

## **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**

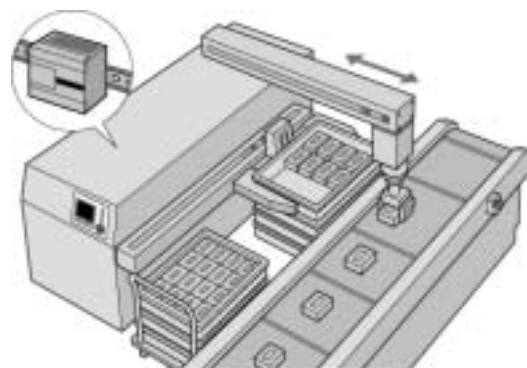
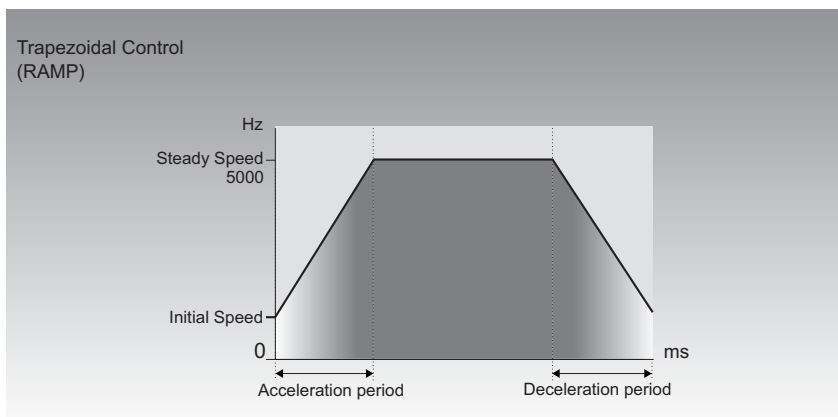
Independent dual-axis control is available with two pulse outputs. Locational values can be easily defined for precise positional (trapezoidal) control.

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

### **Pulse Output Function Specifications**

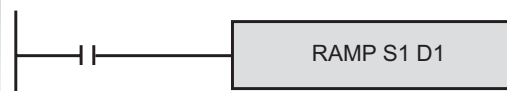
|                          |        |
|--------------------------|--------|
| Number of output points  | 2      |
| Maximum output frequency | 20 kHz |

\*Only one point of trapezoidal control is available.



