

# Micro Programmable Controller CPM2A

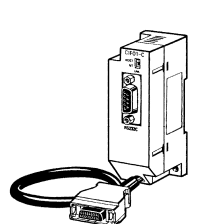
The CPM2A brick-style controllers offer one of the most powerful, small-scale control solutions in the industry today. They provide 20, 30, 40 or 60 I/O point CPUs, pulse I/O for position control, multiple communications ports and a powerful instruction set.

- Expandable up to 120 I/O points
- Peripheral and RS-232C ports standard for direct connection to serial devices and programming tools
- Removable terminals
- Synchronized pulse control coordinates input devices with control devices
- Auxiliary 24 VDC supply (AC type only)
- Relay or Transistor outputs
- Analog I/O expansion modules available
- Temperature sensor input expansion modules available
- Real-time clock
- 20 kHz high-speed counter input
- Two, 10 kHz pulse outputs for position control applications

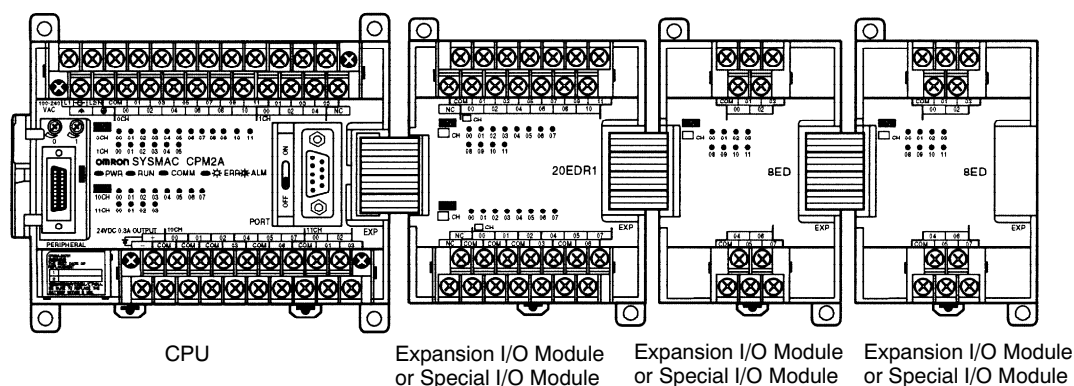


## Basic Configuration

Up to three Expansion I/O Modules or Special I/O Modules can be connected to any CPM2A CPU. The mounting order does not affect the number of modules that can be mounted.



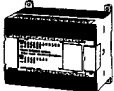
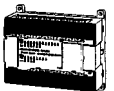
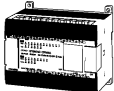
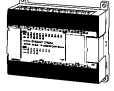
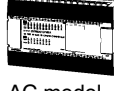
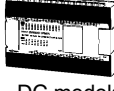
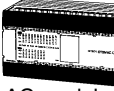
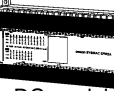
Optional Serial Communications Adapters CPM1-CIF01/CIF11 modify the Peripheral Port for use as an additional serial port.



# Ordering Information

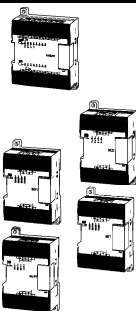
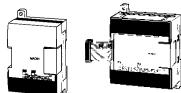
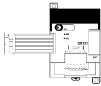
## ■ CPU

**Stock Note:** Shaded models are normally stocked.

| Description                                                                                                                                                                                                         | Input points | Output points | Power supply | Part number   |                    |                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|--------------|---------------|--------------------|----------------|
|                                                                                                                                                                                                                     |              |               |              | Relay outputs | Transistor outputs |                |
|                                                                                                                                                                                                                     |              |               |              |               | NPN (Sinking)      | PNP (Sourcing) |
| CPUs with 20 I/O points<br> AC model  DC models   | 12           | 8             | AC           | CPM2A-20CDR-A | —                  | —              |
|                                                                                                                                                                                                                     |              |               | DC           | CPM2A-20CDR-D | CPM2A-20CDT-D      | CPM2A-20CDT1-D |
| CPUs with 30 I/O points<br> AC model  DC models   | 18           | 12            | AC           | CPM2A-30CDR-A | —                  | —              |
|                                                                                                                                                                                                                     |              |               | DC           | CPM2A-30CDR-D | CPM2A-30CDT-D      | CPM2A-30CDT1-D |
| CPUs with 40 I/O points<br> AC model  DC models   | 24           | 16            | AC           | CPM2A-40CDR-A | —                  | —              |
|                                                                                                                                                                                                                     |              |               | DC           | CPM2A-40CDR-D | CPM2A-40CDT-D      | CPM2A-40CDT1-D |
| CPUs with 60 I/O points<br> AC model  DC models | 36           | 24            | AC           | CPM2A-60CDR-A | —                  | —              |
|                                                                                                                                                                                                                     |              |               | DC           | CPM2A-60CDR-D | CPM2A-60CDT-D      | CPM2A-60CDT1-D |

## ■ EXPANSION I/O AND SPECIAL I/O MODULES

**Stock Note:** Shaded models are normally stocked.

| Description                                                                                                      | Max. number of Units | Inputs                                                         | Outputs                         | Output type                     | Part number                                         |
|------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------|---------------------------------|---------------------------------|-----------------------------------------------------|
| Expansion I/O<br>               | 3 max.               | 12                                                             | 8                               | Relay                           | CPM1A-20EDR1                                        |
|                                                                                                                  |                      |                                                                |                                 | Transistor (NPN)                | CPM1A-20EDT                                         |
|                                                                                                                  |                      |                                                                |                                 | Transistor (PNP)                | CPM1A-20EDT1                                        |
|                                                                                                                  |                      | 8                                                              | —                               | —                               | CPM1A-8ED                                           |
|                                                                                                                  |                      | —                                                              | 8                               | Relay                           | CPM1A-8ER                                           |
|                                                                                                                  |                      | —                                                              | 8                               | Transistor (NPN)                | CPM1A-8ET                                           |
|                                                                                                                  |                      |                                                                |                                 | Transistor (PNP)                | CPM1A-8ET1                                          |
| Analog I/O<br>                  | 3 max.               | 2                                                              | 1                               | Analog                          | CPM1A-MAD01                                         |
|                                                                                                                  |                      |                                                                |                                 |                                 | CPM1A-MAD11                                         |
| Temperature Sensor Inputs<br>   | 3 max.               | 2                                                              | —                               | Thermocouple                    | CPM1A-TS001                                         |
|                                                                                                                  | 1 (See Note.)        | 4                                                              | —                               |                                 | CPM1A-TS002                                         |
|                                                                                                                  | 3 max.               | 2                                                              | —                               | Platinum resistance thermometer | CPM1A-TS101                                         |
|                                                                                                                  |                      | 2                                                              | 1 analog                        |                                 | CPM1A-TS101-DA                                      |
|                                                                                                                  | 1 (See Note.)        | 4                                                              | —                               | CPM1A-TS102                     |                                                     |
| CompoBus/S I/O Link<br>         | 3 max.               | I/O Link of 8 input bits and 8 output bits                     |                                 | —                               | CPM1A-SRT21                                         |
| DeviceNet I/O Link Module<br> | 3 max.               | 32 input bits from the Master and 32 output bits to the Master |                                 | —                               | CPM1A-DRT21                                         |
| Profibus-DP Slave Module<br>  | 3 max.               | 16 bits (Inputs from the Master)                               | 16 bits (Outputs to the Master) | —                               | CPM1A-PRT21                                         |
|                                                                                                                  |                      |                                                                |                                 |                                 | Shielded twisted pair cable, available commercially |

Note: If a CPM1A-TS002/102 is connected, only one other module (and not a CPM1A-TS002/102) can be connected.

