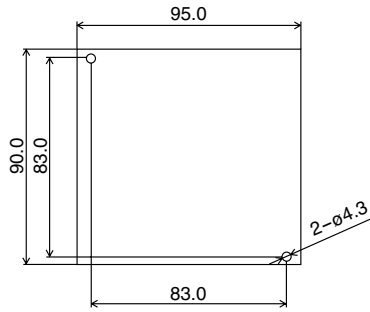
**Mounting Hole Layout**

**CPU Modules:**

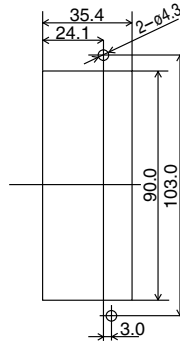
**FC4A-C10R2, FC4A-C10R2C  
FC4A-C16R2, FC4A-C16R2C**



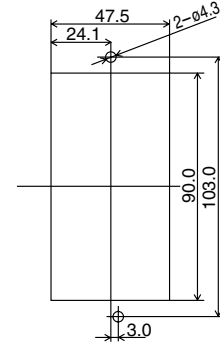
**FC4A-C24R2, FC4A-C24R2C**



**FC4A-C20K3  
FC4A-D20S3**

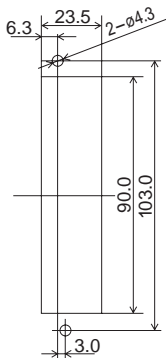


**FC4A-C20RK1, FC4A-D40K3  
FC4A-C20RS1, FC4A-D40S3**

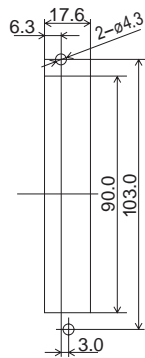


**Expansion Modules:**

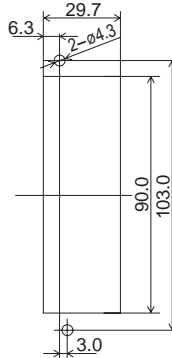
**FC4A-N08B1, FC4A-N08A11,  
FC4A-N16B1, FC4A-R081,  
FC4A-R161, FC4A-T08K1,  
FC4A-T08S1, FC4A-M08BR1,  
FC4A-L03A1, FC4A-L03AP1,  
FC4A-J2A1, FC4A-K1A1**



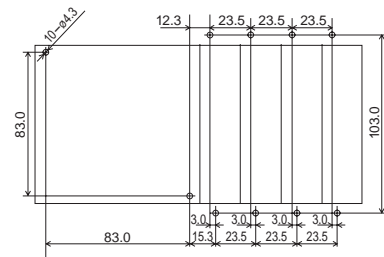
**FC4A-N16B3  
FC4A-T16K3  
FC4A-T16S3**



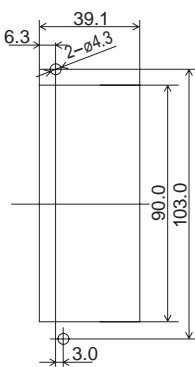
**FC4A-N32B3  
FC4A-T32K3  
FC4A-T32S3**



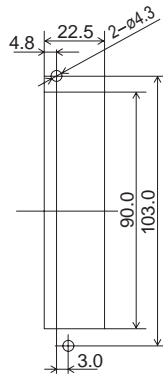
**EXAMPLE:**  
Mounting hole layout for FC4A-C24R2 and 23.5mm-wide I/O modules.



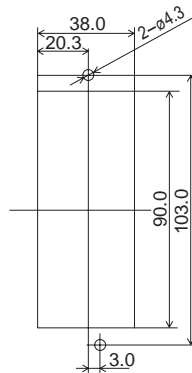
**FC4A-M24BR2**



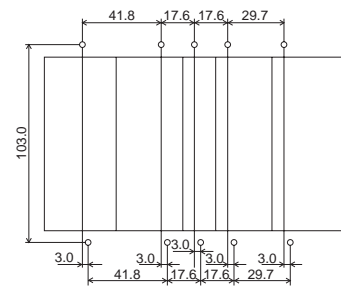
**FC4A-HP1C  
FC4A-HPC2  
FC4A-HPC3**



**FC4A-HPH1**



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



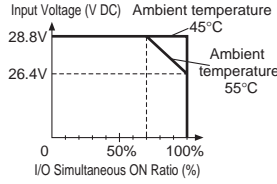
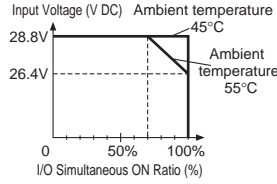
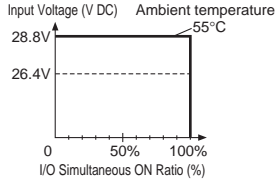
**J**  
Programmable Logic Controllers



## Usage Limits

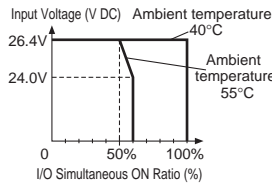
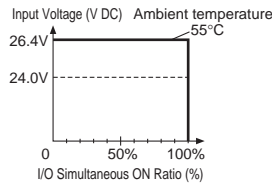
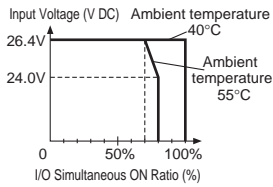
### I/O Usage Limits

All-in-one Type CPU Modules:

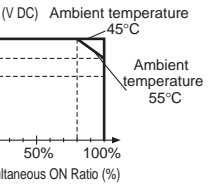
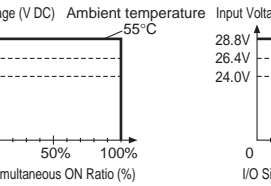
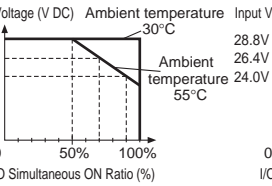
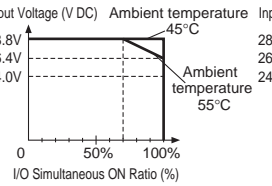
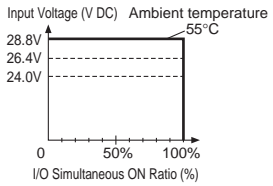


When using at an operating ambient temperature above 40°C, reduce the input voltage or the quantity of I/O points that turn on simultaneously.