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 |



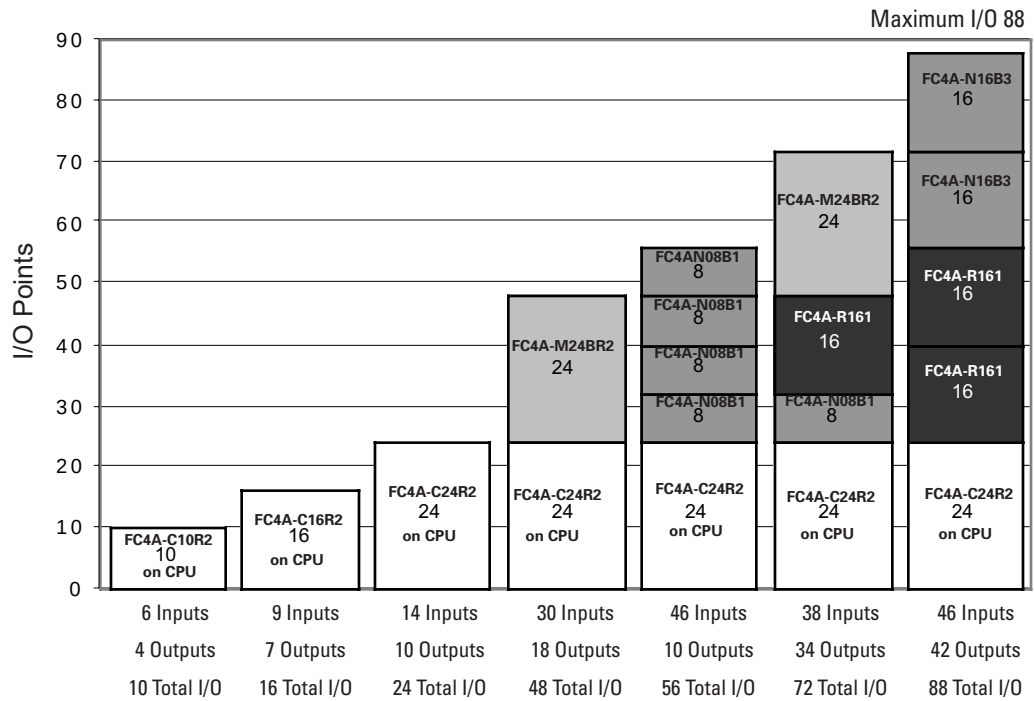
## CPU and Module Combination Examples

## 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.



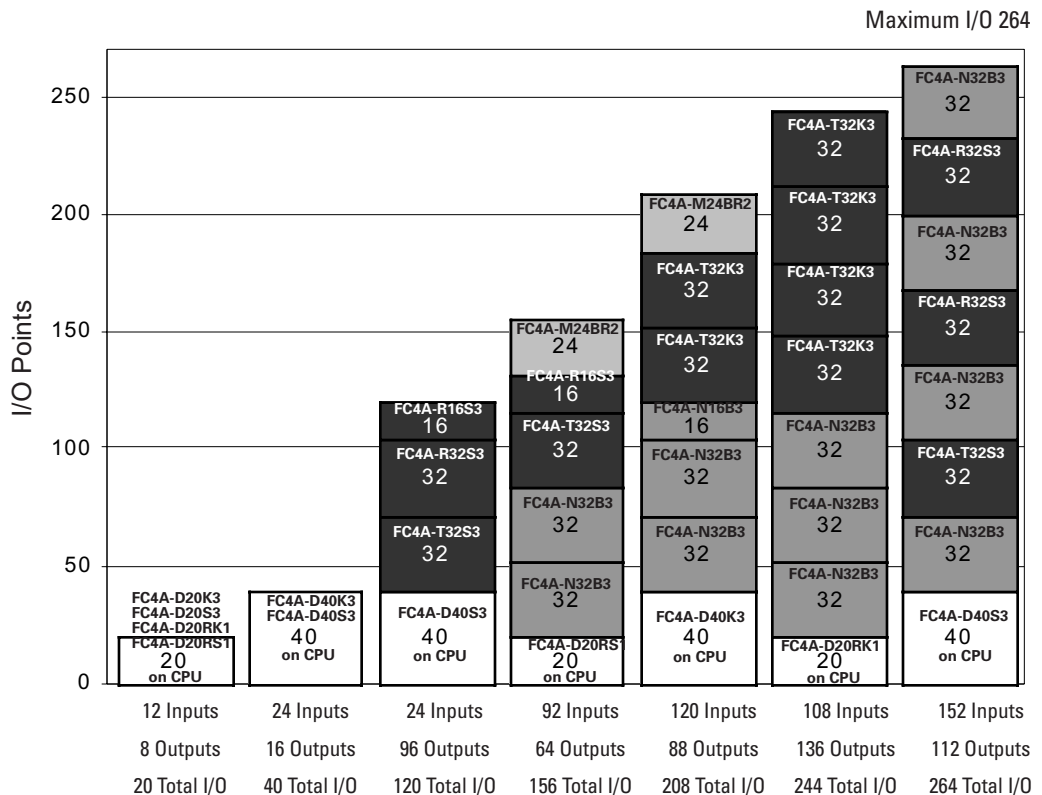
## Slim Type

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

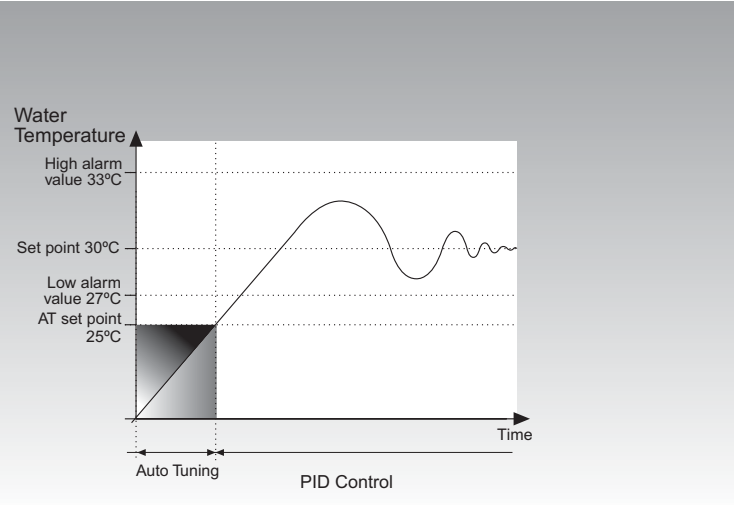


The maximum number of relay outputs that can be turned on simultaneously is 54 points including relay outputs on the CPU module.

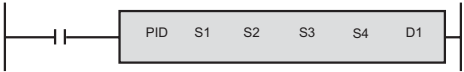


## PID Control

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<br>(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.

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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)                                           |



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

## 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

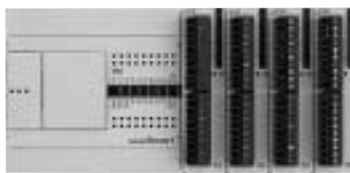
| Part Number | FC4A-K1A1                                                                          | FC4A-J2A1                                                                          | FC4A-L03AP1                                                                        | FC4A-L03A1                                                                          |
|-------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 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



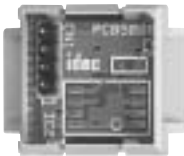
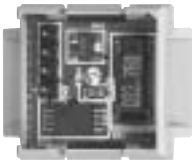
| Module       | Type No.   | Input | Output |
|--------------|------------|-------|--------|
| CPU          | FC4A-C24R2 | 14    | 10     |
| DC Input     | FC4A-N16B1 | 16    | 0      |
| DC Input     | FC4A-N16B1 | 16    | 0      |
| Relay Output | FC4A-R161  | 0     | 16     |
| Relay Output | FC4A-R161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

Example 2



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

## **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

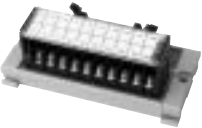
## MicroSmart Options

| 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   |

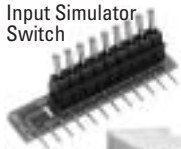
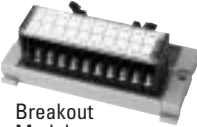


## Accessories con't

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

## MicroSmart Solution Packages

|                                                                                     | Part Number                                                                        | Micro Smart CPU | Operator Interface   | Power Supply                                                                                                                                                                      | Accessories                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                     |  |                 |                      |  15W<br> 50W |  WindLDR<br> Cables<br> WindMSG<br> Manuals |  WindO/I-NV2<br> E-Stop & Nameplate |
|  | <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-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                                                                                                                                                                                           |