## ■ PROGRAMMING CONSOLES AND CABLES

**Stock Note:** Shaded models are normally stocked.

| Product                                                                                | Part number   |
|----------------------------------------------------------------------------------------|---------------|
| Programming console (2 m cable attached), connects directly to peripheral port         | CQM1H-PRO01-E |
| Programming console (2 m cable attached); order CS1W-CN114 adapter for peripheral port | CQM1-PRO01-E  |
| Programming console (Requires separate cable. See below.)                              | C200H-PRO27-E |
| Connecting cable for C200H-PRO27-E                                                     | 2 m cable     |
|                                                                                        | 4 m cable     |
|                                                                                        | C200H-CN222   |
|                                                                                        | C200H-CN422   |

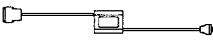
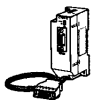
## ■ SUPPORT SOFTWARE

**Stock Note:** Shaded models are normally stocked.

| Product           | Functions                                                                            | Part number        |
|-------------------|--------------------------------------------------------------------------------------|--------------------|
| CX-Programmer Jr. | Windows-based programming software; reduced instruction set and networking commands. | WS02-CXPC1-EJ-V□.□ |
| CX-Programmer     | Full programming software package programs micro, small and larger controllers.      | WS02-CXPC1-E-V□.□  |

## ■ SERIAL COMMUNICATIONS ADAPTERS AND CABLES

**Stock Note:** Shaded models are normally stocked.

| CPM2A port | Name                  | Appearance                                                                          | Comments                                                                             | Cable length    | Part number            |
|------------|-----------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------|------------------------|
| Peripheral | RS-232C Adapter       |    | Cable-mounted communication adapter converts peripheral port to DB9-pin serial port. | 3.3 m (10.8 ft) | <b>CQM1-CIF02</b>      |
|            |                       |    | DIN mount communication adapter converts peripheral port to DB9-pin serial port.     | 3.3 m (10.8 ft) | <b>CPM1-CIF01</b>      |
| RS-232C    | RS-232C Cable         |    | Program download cable from computer to Omron DB9 serial port.                       | 2 m (6.6 ft)    | <b>C200HS-CN220-EU</b> |
|            |                       |                                                                                     | Communication cable to other Omron devices with DB9 serial port                      | 3 m (9.8 ft)    | <b>C200H-CN320-EU</b>  |
|            |                       |                                                                                     | Communication cable to other Omron devices with DB9 serial port                      | 5 m (16.4 ft)   | <b>C200H-CN520-EU</b>  |
|            |                       |                                                                                     | Communication cable for NT31C (port "B" only).                                       | 50 cm           | <b>NT31C-CN510-EU</b>  |
|            |                       |                                                                                     |                                                                                      | 3 m             | <b>NT31C-CN320-EU</b>  |
|            |                       |                                                                                     |                                                                                      |                 | <b>CBL-803*</b>        |
|            |                       |                                                                                     | Communication cable for NT31C (port "B" only).                                       | 5 m             | <b>NT31C-CN520-EU</b>  |
|            |                       |                                                                                     |                                                                                      |                 |                        |
|            |                       |                                                                                     | Programmable download cable from D-sub 9-pin computer port to RS-232C port.          | 2 m             | <b>C200H-CN229-EU</b>  |
| Peripheral | RS-422/RS-485 Adapter |  | Converts CPM2A peripheral port to RS-422/RS-485 communications.                      |                 | <b>CBL-202*</b>        |
|            |                       |                                                                                     |                                                                                      |                 |                        |
|            |                       |                                                                                     |                                                                                      | 2 m             | <b>XW2Z-200S</b>       |
|            |                       |                                                                                     |                                                                                      | 5 m             | <b>XW2Z-500S</b>       |

\* Available in Canada only.

## ■ BATTERY

**Stock Note:** Shaded models are normally stocked.

| Product                    | Function                                                                               | Part number        |
|----------------------------|----------------------------------------------------------------------------------------|--------------------|
| Backup Battery Replacement | Backs up memory in the CPM2A CPU Unit. (One battery is already installed in the unit.) | <b>CPM2A-BAT01</b> |

## ■ PROGRAM TRANSFER EQUIPMENT

**Stock Note:** Shaded models are normally stocked.

| Product               | Description                                                                      | Part number              |
|-----------------------|----------------------------------------------------------------------------------|--------------------------|
| Expansion Memory Unit | Uploads and downloads program and setup memory areas to and from the controller. | <b>CPM1-EMU01-V1</b>     |
| EEPROM (256 kbits)    | Used with the Expansion Memory Unit                                              | <b>EEPROM-CPM1-EMU01</b> |

## ■ MANUALS

| Product            | Description                                         | Part number |
|--------------------|-----------------------------------------------------|-------------|
| Operation manual   | CPM2A operation manual                              | <b>W352</b> |
| Programming manual | CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2) Programming Manual | <b>W353</b> |

# Specifications

## ■ GENERAL SPECIFICATIONS

| Item                                           |                 | CPU's with 20 I/O points                                                                                                                                                                                                                                                                                                                                  | CPU's with 30 I/O points | CPU's with 40 I/O points | CPU's with 60 I/O points |
|------------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|
| Supply voltage                                 | AC power        | 100 to 240 VAC, 50/60 Hz                                                                                                                                                                                                                                                                                                                                  |                          |                          |                          |
|                                                | DC power        | 24 VDC                                                                                                                                                                                                                                                                                                                                                    |                          |                          |                          |
| Operating voltage range                        | AC power        | 85 to 264 VAC                                                                                                                                                                                                                                                                                                                                             |                          |                          |                          |
|                                                | DC power        | 20.4 to 26.4 VDC                                                                                                                                                                                                                                                                                                                                          |                          |                          |                          |
| Power consumption                              | AC power        | 60 VA max.                                                                                                                                                                                                                                                                                                                                                |                          |                          |                          |
|                                                | DC power        | 20 W max. (See separate table following this one for details)                                                                                                                                                                                                                                                                                             |                          |                          |                          |
| Inrush current                                 | AC power        | 60 A max.                                                                                                                                                                                                                                                                                                                                                 |                          |                          |                          |
|                                                | DC power        | 20 A max.                                                                                                                                                                                                                                                                                                                                                 |                          |                          |                          |
| External power supply (AC power supplies only) | Supply voltage  | 24 VDC                                                                                                                                                                                                                                                                                                                                                    |                          |                          |                          |
|                                                | Output capacity | 300 mA (See Notes 1, 2, 3.)                                                                                                                                                                                                                                                                                                                               |                          |                          |                          |
| Insulation resistance                          |                 | 20 MΩ min. (at 500 VDC) between the external AC terminals and protective earth terminals.                                                                                                                                                                                                                                                                 |                          |                          |                          |
| Dielectric strength                            |                 | 2,300 VAC 50/60 Hz for 1 min between the external AC and protective earth terminals, leakage current: 10 mA max.                                                                                                                                                                                                                                          |                          |                          |                          |
| Noise immunity                                 |                 | Conforms to IEC61000-4-4, 2 kV (power lines)                                                                                                                                                                                                                                                                                                              |                          |                          |                          |
| Vibration resistance                           |                 | 10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s <sup>2</sup> in X, Y, and Z directions for 80 minutes each.<br>(Time coefficient; 8 minutes × coefficient factor 10 = total time 80 minutes)                                                                                                                                         |                          |                          |                          |
| Shock resistance                               |                 | 147 m/s <sup>2</sup> three times each in X, Y, and Z directions.                                                                                                                                                                                                                                                                                          |                          |                          |                          |
| Ambient temperature                            |                 | Operating: 0° to 55°C                                                                                                                                                                                                                                                                                                                                     |                          |                          |                          |
|                                                |                 | Storage: -20° to 75°C                                                                                                                                                                                                                                                                                                                                     |                          |                          |                          |
| Humidity                                       |                 | 10% to 90% (with no condensation)                                                                                                                                                                                                                                                                                                                         |                          |                          |                          |
| Atmosphere                                     |                 | Must be free from corrosive gas                                                                                                                                                                                                                                                                                                                           |                          |                          |                          |
| Terminal screw size                            |                 | M3                                                                                                                                                                                                                                                                                                                                                        |                          |                          |                          |
| Power interrupt time                           |                 | AC power supply: 10 ms min.<br>DC power supply: 2 ms min.                                                                                                                                                                                                                                                                                                 |                          |                          |                          |
| CPU weight                                     | AC power        | 650 g max.                                                                                                                                                                                                                                                                                                                                                | 700 g max.               | 800 g max.               | 1,000 g max.             |
|                                                | DC power        | 550 g max.                                                                                                                                                                                                                                                                                                                                                | 600 g max.               | 700 g max.               | 900 g max.               |
| Expansion weight                               |                 | Units with 20 I/O points: 300 g max.<br>Units with 8 output points: 250 g max.<br>Units with 8 input points: 200 g max.<br>MAD01 Analog I/O Unit: 150 g max.<br>MAD11 Analog I/O Unit: 250 g max.<br>Temperature Sensor Units: 250 g max.<br>CompoBus/S I/O Link Unit: 200 g max.<br>DeviceNet I/O Link Unit: 200 g max.<br>Profibus-DP Slave Unit: 125 g |                          |                          |                          |

- Note: 1. Use the external power supply as the power supply for input devices only. (It cannot be used to drive output devices.)
2. If the external power supply current exceeds the rated current, or there is a short-circuit, the external power supply voltage will drop and PLC operation will stop.
3. If there are 3 CPM1A-MAD11 modules mounted to a CPM2A-60CDR-A, the current for the external power supply must not exceed 200 mA.