Slim Type CPU Modules:



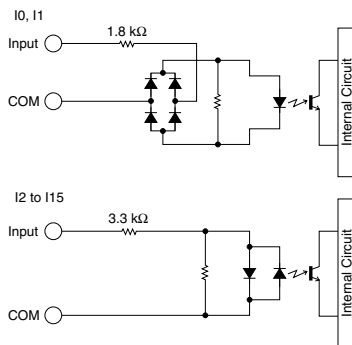
### Input Usage Limits



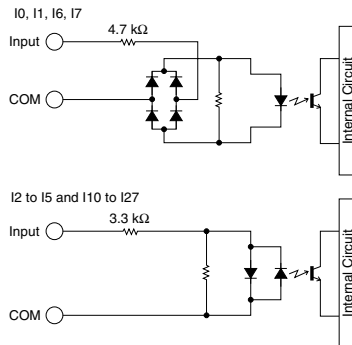
## Internal Circuits

### Input Internal Circuits

#### ALL-IN-ONE TYPE

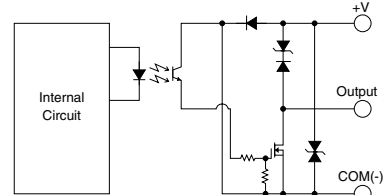


#### SLIM TYPE

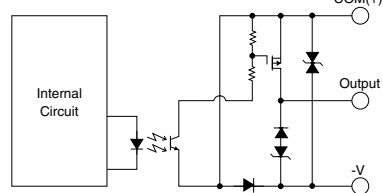


### Output Internal Circuit (Slim Type)

#### SINK OUTPUT



#### SOURCE OUTPUT

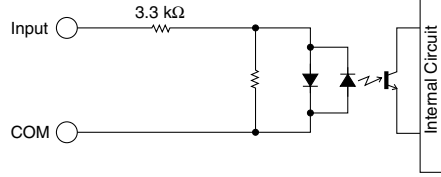


Internal Circuits

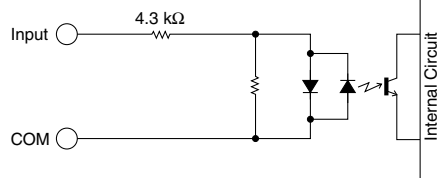
**Input Internal Circuits (Expansion Modules)**

**Output Internal Circuits**

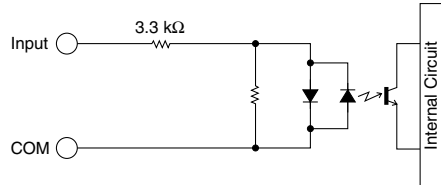
**FC4A-N081, FC4A-N16B1**



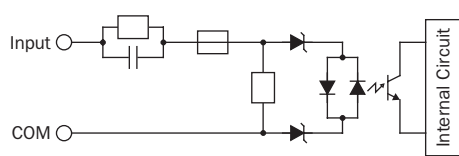
**FC4A-N16B3, FC4A-N32B3**



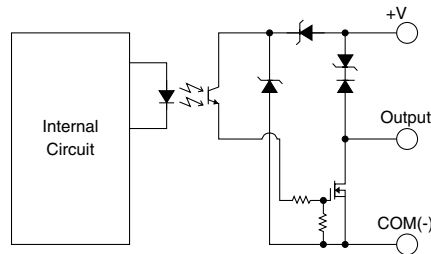
**FC4A-M08BR1, FC4A-M24BR2**



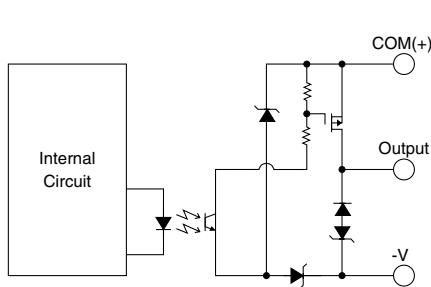
**FC4A-N08A11**



**FC4A-T08K1, FC4A-T16K3, FC4A-T32K3**



**FC4A-T08S1, FC4A-T16S3, FC4A-T32S3**

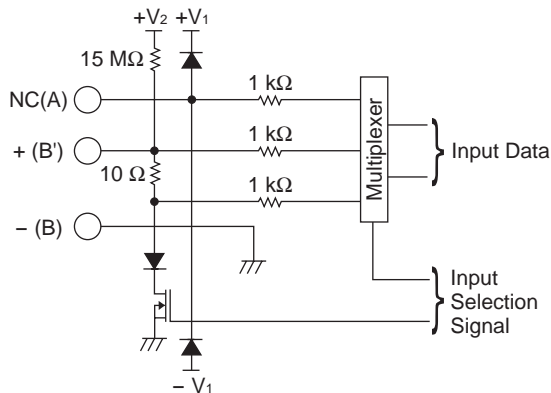


J

Programmable Logic Controllers

**Analog I/O Module**

**Input Circuit**



**Output Circuit**