## 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 | Rated Voltage                          |                           | AC Power Type: 100-240V AC<br>DC Power Type: 24V DC                                                                                                                                                  |                                |                                 | 24V DC                                                                                                   |                          |      |
|                            | Allowable Range                        |                           | AC Power Type: 85-264V AC<br>DC Power Type: 16.0 - 31.2V DC                                                                                                                                          |                                |                                 | 20.4 to 26.4V DC (including ripple)                                                                      |                          |      |
|                            | Rated Frequency                        |                           | AC Power Type: 50/60 Hz (47-63 Hz)                                                                                                                                                                   |                                |                                 | —                                                                                                        |                          |      |
|                            | Maximum Input Current                  |                           | 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) #       |      |
|                            | Max. Power Consumption                 | 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                                                                                           |                          |      |
|                            | Allowable Momentary Power Interruption |                           | 10 msec at the rated inputs and outputs (IEC61131)                                                                                                                                                   |                                |                                 | 10 msec (at 24V DC)                                                                                      |                          |      |
|                            | Dielectric Strength                    |                           | 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              |                          |      |
|                            | Insulation Resistance                  |                           | 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)                     |                          |      |
|                            | Noise Resistance                       |                           | 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 |                          |      |
|                            | Inrush Current                         |                           | 35A max.                                                                                                                                                                                             | 35A max.                       | 40A max.                        | 50A maximum (24V DC)                                                                                     |                          |      |
|                            | Power Supply Wire                      |                           | 22 - 18AWG                                                                                                                                                                                           |                                |                                 |                                                                                                          |                          |      |
|                            | Operating Temperature                  |                           | 0 to 55°C                                                                                                                                                                                            |                                |                                 |                                                                                                          |                          |      |
|                            | Storage Temperature                    |                           | -25 to +70°C                                                                                                                                                                                         |                                |                                 |                                                                                                          |                          |      |
|                            | Operating Humidity                     |                           | 30-95% Level RH1 (no condensation)                                                                                                                                                                   |                                |                                 |                                                                                                          |                          |      |
|                            | Altitude                               |                           | Operation: 0 to 2,000m (0 to 6,595 ft)<br>Transport: 0 to 3,000m (0 to 9,840 ft)                                                                                                                     |                                |                                 |                                                                                                          |                          |      |
|                            | Pollution Degree                       |                           | 2 (IEC60664)                                                                                                                                                                                         |                                |                                 |                                                                                                          |                          |      |
|                            | Corrosion Immunity                     |                           | Free from corrosive gases                                                                                                                                                                            |                                |                                 |                                                                                                          |                          |      |
|                            | Degree of Protection                   |                           | IP20                                                                                                                                                                                                 |                                |                                 |                                                                                                          |                          |      |
|                            | Grounding Wire                         |                           | 16 AWG                                                                                                                                                                                               |                                |                                 | 22 AWG                                                                                                   |                          |      |
|                            | Vibration Resistance                   |                           | DIN rail mounted: 10 to 57Hz / amplitude 0.075mm, 57 to 150Hz / acceleration 9.8m/s2 (1G)<br>Direct mounted: 2 to 25Hz / amplitude 1.6mm, 25 to 100Hz / acceleration 39.2m/s2 (4B) in each of 3 axes |                                |                                 |                                                                                                          |                          |      |
|                            | Shock Resistance                       |                           | 15G, 11ms, 3 shocks in each of 3 axes                                                                                                                                                                |                                |                                 |                                                                                                          |                          |      |
|                            | Weight                                 | 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

|                                                           |                                                              |
|-----------------------------------------------------------|--------------------------------------------------------------|
| Standards                                                 | EIA RS232C                                                   |
| Maximum Baud Rate                                         | 19200 bps                                                    |
| Maintenance Communication                                 | Possible                                                     |
| User Communication                                        | Possible                                                     |
| Modem Communication                                       | Not possible                                                 |
| Data Link Communication                                   | Not possible                                                 |
| Cable                                                     | Special Cables: FC2A-KC4C, FC2A-KP1C, FC4A-KC1CA, FC4A-KC2CA |
| Isolation between Internal Circuit and Communication Port | 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                 |                                           |
|-----------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------|
| CPU Function Specifications | Control System                                      | Stored program system                                                                                                                                                                                                                                                                                                                                       |                                                                  |                                                                 |                                                                                                   |                                          |                                           |
|                             | Instruction words                                   | 35 basic instructions                                                                                                                                                                                                                                                                                                                                       |                                                                  |                                                                 |                                                                                                   |                                          |                                           |
|                             |                                                     | 38 advanced                                                                                                                                                                                                                                                                                                                                                 | 40 advanced                                                      | 46 advanced                                                     | 53 advanced                                                                                       | 70 advanced                              |                                           |
|                             | Program Capacity                                    | 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                                                                                                                                                                                                                                                                                                                                 |                                                                  |                                                                 |                                                                                                   |                                          |                                           |
|                             | User Program Storage                                | Internal EEPROM, Memory cartridge (option: EEPROM)                                                                                                                                                                                                                                                                                                          |                                                                  |                                                                 |                                                                                                   |                                          |                                           |
|                             | Processing Time                                     | 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)                                                                                                                                                                  |                                                                  |                                                                 |                                                                                                   |                                          |                                           |
|                             | Expandable I/O Modules                              | —                                                                                                                                                                                                                                                                                                                                                           | —                                                                | 4 modules                                                       | 7 modules                                                                                         |                                          |                                           |
|                             | RAM Backup                                          | 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 |                                                                  |                                                                 |                                                                                                   |                                          |                                           |
|                             | I/O Points                                          | 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/) |
|                             | Internal Relay                                      | 256                                                                                                                                                                                                                                                                                                                                                         | 1024                                                             |                                                                 |                                                                                                   |                                          |                                           |
|                             | Shift Register                                      | 64                                                                                                                                                                                                                                                                                                                                                          | 128                                                              |                                                                 |                                                                                                   |                                          |                                           |
|                             | Data Register                                       | 400                                                                                                                                                                                                                                                                                                                                                         | 1300                                                             |                                                                 |                                                                                                   |                                          |                                           |
|                             | Expansion Data Register                             | —                                                                                                                                                                                                                                                                                                                                                           |                                                                  |                                                                 |                                                                                                   | 6000                                     |                                           |
|                             | Counter                                             | 32                                                                                                                                                                                                                                                                                                                                                          | 100                                                              |                                                                 |                                                                                                   |                                          |                                           |
|                             | Timer (1-sec, 100-msec, 10-msec, 1-msec)            | 32                                                                                                                                                                                                                                                                                                                                                          | 100                                                              |                                                                 |                                                                                                   |                                          |                                           |
|                             | Self-Diagnostic Function                            | 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                                                                          |                                                                  |                                                                 |                                                                                                   |                                          |                                           |
|                             | Input Filter                                        | 3 to 15 msec (1-msec increments)                                                                                                                                                                                                                                                                                                                            |                                                                  |                                                                 |                                                                                                   |                                          |                                           |
|                             | Catch Input/Interrupt Input                         | 4 input (I2 through I5)    Minimum turn on pulse width: 40 µsec maximum    Minimum turn off pulse width: 150 µsec maximum                                                                                                                                                                                                                                   |                                                                  |                                                                 |                                                                                                   |                                          |                                           |
|                             | High-Speed Counter                                  | 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                                                                                                                                                                                                                                                            |                                                                  |                                                                 |                                                                                                   |                                          |                                           |
|                             | Analog Potentiometer                                | 1 point                                                                                                                                                                                                                                                                                                                                                     |                                                                  | 2 points                                                        | 1 point                                                                                           |                                          |                                           |
|                             |                                                     | Data Range: 0 to 255                                                                                                                                                                                                                                                                                                                                        |                                                                  |                                                                 |                                                                                                   |                                          |                                           |
|                             | Analog Voltage Input                                | —                                                                                                                                                                                                                                                                                                                                                           |                                                                  |                                                                 | 1 point, 0 to 10V DC Input Voltage Range, approx. 100kΩ Input Impedance, data range 0-255 (8 bit) |                                          |                                           |
|                             | Pulse Output                                        | —                                                                                                                                                                                                                                                                                                                                                           |                                                                  |                                                                 | 2 points, max. frequency 20kHz                                                                    |                                          |                                           |
|                             | Sensor Power Supply                                 | 24V DC (+10% to -15%), 250 mA, no overload detection<br>Isolated from the internal circuit                                                                                                                                                                                                                                                                  |                                                                  |                                                                 | —                                                                                                 |                                          |                                           |
|                             | Port 1                                              | RS232C Maintenance Communication, User Communication, Modem Communication                                                                                                                                                                                                                                                                                   |                                                                  |                                                                 |                                                                                                   |                                          |                                           |
|                             | Port 2 (optional)                                   | —                                                                                                                                                                                                                                                                                                                                                           | Possible: RS232C or RS485 (Maintenance communication, data link) |                                                                 |                                                                                                   |                                          |                                           |
| Clock Function (optional)   | Possible<br>Select either clock or memory cartridge |                                                                                                                                                                                                                                                                                                                                                             |                                                                  | Possible<br>Year, month, day, day of week, hour, minute, second |                                                                                                   |                                          |                                           |
| Memory Cartridge (optional) |                                                     |                                                                                                                                                                                                                                                                                                                                                             |                                                                  | Possible                                                        |                                                                                                   |                                          |                                           |
| HMI Module (optional)       | Possible                                            |                                                                                                                                                                                                                                                                                                                                                             |                                                                  | Possible using HMI Base Module                                  |                                                                                                   |                                          |                                           |