## ■ CHARACTERISTICS

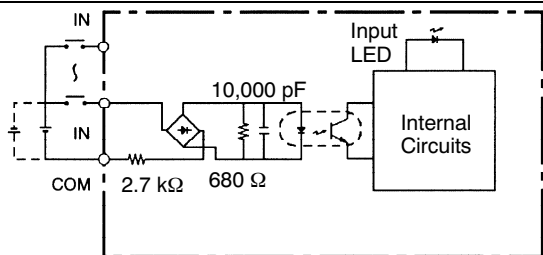
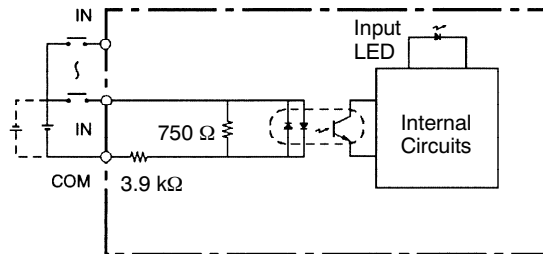
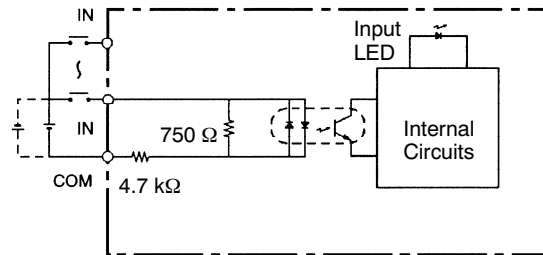
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|-----------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------|-----------------|
| Control method                          |                            | Stored program method                                                                                                                                                                                                                                                          |                |                 |                 |
| I/O control method                      |                            | Cyclic scan with direct output (Immediate refreshing can be performed with IORF(97).)                                                                                                                                                                                          |                |                 |                 |
| Programming language                    |                            | Ladder diagram                                                                                                                                                                                                                                                                 |                |                 |                 |
| Instruction length                      |                            | 1 step per instruction, 1 to 5 words per instruction                                                                                                                                                                                                                           |                |                 |                 |
| Instructions                            |                            | Basic instructions: 14<br>Special instructions: 105 instructions, 185 variations                                                                                                                                                                                               |                |                 |                 |
| Execution time                          |                            | Basic instructions: 0.64 $\mu$ s (LD instruction)<br>Special instructions: 7.8 $\mu$ s (MOV instruction)                                                                                                                                                                       |                |                 |                 |
| Program capacity                        |                            | 4,096 words                                                                                                                                                                                                                                                                    |                |                 |                 |
| User data memory                        |                            | 2,048 words                                                                                                                                                                                                                                                                    |                |                 |                 |
| I/O capacity                            | CPU Unit only              | 20 points                                                                                                                                                                                                                                                                      | 30 points      | 40 points       | 60 points       |
|                                         | With Expansion I/O Modules | 80 points max.                                                                                                                                                                                                                                                                 | 90 points max. | 100 points max. | 120 points max. |
| Memory protection                       |                            | HR area, AR area, program contents, read/write DM area contents, and counter values maintained during power interruptions.                                                                                                                                                     |                |                 |                 |
| Memory backup                           |                            | Flash memory:<br>Program, read-only DM area, and PC Setup<br><br>Battery backup:<br>The read/write DM area, HR area, AR area, and counter values are backed up by a battery. (Battery life is approximately 5 years.)                                                          |                |                 |                 |
| Self-diagnostic functions               |                            | CPU failure (watchdog timer), I/O bus error, and memory failure, battery error                                                                                                                                                                                                 |                |                 |                 |
| Program checks                          |                            | No END instruction and programming errors are checked at the start of operation.                                                                                                                                                                                               |                |                 |                 |
| Communications functions                |                            | Built-in peripheral port:<br>Supports host link, peripheral bus, no-protocol, or Programming Console connections.<br><br>Built-in RS-232C port:<br>Supports Host Link, No-protocol, 1:1 Slave Unit link, 1:1 Master Unit link, or 1:1 NT Link connections.                     |                |                 |                 |
| Functions provided by Expansion Modules |                            | Analog I/O Module: Provides 2 analog inputs and 1 analog output.<br>CompoBus/S I/O Link Module: Provides 8 inputs and 8 outputs as a CompoBus/S Slave.<br>Temperature Sensor Modules: Provide 2 or 4 thermocouple inputs, or 2 or 4 temperature-resistance thermometer inputs. |                |                 |                 |

## ■ I/O ALLOCATION

|                            |                                 |                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input bits                 |                                 | IR 00000 to IR 00915 (Words not used for input bits can be used for work bits.)                                                                                                                                                                                                                                                                          |
| Output bits                |                                 | IR 01000 to IR 01915 (Words not used for output bits can be used for work bits.)                                                                                                                                                                                                                                                                         |
| Work bits                  |                                 | 928 bits: IR 02000 to IR 04915 (Words IR 020 to IR 049) and IR 20000 to IR 22715 (Words IR 200 to IR 227)                                                                                                                                                                                                                                                |
| Special bits (SR area)     |                                 | 448 bits: SR 22800 to SR 25515 (Words IR 228 to IR 255)                                                                                                                                                                                                                                                                                                  |
| Temporary bits (TR area)   |                                 | 8 bits (TR0 to TR7)                                                                                                                                                                                                                                                                                                                                      |
| Holding bits (HR area)     |                                 | 320 bits: HR 0000 to HR 1915 (Words HR 00 to HR 19)                                                                                                                                                                                                                                                                                                      |
| Auxiliary bits (AR area)   |                                 | 384 bits: AR 0000 to AR 2315 (Words AR 00 to AR 23)                                                                                                                                                                                                                                                                                                      |
| Link bits (LR area)        |                                 | 256 bits: LR 0000 to LR 1515 (Words LR 00 to LR 15)                                                                                                                                                                                                                                                                                                      |
| Timers/Counters            |                                 | 256 timers/counters (TIM/CNT 000 to TIM/CNT 255)<br>1-ms timers: TMHH(--)<br>10-ms timers: TIMH(15)<br>100-ms timers: TIM<br>1-s/10-s timers: TIML(--)<br>Decrementing counters: CNT<br>Reversible counters: CNTR(12)                                                                                                                                    |
| Data memory                |                                 | Read/Write: 2,048 words (DM 0000 to DM 2047)<br>Error Log is contained in DM 2000 to DM 2021<br>Read-only: 456 words (DM 6144 to DM 6599)<br>PC Setup: 56 words (DM 6600 to DM 6655)                                                                                                                                                                     |
| Basic in-<br>terrupts      | Interrupt processing            | External interrupts: 4<br>(Shared by the external interrupt inputs (counter mode) and the quick-response inputs.)                                                                                                                                                                                                                                        |
|                            | Interval timer interrupts       | 1 (Scheduled Interrupt Mode or Single Interrupt Mode)                                                                                                                                                                                                                                                                                                    |
| High-speed counter         | High-speed counter              | One high-speed counter: 20 kHz single-phase or 5 kHz two-phase (linear count method)<br>Counter interrupt: 1 (set value comparison or set-value range comparison)                                                                                                                                                                                        |
|                            | Interrupt inputs (counter mode) | Four inputs (Shared with external interrupt inputs (counter mode) and quick-response inputs.)<br>Counter interrupts: 4 (Shared by the external interrupt inputs and quick-response inputs.)                                                                                                                                                              |
| Pulse output               |                                 | Two points with no acceleration/deceleration, 10 to 10 kHz each, and no direction control.<br>One point with waveform acceleration/deceleration, 10 to 10 kHz, and direction control.<br>Two points with variable duty-ratio outputs using PWM(--).<br>(Pulse outputs can be used with transistor outputs only, they cannot be used with relay outputs.) |
| Synchronized pulse control |                                 | One point:<br>A pulse output can be created by combining the high-speed counter with the pulse output and multiplying the frequency of the input pulses from the high-speed counter by a fixed factor.<br>(This output is possible with transistor outputs only, it cannot be used with relay outputs.)                                                  |
| Quick-response inputs      |                                 | Four points (Min. input pulse width: 50 $\mu$ s min.)                                                                                                                                                                                                                                                                                                    |
| Analog controls            |                                 | 2 controls, setting range: 0 to 200                                                                                                                                                                                                                                                                                                                      |
| Input time constant        |                                 | Can be set for all input points.<br>(1 ms, 2 ms, 3 ms, 5 ms, 10 ms, 20 ms, 40 ms, or 80 ms; default setting: 10 ms)                                                                                                                                                                                                                                      |
| Clock function             |                                 | Shows the year, month, day of the week, day, hour, minute, and second. (Battery backup)                                                                                                                                                                                                                                                                  |

## I/O SPECIFICATIONS

### CPU Input

| Item                  | Inputs             | Specification                                                                        |
|-----------------------|--------------------|--------------------------------------------------------------------------------------|
| Input voltage         | All                | 24 VDC +10%/−15%                                                                     |
| Input impedance       | IN00000 to IN00001 | 2.7 k $\Omega$                                                                       |
|                       | IN00002 to IN00006 | 3.9 k $\Omega$                                                                       |
|                       | IN00007 and up     | 4.7 k $\Omega$                                                                       |
| Input current         | IN00000 to IN00001 | 8 mA typical                                                                         |
|                       | IN00002 to IN00006 | 6 mA typical                                                                         |
|                       | IN00007 and up     | 5 mA typical                                                                         |
| ON voltage/current    | IN00000 to IN00001 | 17 VDC min., 5 mA                                                                    |
|                       | IN00002 and up     | 14.4 VDC min., 3 mA                                                                  |
| OFF voltage/current   | All                | 5.0 VDC max., 1 mA                                                                   |
| ON delay              | All                | 1 to 80 ms max. Default: 10 ms (See Note.)                                           |
| OFF delay             | All                | 1 to 80 ms max. Default: 10 ms (See Note.)                                           |
| Circuit configuration | IN00000 to IN00001 |    |
|                       | IN00002 to IN00006 |   |
|                       | IN00007 and up     |  |

Note: The input time constant can be set to 1, 2, 3, 5, 10, 20, 40, or 80 ms in the PLC Setup.

### High-speed Counter Inputs

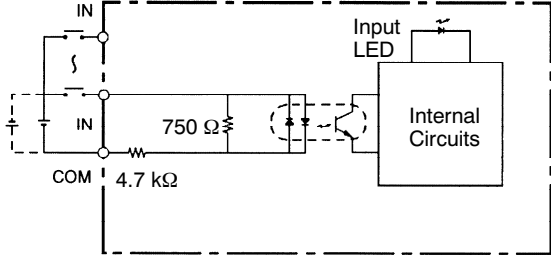
Inputs IN00000 through IN00002 can be used as high-speed counter inputs, as shown in the following table. The maximum count frequency is 5 kHz in differential phase mode and 20 kHz in the other modes.

| Input   | Function                                                                                                                            |                              |                       |                       |
|---------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------------------|-----------------------|
|         | Differential phase mode                                                                                                             | Pulse + direction input mode | Up/down input mode    | Increment mode        |
| IN00000 | A-phase pulse input                                                                                                                 | Pulse input                  | Increment pulse input | Increment pulse input |
| IN00001 | B-phase pulse input                                                                                                                 | Direction input              | Decrement pulse input | Normal input          |
| IN00002 | Z-phase pulse input/Hardware reset input (IN00002 can be used as a normal input when it is not used as a high-speed counter input.) |                              |                       |                       |

### Interrupt Inputs

Inputs IN00003 through IN00006 can be used as interrupt inputs (interrupt input mode or counter mode) and quick-response inputs. The minimum pulse width for these inputs is 0.05 ms.

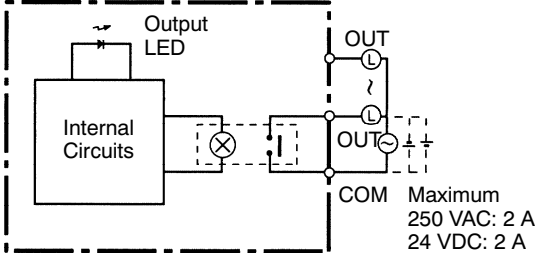
## Expansion I/O Module Input

| Item                  | Specification                                                                      |
|-----------------------|------------------------------------------------------------------------------------|
| Input voltage         | 24 VDC $+10\%/-15\%$                                                               |
| Input impedance       | 4.7 k $\Omega$                                                                     |
| Input current         | 5 mA typical                                                                       |
| ON voltage            | 14.4 VDC min.                                                                      |
| OFF voltage           | 5.0 VDC max.                                                                       |
| ON delay              | 1 to 80 ms max. Default: 10 ms (See note.)                                         |
| OFF delay             | 1 to 80 ms max. Default: 10 ms (See note.)                                         |
| Circuit configuration |  |

Note: The input time constant can be set to 1, 2, 3, 5, 10, 20, 40, or 80 ms in the PLC Setup.

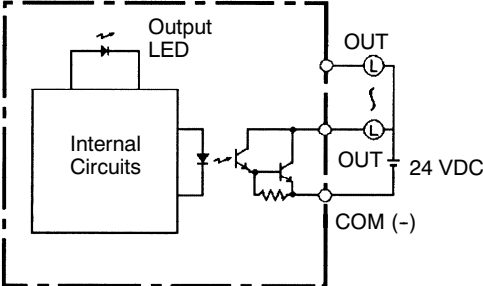
## ■ OUTPUT SPECIFICATIONS (CPU AND EXPANSION I/O MODULE)

### Relay Output

| Item                    | Specification                                                                                                                                               |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Max. switching capacity | 2 A, 250 VAC ( $\cos\phi = 1$ )<br>2 A, 24 VDC<br>(4 A/common)                                                                                              |
| Min. switching capacity | 10 mA, 5 VDC                                                                                                                                                |
| Service life of relay   | Electrical: 150,000 operations (30 VDC resistive load)<br>100,000 operations (240 VAC inductive load, $\cos\phi = 4$ )<br>Mechanical: 20,000,000 operations |
| ON delay                | 15 ms max.                                                                                                                                                  |
| OFF delay               | 15 ms max.                                                                                                                                                  |
| Circuit configuration   |                                                                         |

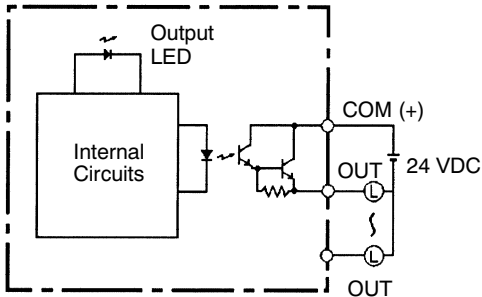
Maximum  
250 VAC: 2 A  
24 VDC: 2 A

**Transistor Output (Sinking)**

| Item                    | Specification                                                                                                                                                             |                            |                            |                            |                            |                                                       |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-------------------------------------------------------|
|                         | 20CDT-D                                                                                                                                                                   | 30CDT-D                    | 40CDT-D                    | 60CDT-D                    | 8ET                        | 20EDT1                                                |
| Max. switching capacity | OUT01000, 01001: 4.5 to 30 VDC, 0.2 A/output<br>OUT01002 and up: 4.5 to 30 VDC, 0.3 A/output                                                                              |                            |                            |                            |                            | 24 VDC $+10\%/-5\%$ ,<br>0.3 A/output                 |
|                         | 0.8 A/common<br>1.6 A/Unit                                                                                                                                                | 0.8 A/common<br>2.4 A/Unit | 0.8 A/common<br>3.2 A/Unit | 0.8 A/common<br>4.8 A/Unit | 0.9 A/common<br>1.8 A/Unit | 0.9 A/common<br>1.8 A/Unit                            |
| Leakage current         | 0.1 mA max.                                                                                                                                                               |                            |                            |                            |                            |                                                       |
| Residual voltage        | 1.5 V max.                                                                                                                                                                |                            |                            |                            |                            |                                                       |
| ON delay                | OUT01000 and OUT01001: 20 $\mu$ s max.<br>OUT01002 and up: 0.1 ms max.                                                                                                    |                            |                            |                            |                            | 0.1 ms max.                                           |
| OFF delay               | OUT01000 and OUT01001: 40 $\mu$ s max. (4.5 to 26.5 V, 10 to 100 mA)<br>0.1 ms max. (4.5 to 30 V, 10 to 300 mA)<br>OUT01002 and up: 1 ms max. (4.5 to 30 V, 10 to 300 mA) |                            |                            |                            |                            | 1 ms max.<br>24 VDC<br>$+10\%/-5\%$ ,<br>5 to 300 mA) |
| Fuse (See Note)         | 1 fuse/output                                                                                                                                                             |                            |                            |                            |                            | 1 fuse/common                                         |
| Circuit configuration   |                                                                                         |                            |                            |                            |                            |                                                       |

Note: Cannot be replaced by the user.