## 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         |
|---------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|---------------------------------------------------------------------------------------|----------------------------------------|----------------------------------|
| Rated Input Voltage                   |                              | 24V DC sink / source input signal                                                                                                            |                           |                           |                                                                                       |                                        |                                  |
| Allowable Range                       |                              | 20.4 to 28.8V DC                                                                                                                             |                           |                           | 20.4 to 26.4V DC                                                                      |                                        |                                  |
| Rated Input Current                   |                              | I0, I1: 11mA, I2 to I7, I10 to I15: 7mA                                                                                                      |                           |                           | I0, I1, I6, I7: 5mA/point, I2 to I5, I10 to I27: 7mA/point                            |                                        |                                  |
| Input Impedance                       |                              | 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                                    |                                        |                                  |
| OFF/ON Time                           | OFF/ON                       | 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                  |                                        |                                  |
|                                       | ON/OFF                       | 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 |                                        |                                  |
| Input Points                          |                              | 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        |
| Connector                             | On Mother Board              | —                                                                                                                                            |                           |                           | FL26A2MA<br>(Oki Electric Cable)                                                      | MC1.5/13-G-3.81BK<br>(Phoenix Contact) | FL26A2MA<br>(Oki Electric Cable) |
|                                       | Insertion/Removal Durability | —                                                                                                                                            |                           |                           | 100 times minimum                                                                     |                                        |                                  |
| Isolation                             |                              | Between input terminals: Not isolated<br>Internal circuit: Photocoupler isolated                                                             |                           |                           |                                                                                       |                                        |                                  |
| Input Type                            |                              | Type 1 (IEC61131)                                                                                                                            |                           |                           |                                                                                       |                                        |                                  |
| 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)                                                                                                                                 |                           |                           |                                                                                       |                                        |                                  |

### 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             |
|------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|----------------------------------------|
| Output Points                            |                              | 4 points                                                                                                                                                                               | 7 points                  | 10 points                 | 8 points                               |
| Output Points per Common                 | COM0                         | 3 points                                                                                                                                                                               | 4 points                  | 4 points                  | 2 points<br>(transistor output)        |
|                                          | COM1                         | 1 point                                                                                                                                                                                | 2 points                  | 4 points                  | 3 points                               |
|                                          | COM2                         | —                                                                                                                                                                                      | 1 point                   | 1 point                   | 2 points                               |
|                                          | COM3                         | —                                                                                                                                                                                      | —                         | 1 point                   | 1 point                                |
| Type of Output                           |                              | 1NO                                                                                                                                                                                    |                           |                           |                                        |
| Maximum Load Current                     | Per point                    | 2A                                                                                                                                                                                     |                           |                           |                                        |
|                                          | Per Common                   | 8A                                                                                                                                                                                     |                           |                           |                                        |
| Minimum Switching Load                   |                              | 0.1mA, 0.1V DC (reference value)                                                                                                                                                       |                           |                           |                                        |
| Initial Contact Resistance               |                              | 30m $\Omega$ maximum                                                                                                                                                                   |                           |                           |                                        |
| Electrical Life                          |                              | 100,000 operations (rated load) @ 1,800 operations/hr                                                                                                                                  |                           |                           |                                        |
| Mechanical Life                          |                              | 200,000 operations (no load) @ 18,000 operations/hr                                                                                                                                    |                           |                           |                                        |
| Rated Load Current (resistive/inductive) |                              | 240V AC/2A, 24V DC/2A (30V DC / 2A)                                                                                                                                                    |                           |                           |                                        |
| Dielectric Strength                      |                              | Between output and $\oplus$ 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 |                           |                           |                                        |
| Connector                                | On Mother Board              | —                                                                                                                                                                                      |                           |                           | MC1.5/16-G-3.81BK<br>(Phoenix Contact) |
|                                          | Insertion/Removal Durability | —                                                                                                                                                                                      |                           |                           | 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                                                     |
| Input Points                          |                              | 8 points (8/1 common)                                                                                                                           | 16 points (16/1 common)        |                                | 32 points (16/1 common)        | 8 points (4/1 common)                                           |
| Rated Input Voltage                   |                              | 24V DC sink/source input signal                                                                                                                 |                                |                                |                                | 100 - 120V AC (50-60Hz)                                         |
| Input Voltage Range                   |                              | 20.4 to 28.8V DC                                                                                                                                |                                |                                |                                | 85 to 132V AC                                                   |
| Rated Input Current                   |                              | 7mA/point (24V DC)                                                                                                                              |                                | 5mA/point (24V DC)             |                                | 7.5mA/pt (100V AC, 60Hz)                                        |
| Input Impedance                       |                              | 3.4 kΩ                                                                                                                                          |                                | 4.4 kΩ                         |                                | 0.8kΩ (60Hz)                                                    |
| Input Delay Time                      |                              | ON time: 4 msec<br>OFF time: 4 msec                                                                                                             |                                |                                |                                | ON time: 25 msec<br>OFF time: 30 msec                           |
| Isolation                             | Between input terminals      | Not isolated                                                                                                                                    |                                |                                |                                | In the same commons: not isolated<br>In different commons: 500V |
|                                       | Internal circuit             | Photocoupler isolated                                                                                                                           |                                |                                |                                | 2500V (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.<br>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                                                                                        |                                |                                |                                |                                                                 |
| Connector                             | On Mother Board              | MC1.5/10-G-3.81BK (Phoenix contact)                                                                                                             |                                | FL20A2MA (Oki Electric Cable)  |                                |                                                                 |
|                                       | Insertion/Removal Durability | 100 times minimum                                                                                                                               |                                |                                |                                |                                                                 |
| Internal Current Draw                 | All Inputs ON                | 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)                                    |
|                                       | All Inputs OFF               | 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)                                    |
| Weight                                |                              | 85g                                                                                                                                             | 100g                           | 65g                            | 100g                           | —                                                               |