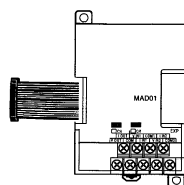
**Transistor Output (Sourcing)**

| Item                    | Specification                                                                                                                                                             |                            |                            |                            |                            |                                                    |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------------------------------|
|                         | 20CDT1-D                                                                                                                                                                  | 30CDT1-D                   | 40CDT1-D                   | 60CDT1-D                   | 8ET1                       | 20EDT1                                             |
| Max. switching capacity | OUT01000, 01001: 4.5 to 30 VDC, 0.2 A/output<br>OUT01002 and up: 4.5 to 30 VDC, 0.3 A/output                                                                              |                            |                            |                            |                            | 24 VDC $+10\%/-5\%$ ,<br>0.3 A/output              |
|                         | 0.8 A/common<br>1.6 A/Unit                                                                                                                                                | 0.8 A/common<br>2.4 A/Unit | 0.8 A/common<br>3.2 A/Unit | 0.8 A/common<br>4.8 A/Unit | 0.9 A/common<br>1.8 A/Unit | 0.9 A/common<br>1.8 A/Unit                         |
| Leakage current         | 0.1 mA max.                                                                                                                                                               |                            |                            |                            |                            |                                                    |
| Residual voltage        | 1.5 V max.                                                                                                                                                                |                            |                            |                            |                            |                                                    |
| ON delay                | OUT01000 and OUT01001: 20 $\mu$ s max.<br>OUT01002 and up: 0.1 ms max.                                                                                                    |                            |                            |                            |                            | 0.1 ms max.                                        |
| OFF delay               | OUT01000 and OUT01001: 40 $\mu$ s max. (4.5 to 26.5 V, 10 to 100 mA)<br>0.1 ms max. (4.5 to 30 V, 10 to 300 mA)<br>OUT01002 and up: 1 ms max. (4.5 to 30 V, 10 to 300 mA) |                            |                            |                            |                            | 1 ms max.<br>24 VDC $+10\%/-5\%$ ,<br>5 to 300 mA) |
| Fuse (See Note)         | 1 fuse/output                                                                                                                                                             |                            |                            |                            |                            | 1 fuse/common                                      |
| Circuit configuration   |                                                                                       |                            |                            |                            |                            |                                                    |

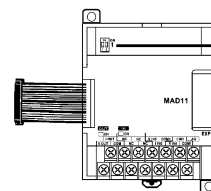
Note: Cannot be replaced by the user.

# ANALOG I/O MODULE

Up to 3 Expansion I/O Modules or Expansion Modules (including the CPM1A-MAD01 Analog I/O Module) can be connected to a CPM2A CPU.



CPM1A-MAD01



CPM1A-MAD11

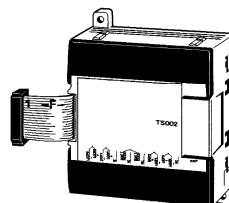
| Item                           |                                         | CPM1A-MAD01                                                                                                    |             | CPM1A-MAD11                                                                                                         |                                |
|--------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------|
|                                |                                         | Voltage I/O                                                                                                    | Current I/O | Voltage I/O                                                                                                         | Current I/O                    |
| Analog inputs                  | Number of inputs                        | 2                                                                                                              |             | 2 (allocated 2 words)                                                                                               |                                |
|                                | Input signal ranges                     | 0 to 10 V or 1 to 5 V                                                                                          | 4 to 20 mA  | 0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V                                                                          | 0 to 20 mA, 4 to 20 mA         |
|                                | Maximum rated input                     | ±15 V                                                                                                          | ±30 mA      | ±15 V                                                                                                               | ±30 mA                         |
|                                | External input impedance                | 1 MΩ min.                                                                                                      | 250 Ω rated | 1 MΩ min.                                                                                                           | 250 Ω                          |
|                                | Resolution                              | 1/256                                                                                                          |             | 1/6,000 (full scale)                                                                                                |                                |
|                                | Overall precision                       | 1.0% of full scale                                                                                             |             | 25°C: ±0.3% of full scale                                                                                           | 25°C: ±0.4% of full scale      |
|                                |                                         |                                                                                                                |             | 0 to 55°C: ±0.6% of full scale                                                                                      | 0 to 55°C: ±0.8% of full scale |
|                                | Converted A/D data                      | 8-bit binary                                                                                                   |             | Binary data (4-digit hexadecimal)<br>-10 to 10 V: F448 to 0BB8 Hex full scale<br>Other: 0000 to 1770 Hex full scale |                                |
| Analog output<br>(See Note 1.) | Averaging                               | —                                                                                                              |             | Supported (set for each input with DIP switch)                                                                      |                                |
|                                | Disconnected line detection             | —                                                                                                              |             | Supported                                                                                                           |                                |
|                                | Number of outputs                       | 1                                                                                                              |             | 1 (allocated 1 word)                                                                                                |                                |
|                                | Output signal ranges                    | 0 to 10 V or -10 to 10 V                                                                                       | 4 to 20 mA  | 1 to 5 V, 0 to 10 V, -10 to 10 V                                                                                    | 0 to 20 mA, 4 to 20 mA         |
|                                | External output max. current            | 5 mA                                                                                                           | —           | —                                                                                                                   | —                              |
|                                | External output allowed load resistance | —                                                                                                              | 350 Ω       | 1 kΩ min.                                                                                                           | 600 Ω max.                     |
|                                | External output impedance               | —                                                                                                              |             | 0.5 Ω max.                                                                                                          | —                              |
|                                | Resolution                              | 1/256 (1/512 when the output signal range is -10 to 10 V.)                                                     |             | 1/6,000 (full scale)                                                                                                |                                |
|                                | Overall precision                       | 1.0% of full scale                                                                                             |             | 25°C: ±0.4% of full scale                                                                                           |                                |
|                                |                                         |                                                                                                                |             | 0 to 55°C: ±0.8% of full scale                                                                                      |                                |
|                                | Data setting                            | 8-bit binary with sign bit                                                                                     |             | —                                                                                                                   |                                |
|                                | D/A data setting                        | —                                                                                                              |             | Binary data (4-digit hexadecimal)<br>-10 to 10 V: F448 to 0BB8 Hex full scale<br>Other: 0000 to 1770 Hex full scale |                                |
| Conversion time (See Note 2.)  |                                         | 10 ms/Unit max.                                                                                                |             | 2 ms/point (6 ms/all analog I/O)                                                                                    |                                |
| Isolation method               |                                         | Photocoupler isolation between I/O terminals and PC<br>(There is no isolation between the analog I/O signals.) |             | Photocoupler isolation between analog I/O and internal circuits. (Individual analog I/O signals are not isolated.)  |                                |

Note: 1. The voltage output and current output can be used at the same time, but the total output current cannot exceed 21 mA.

2. The conversion time is the total time for 2 analog inputs and 1 analog output.

## ■ TEMPERATURE SENSOR MODULES

By connecting a Temperature Sensor Module (CPM1A-TS001/TS002/TS101/TS101A/TS102) to the CPM2A, inputs can be received from thermocouples or temperature-resistance thermometers. Inputs converted to binary data (4-digit hexadecimal) and stored in the IR area.



### Specifications

| Item                          | Specification                                                                         |                                                                                       |                                                                 |
|-------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Model                         | CPM1A-TS001/TS002                                                                     | CPM1A-TS101/TS102                                                                     | CPM1A-TS101-DA                                                  |
| Number of inputs              | TS001: 2; TS002: 4                                                                    | TS101: 2; TS102: 4                                                                    | 2                                                               |
| Input types<br>(See Note 1)   | Thermocouple types K or J, selectable                                                 | Platinum resistance thermometer types Pt100 and JPt100, selectable                    |                                                                 |
| Input resolution              | 0.1°C in 2's complement format                                                        | 0.1°C in 2's complement format                                                        |                                                                 |
| Input accuracy                | ±0.5% or ±2% of the stored value<br>whichever is larger ±1 digit max.<br>(See Note 2) | ±0.5% or ±1% of the stored value<br>whichever is larger ±1 digit max.<br>(See Note 2) | 1.0% max. full scale                                            |
| Number of outputs             | None                                                                                  | None                                                                                  | 1                                                               |
| Output types                  | —                                                                                     | —                                                                                     | Voltage or current output                                       |
| Output resolution             | —                                                                                     | —                                                                                     | 1/256 (0 to 10 V)<br>1/512 (-10 to +10 V)<br>1/256 (4 to 20 mA) |
| Output accuracy               | —                                                                                     | —                                                                                     | 1.0% max. full scale                                            |
| Conversion cycle              | 250 ms for all points                                                                 |                                                                                       | 60 ms max. for all points                                       |
| Converted<br>temperature data | Binary data (4-digit hexadecimal)                                                     |                                                                                       | Binary data (8-digit hexadecimal)                               |
| Isolation method              | Photocoupler isolation between I/O terminals and the PLC                              |                                                                                       |                                                                 |

Note: 1. The same input type must be used for all inputs.