### Relay Output Module Specifications

|                                  |                              | FC4A-R081                                                                                                                                                                              | FC4A-R161                              |
|----------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Output Points and Common Lines   |                              | 8 points (4/1 common)                                                                                                                                                                  | 16 points (8/1 common)                 |
| Output Type                      |                              | 1NO                                                                                                                                                                                    |                                        |
| Maximum Load Current             | per point                    | 2A                                                                                                                                                                                     |                                        |
|                                  | per common                   | 7A                                                                                                                                                                                     | 8A                                     |
| Minimum Switching Load           |                              | 0.1 mA/0.1V DC (reference value)                                                                                                                                                       |                                        |
| Initial Contact Resistance       |                              | 30 m $\Omega$ maximum                                                                                                                                                                  |                                        |
| Electrical Life                  |                              | 100,000 operations minimum<br>(rated load 1,800 operations/hour)                                                                                                                       |                                        |
| Mechanical Life                  |                              | 20,000,000 operations minimum<br>(no load 18,000 operations/hour)                                                                                                                      |                                        |
| Rated Load (resistive/inductive) |                              | 240V AC/2A, 30V DC/2A                                                                                                                                                                  |                                        |
| Dielectric Strength              |                              | Between output and $\oplus$ 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 |                                        |
| Connector                        | On Mother Board              | MC1.5/11-G-3.81BK<br>(Phoenix contact)                                                                                                                                                 | MC1.5/10-G-3.81BK<br>(Phoenix contact) |
|                                  | Insertion/Removal Durability | 100 times minimum                                                                                                                                                                      |                                        |
| Internal Current Draw            | All Inputs ON                | 30 mA (5V DC)<br>40 mA (24V DC)                                                                                                                                                        | 45 mA (5V DC)<br>75 mA (24V DC)        |
|                                  | All Inputs OFF               | 5 mA (5V DC)<br>0 mA (24V DC)                                                                                                                                                          | 5 mA (5V DC)<br>0 mA (24V DC)          |
| Weight                           |                              | 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      |
|------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------|
| Output Points                |                              | 8 points (8/1 common)                                                                                                    | 16 points (16/1 common)             | 32 points (16/1 common)       |
| Output Type                  |                              | FC4A-T□K□: Transistor sink output<br>FC4A-T□S□: Transistor source output                                                 |                                     |                               |
| Rated Load Voltage           |                              | 24V DC                                                                                                                   |                                     |                               |
| Operating Load Voltage Range |                              | 20.4 to 28.8V DC                                                                                                         |                                     |                               |
| Rated Load Current           |                              | 0.3A per output point<br>(at 28.8V DC)                                                                                   | 0.1A per output point (at 28.8V DC) |                               |
| Maximum Load Current         | per point                    | 0.36A (at28.8V DC)                                                                                                       | 0.12A (at 28.8V DC)                 |                               |
|                              | per common                   | 3A (at 28.8V DC)                                                                                                         | 1A (at 28.8V DC)                    |                               |
| Voltage Drop (ON Voltage)    |                              | 1V maximum (between COM and output terminals when output is on)                                                          |                                     |                               |
| Inrush Current               |                              | 1A maximum                                                                                                               |                                     |                               |
| Leakage Current              |                              | 0.1A maximum                                                                                                             |                                     |                               |
| Clamping Voltage             |                              | 39V ± 1V                                                                                                                 |                                     |                               |
| Maximum Clamping Load        |                              | 8W                                                                                                                       |                                     |                               |
| Inductive Load               |                              | L/R = 10 msec (DC 28.8V, 1Hz)                                                                                            |                                     |                               |
| External Current Draw        |                              | 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) |                                     |                               |
| Isolation                    |                              | Between output terminal and internal circuit: Photocoupler isolated<br>Between output terminals: Not isolated            |                                     |                               |
| Connector                    | Type (on Mother Board)       | MC1.5/10-G-3.81BK<br>(Phoenix contact)                                                                                   | FL20A2MA (0Ki Electric Cable)       |                               |
|                              | Insertion/Removal Durability | 100 times minimum                                                                                                        |                                     |                               |
| Internal Current Draw        | All Inputs ON                | 10mA (5V DC)<br>20mA (24V DC)                                                                                            | 10mA (5V DC)<br>40mA (24V DC)       | 20mA (5V DC)<br>70mA (24V DC) |
|                              | All Inputs OFF               | 5mA (5V DC)<br>0mA (24V DC)                                                                                              | 5mA (5V DC)<br>0mA (24V DC)         | 10mA (5V DC)<br>0mA (24V DC)  |
| Output Delay                 | Turn ON time                 | 300μsec maximum                                                                                                          |                                     |                               |
|                              | Turn OFF time                | 300μsec maximum                                                                                                          |                                     |                               |
| Weight                       |                              | 85g                                                                                                                      | 70g                                 | 105g                          |

## 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<br>(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

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

#### Analog Output Specifications

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

## 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)                                                |                    |                                                                                          |                                                  |



1. \* Total input system transfer time = Sample repetition time x 2 + 1 scan time

2. \*\* 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.