2. Accuracy for K thermocouples at temperatures less than -100°C: ±4°C ± 1 digit max.

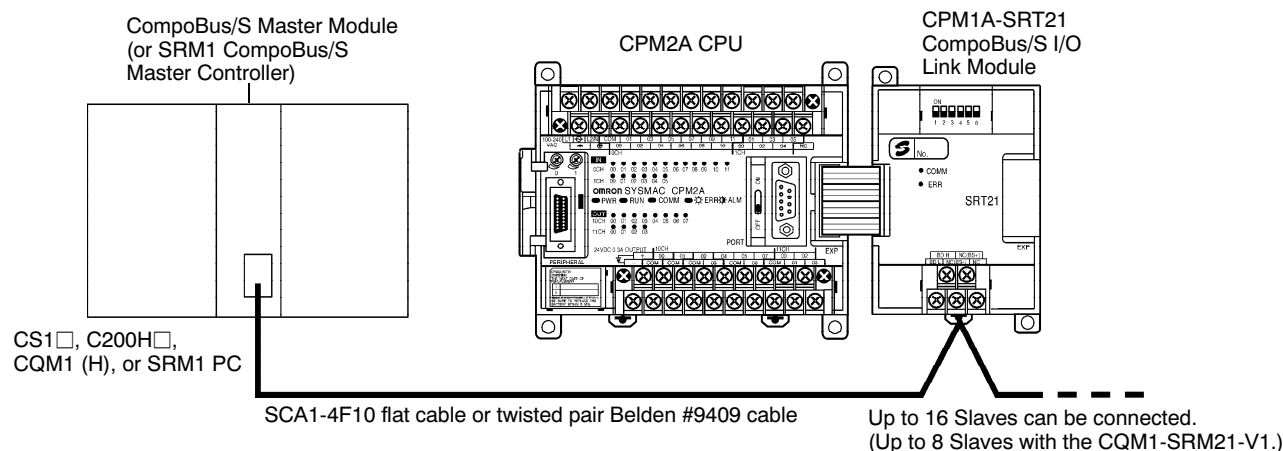
### Input Temperature Ranges

The input type is selected with a rotary switch. The ranges for each of the input types are shown in the following table.

| Model       | CPM1A-TS001/TS002           |                            | CPM1A-TS101/TS101-DA/TS102 |                     |
|-------------|-----------------------------|----------------------------|----------------------------|---------------------|
| Input type  | Thermocouple type K         | Thermocouple type J        | Platinum RTD Pt100         | Platinum RTD JPt100 |
| Range in °C | -200 to 1,300, 0.0 to 500.0 | -100 to 850, 0.0 to 400.0  | -200.0 to 650.0            | -200.0 to 650.0     |
| Range in °F | -300 to 2300, 0.0 to 900.0  | -100 to 1500, 0.0 to 750.0 | -300.0 to 1200.0           | -300.0 to 1200.0    |

## ■ COMPOBUS/S I/O LINK MODULE

The CPM2A PLC can function as a Slave to a CompoBus/S Master Module (or SRM1 CompoBus/S Master Controller) when a CPM1A-SRT21 CompoBus/S I/O Link Module is connected. The CompoBus/S I/O Link Module establishes an I/O link of 8 inputs and 8 outputs between the Master Module and the CPM2A. Up to 3 Expansion I/O Modules or Expansion Modules can be connected to a CPM2A CPU.



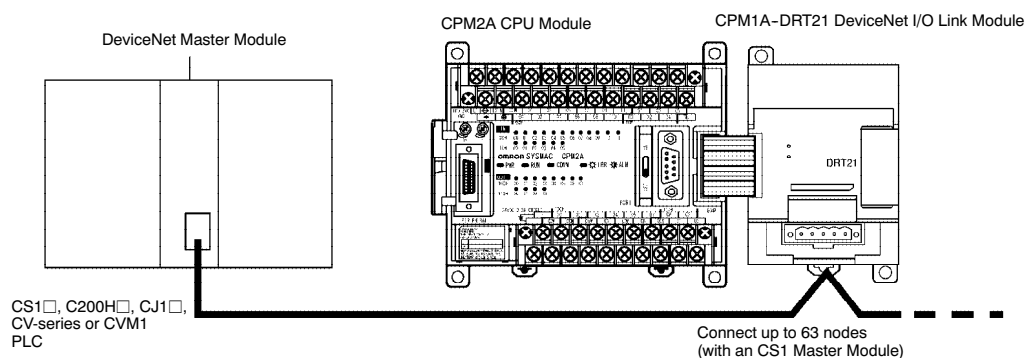
### Specifications

| Item                                         | Specification                                                                                              |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Model number                                 | CPM1A-SRT21                                                                                                |
| Master/Slave                                 | CompoBus/S Slave                                                                                           |
| Number of I/O bits                           | 8 input bits, 8 output bits                                                                                |
| Number of words occupied in CPM2A I/O memory | 1 input word, 1 output word<br>(Allocated in the same way as other Expansion I/O Units or Expansion Units) |
| Node number setting                          | Set using the DIP switch.                                                                                  |

Note: See the CompoBus/S section of Omron's *Remote I/O and Wiring Solutions Catalog (GC RIO1)* for more details on CompoBus/S communications.

## ■ CPM1A-DRT21 DEVICENET I/O LINK MODULE

The CPM1A-DRT21 DeviceNet I/O Link Module can be connected to the CPM2A to function as a slave under a DeviceNet Master Module. This enables an I/O Link with the Master Module via 32 input and 32 output points.

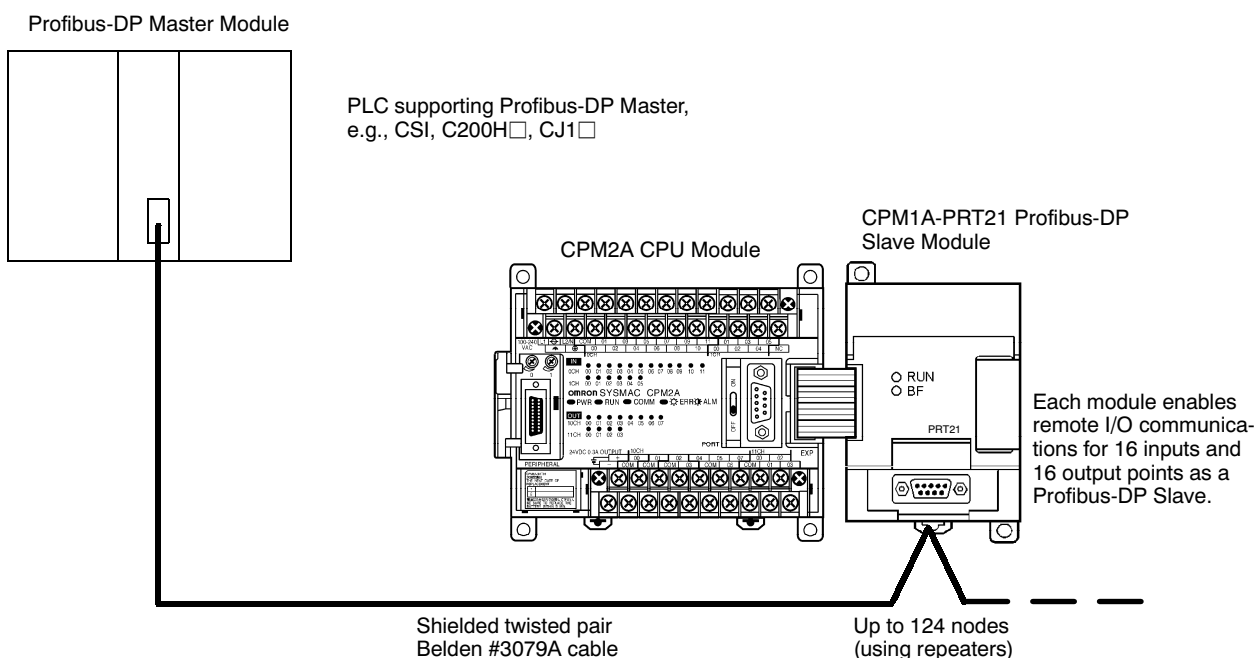


## Specifications

| Item                                                                          | Specification                                                                                     |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Model number                                                                  | CPM1A-DRT21                                                                                       |
| Master/slave                                                                  | DeviceNet slave                                                                                   |
| I/O capacity to master                                                        | 32 input and 32 output points                                                                     |
| I/O memory allocated in CPM2A                                                 | 2 input words and 2 output words (same as other Expansion Units)                                  |
| Node address setting                                                          | DIP switch (Set before turning ON power for the CPU Unit.)                                        |
| Maximum number of nodes (depending on the PC to which Master Unit is mounted) | CS1: 63 nodes<br>CJ1: 63 nodes<br>CVM1/CV: 32 nodes<br>C200HX/HG/HE: 25 nodes<br>C200HS: 16 nodes |

## ■ PROFIBUS-DP SLAVE MODULE

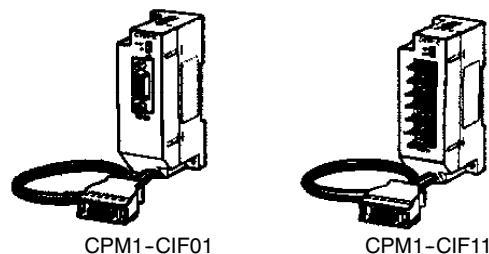
The CPM2A controller can function as a Slave to a Profibus-DP Master Module when a CPM1A-PRT21 Profibus-DP Slave Module is connected. The Profibus-DP Slave Module establishes an I/O link of 16 inputs and 16 outputs between the master and the controller. A maximum of 3 Profibus-DP Slave Modules can be connected to a CPM1A or CPM2A to create I/O links for up to 96 points (48 inputs and 48 outputs).