3. # 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**

|                                                                  | <b>FC4A-PC1<br/>FC4A-HPC1</b> | <b>FC4A-PC2<br/>FC4A-HPC2</b> | <b>FC4A-PC3<br/>FC4A-HPC3</b>                                               |
|------------------------------------------------------------------|-------------------------------|-------------------------------|-----------------------------------------------------------------------------|
| <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**

|                              | <b>FC4A-PH1</b>                      |
|------------------------------|--------------------------------------|
| <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**

|                                   | <b>FC4A-PM32</b>                                       | <b>FC4A-PM64</b> |
|-----------------------------------|--------------------------------------------------------|------------------|
| <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**

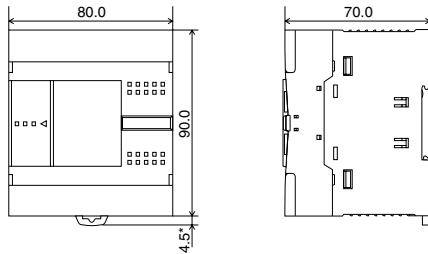
|                        | <b>FC4A-PT1</b>                                                      |
|------------------------|----------------------------------------------------------------------|
| <b>Accuracy</b>        | ±30 sec/month (typical) at 25°C                                      |
| <b>Backup 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**

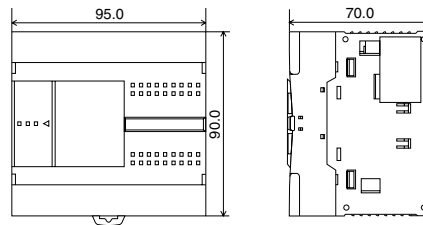
### **CPU Modules:**

all dimensions in mm

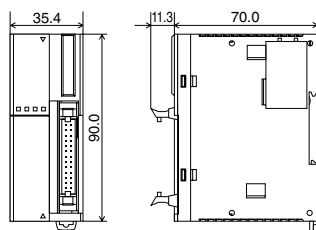
FC4A-C10R2, FC4A-C16R2  
FC4A-C10R2C, FC4A-C16R2C



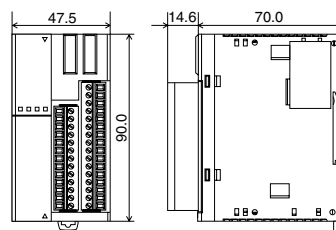
FC4A-C24R2, FC4A-C24R2C



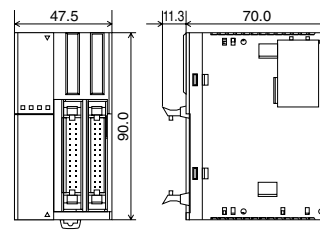
FC4A-D20K3, FC4A-D20S3



FC4A-D20RK1, FC4A-D20RS1

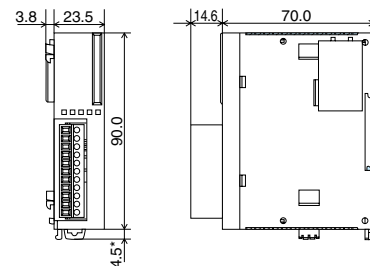


FC4A-D40K3, FC4A-D40S3

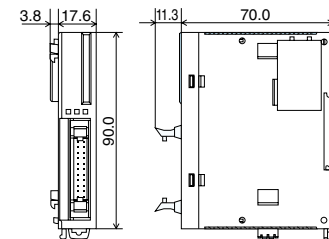


### **Expansion Modules:**

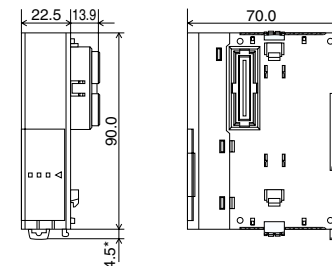
FC4A-N08B1, FC4A-N08A11, FCA-T08K1,  
FC4A-M08BR1, FC4A-L03AP1, FC4A-K1A1  
FC4A-R081, FC4A-T08S1, FC4A-L03A1,  
FC4A-J2A1



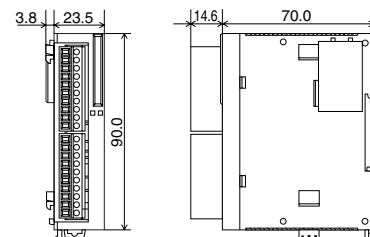
FC4A-N16B3, FC4A-T16K3, FC4A-T16S3



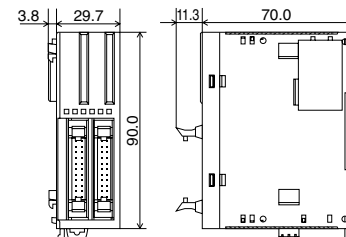
FC4A-HPC1, FC4A-HPC2, FC4A-HPC3



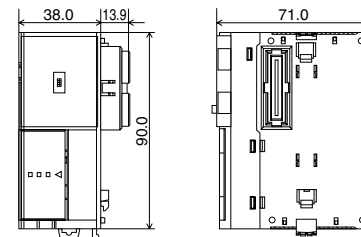
FC4A-N16B1, FC4A-R161



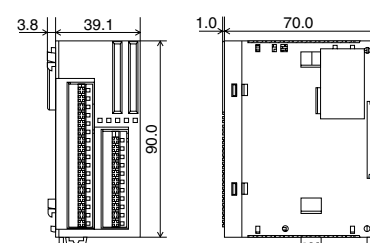
FC4A-N32B3, FC4A-T32K3, FC4A-T32S3



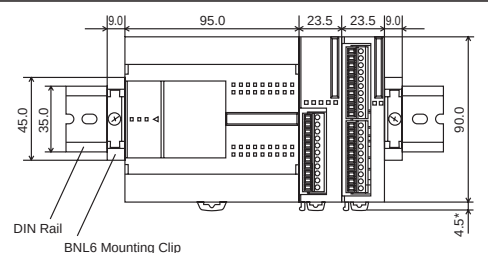
FC4A-HPH1



FC4A-M24BR2



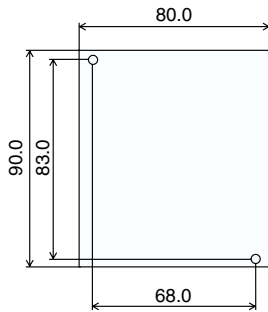
Example:  
This figure illustrates a  
system setup with the  
FC4A-C24R2 All-in-one  
type CPU, an 8-point  
relay output module,  
and a 16-point DC input  
module, mounted on a  
35mm DIN rail using  
BNL6 mounting clips.



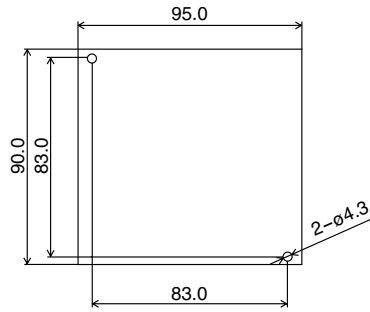
## Mounting Hole Layout

### CPU Modules:

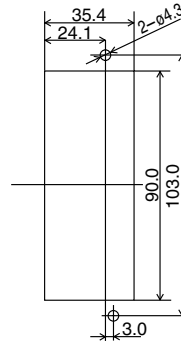
FC4A-C10R2, FC4A-C10R2C  
FC4A-C16R2, FC4A-C16R2C



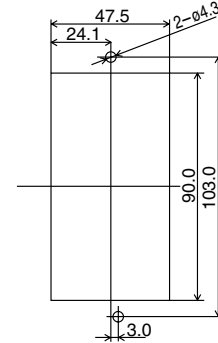
FC4A-C24R2, FC4A-C24R2C



FC4A-C20K3  
FC4A-D20S3

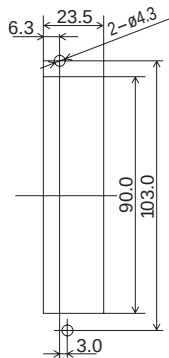


FC4A-C20RK1, FC4A-D40K3  
FC4A-C20RS1, FC4A-D40S3

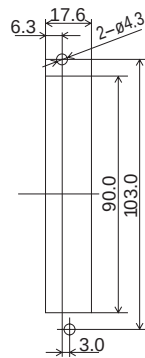


### Expansion Modules:

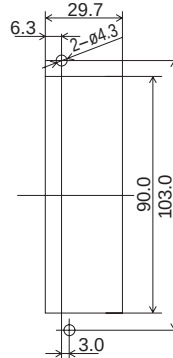
FC4A-N08B1, FC4A-N08A11,  
FC4A-N16B1, FC4A-R081,  
FC4A-R161, FC4A-T08K1,  
FC4A-T08S1, FC4A-M08BR1,  
FC4A-L03A1, FC4A-L03AP1,  
FC4A-J2A1, FC4A-K1A1



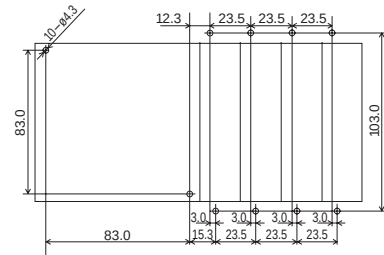
FC4A-N16B3  
FC4A-T16K3  
FC4A-T16S3



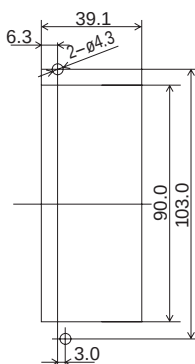
FC4A-N32B3  
FC4A-T32K3  
FC4A-T32S3



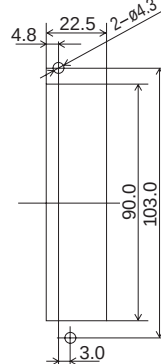
EXAMPLE:  
Mounting hole layout for FC4A-C24R2 and  
23.5mm-wide I/O modules.



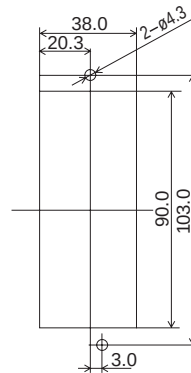
FC4A-M24BR2



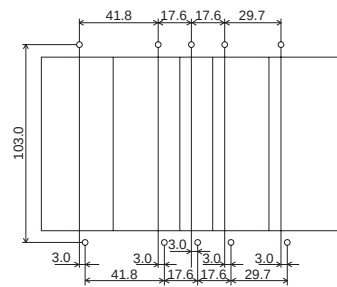
FC4A-HP1C  
FC4A-HPC2  
FC4A-HPC3



FC4A-HPH1



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

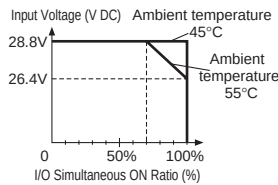
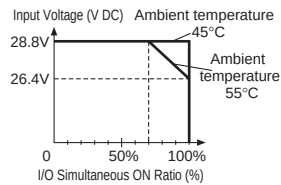
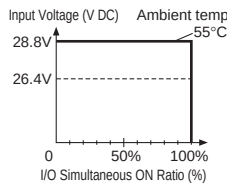




## Usage Limits

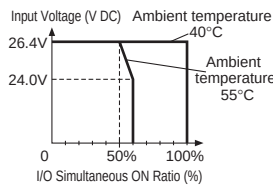
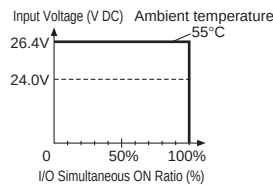
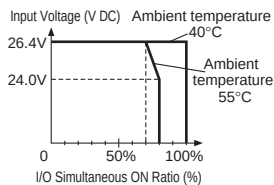
### I/O Usage Limits