## Specifications

|                     |                               |
|---------------------|-------------------------------|
| Storage temperature | -20 to +75°C                  |
| Ambient temperature | 0 to +55°C                    |
| Ambient humidity    | 10 to 90% (non-condensing)    |
| EMC compliance      | EN 50081-2, EN 61131-2        |
| Current consumption | 100 mA from the PLC I/O bus   |
| Weight              | 125 g (typical)               |
| Control data        | From CPU to unit: none        |
| Status data         | From unit to CPU: none        |
| I/O data (in bytes) | 2 bytes input, 2 bytes output |

## ■ COMMUNICATIONS ADAPTER



**RS-232C Adapter and RS-422 Adapter**

| Part number          |           | CPM1-CIF01                                                                                                                                                                    | CPM1-CIF11                                                                                 |
|----------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| Functions            |           | Level conversion between the CMOS level (CPU side) and the RS-232C (peripheral device side)                                                                                   | Level conversion between the CMOS level (CPU side) and the RS-422 (peripheral device side) |
| Insulation           |           | The RS-232C (peripheral device side) is insulated by a DC/DC converter and photocoupler.                                                                                      | The RS-422 (peripheral device side) is insulated by a DC/DC converter and photocoupler.    |
| Power supply         |           | Power is supplied by the CPU.                                                                                                                                                 |                                                                                            |
| Power consumption    |           | 0.3 A max.                                                                                                                                                                    |                                                                                            |
| Transmission speed   |           | 38.4 kbits/s max.                                                                                                                                                             |                                                                                            |
| Vibration resistance |           | 10 to 57 Hz with an amplitude of 0.075 mm, and 57 to 150 Hz with an acceleration of 1 G in the X, Y and Z directions for 80 minutes each (i.e. for 8 minutes each, 10 times). |                                                                                            |
| Shock resistance     |           | 1.5 G in the X, Y and Z directions 3 times each.                                                                                                                              |                                                                                            |
| Ambient temperature  | Operating | 0°C to 55°C (32°F to 131°F)                                                                                                                                                   | 0°C to 55°C (32°F to 131°F)                                                                |
|                      | Storage   | -20°C to 75°C (-4°F to 167°F)                                                                                                                                                 | -20°C to 75°C (-4°F to 167°F)                                                              |
| Ambient humidity     | Operating | 10% to 90% RH (with no condensation)                                                                                                                                          |                                                                                            |
| Ambient environment  | Operating | With no corrosive gas                                                                                                                                                         |                                                                                            |
| Weight               |           | 200 g max.                                                                                                                                                                    |                                                                                            |

# Dimensions

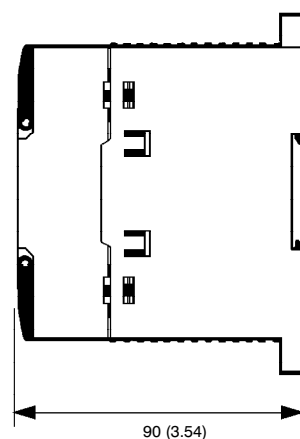
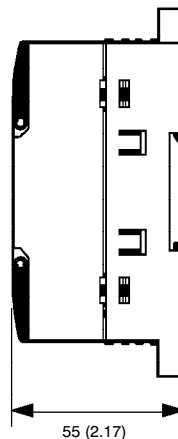
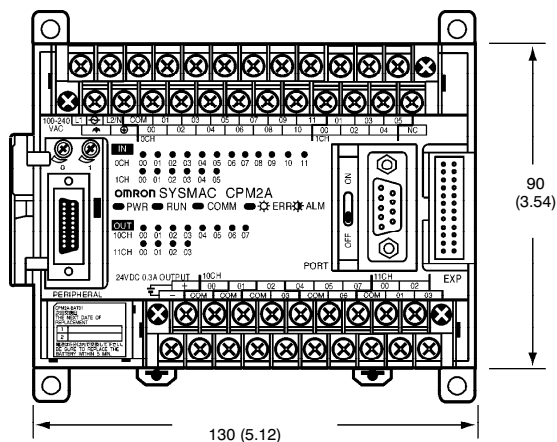
Unit: mm (inch)

## CPU

CPM2A-20CD□-□/30CD□-□

CPUs with DC Power

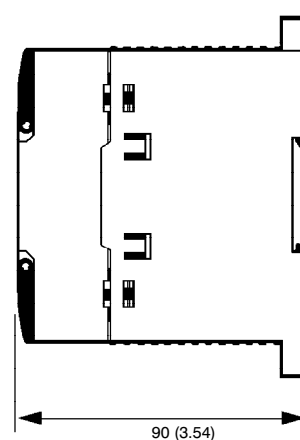
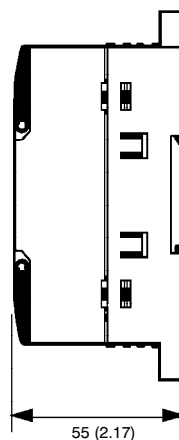
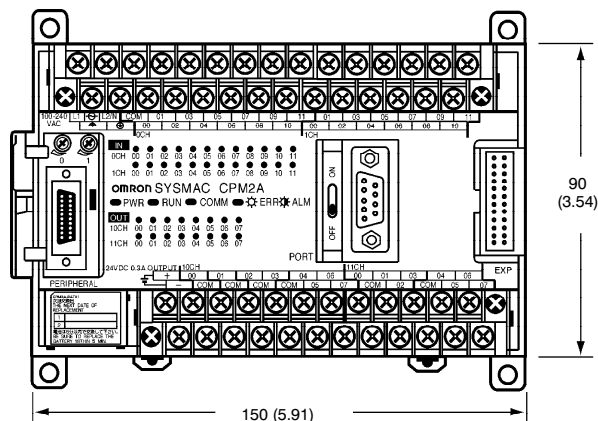
CPUs with AC Power



CPM2A-40CD□-□

CPUs with DC Power

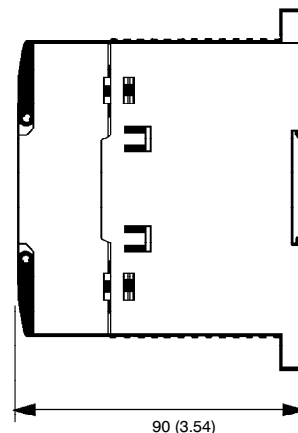
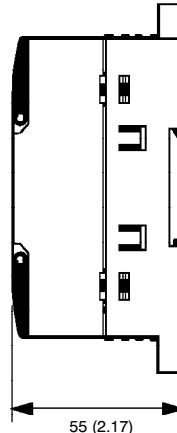
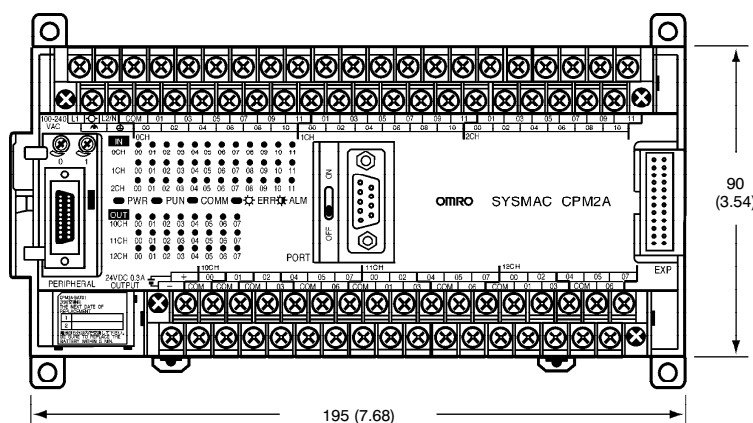
CPUs with AC Power