All-in-one Type CPU Modules:

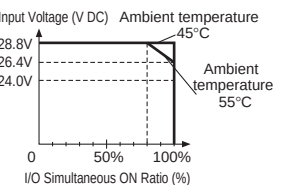
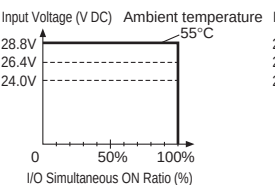
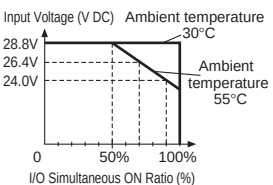
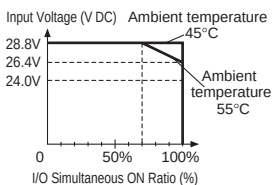
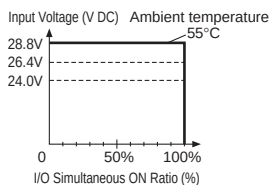


When using at an operating ambient temperature above 40°C, reduce the input voltage or the quantity of I/O points that turn on simultaneously.

Slim Type CPU Modules:



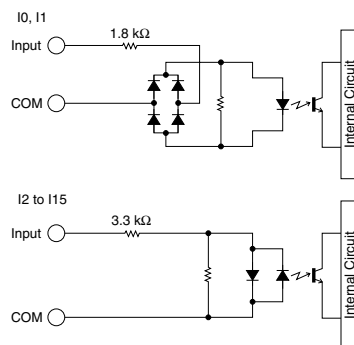
### Input Usage Limits



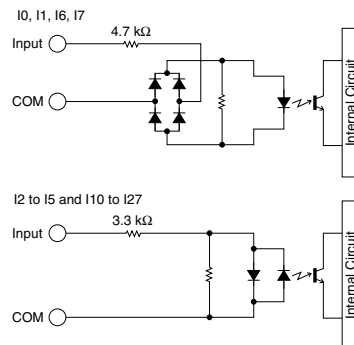
## Internal Circuits

### Input Internal Circuits

#### ALL-IN-ONE TYPE

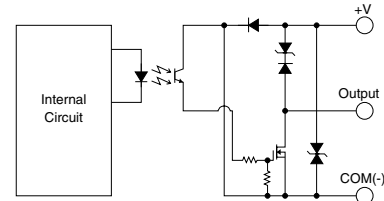


#### SLIM TYPE

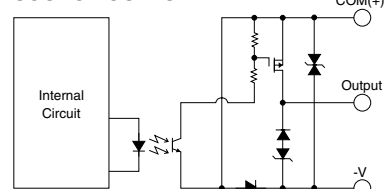


### Output Internal Circuit (Slim Type)

#### SINK OUTPUT



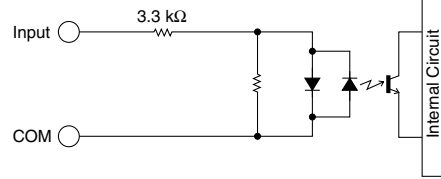
#### SOURCE OUTPUT



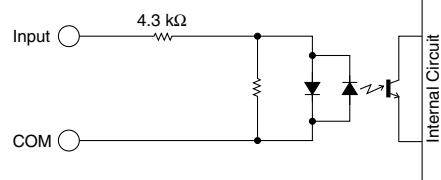
## Internal Circuits

## Input Internal Circuits (Expansion Modules)

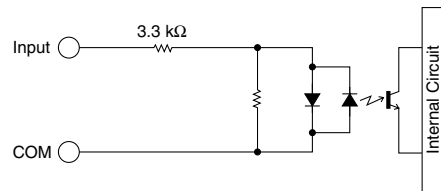
## FC4A-N081, FC4A-N16B1



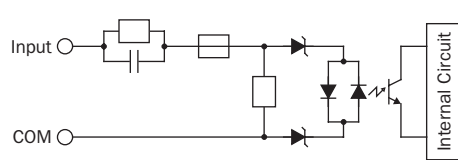
## FC4A-N16B3, FC4A-N32B3



## FC4A-M08BR1, FC4A-M24BR2

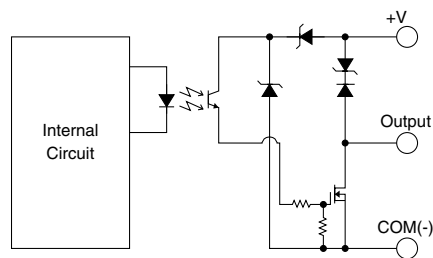


## FC4A-N08A11

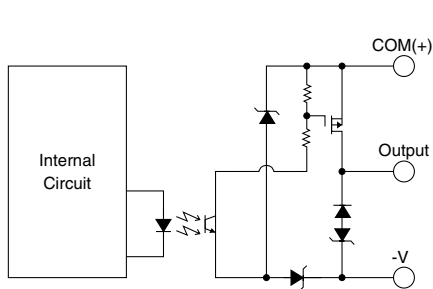


## Output Internal Circuits

## FC4A-T08K1, FC4A-T16K3, FC4A-T32K3



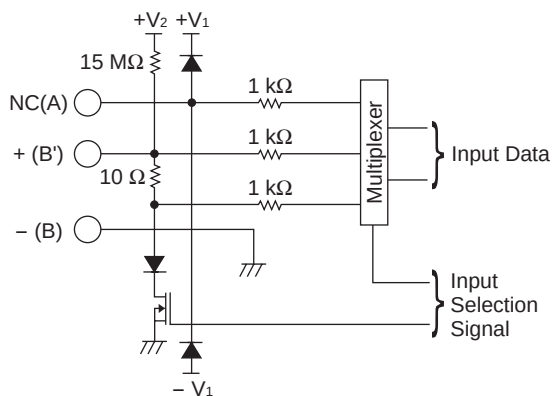
## FC4A-T08S1, FC4A-T16S3, FC4A-T32S3



J

## Analog I/O Module

## Input Circuit



## Output Circuit