CPM2A-60CD□-□

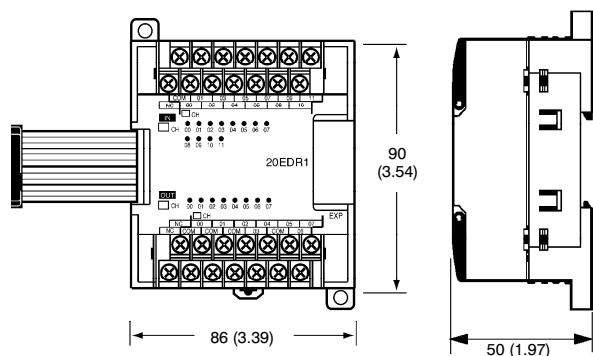
CPUs with DC Power

CPUs with AC Power

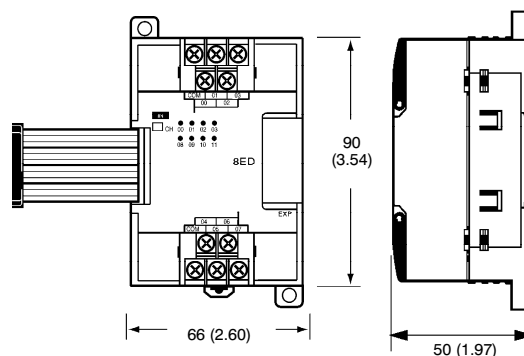


## ■ EXPANSION I/O AND SPECIAL I/O MODULES

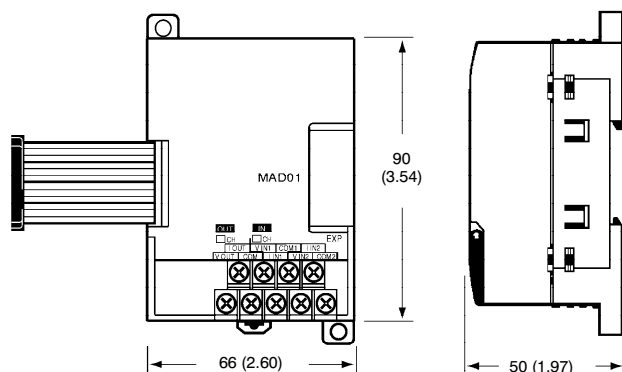
### CPM1A-20ED□ Expansion I/O Modules



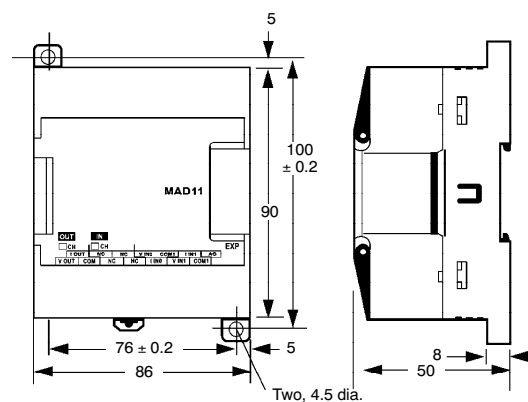
### CPM1A-8□□□ Expansion I/O Modules



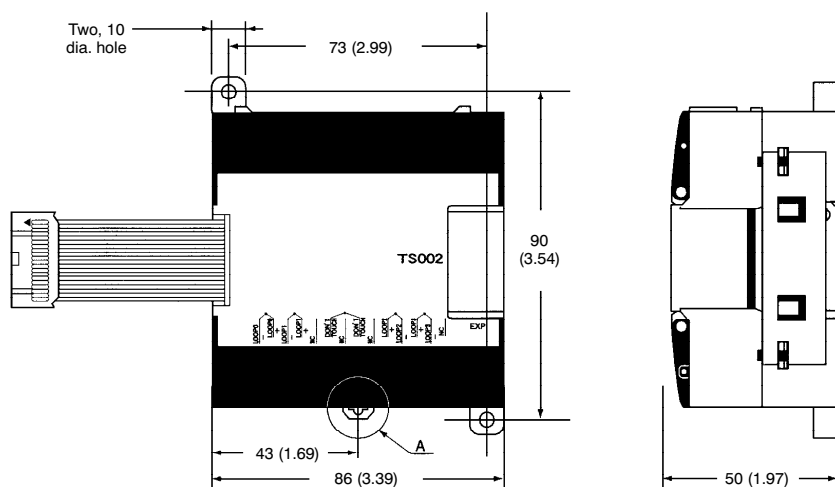
### CPM1A-MAD01 Analog I/O Module



### CPM1A-MAD11 Analog I/O Module

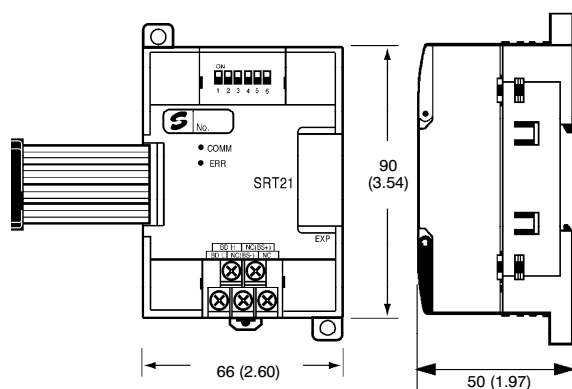


### CPM1A-TS□□□ Temperature Sensor Input Modules

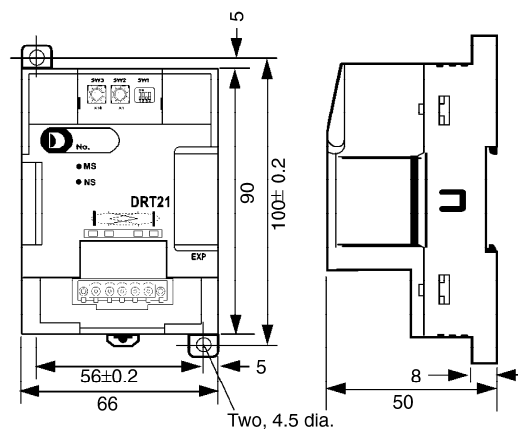


Unit: mm (inch)

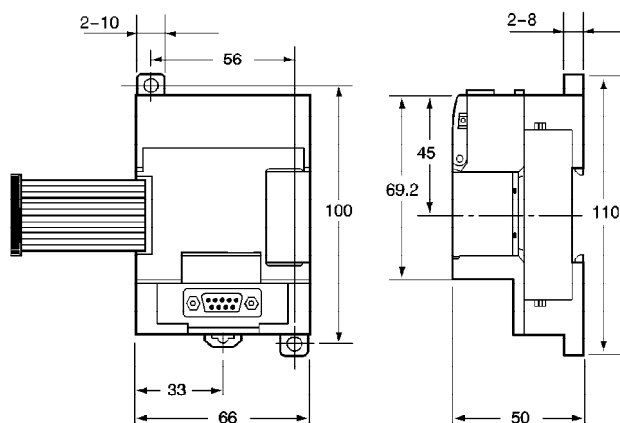
### CPM1A-SRT21 CompoBus/S I/O Link Module



### CPM1A-DRT21 DeviceNet I/O Link Module

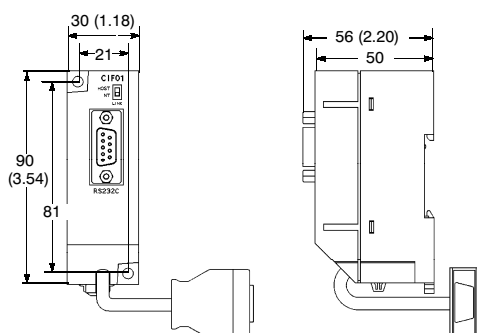


### CPM1A-PRT21 Profibus-DP Slave Module

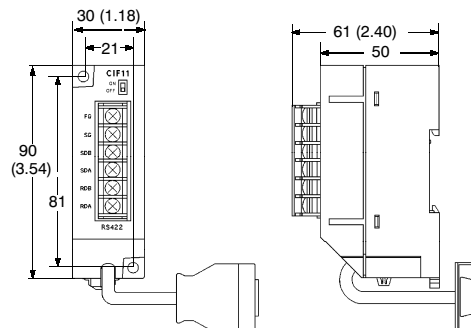


## COMMUNICATION ADAPTER MODULES

### CPM1-CIF01



### CPM1-CIF11

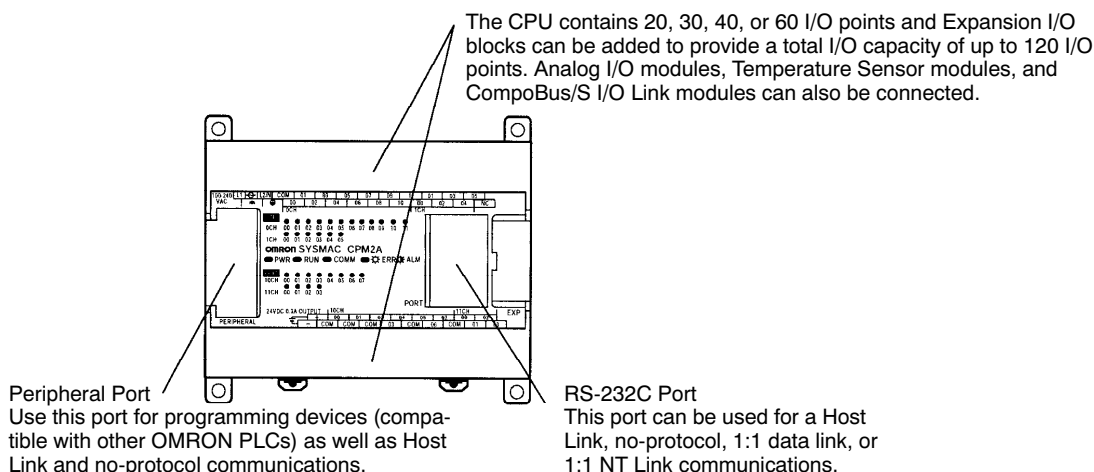


# Functions

## ■ CONFIGURATION

The CPM2A PLCs incorporate a variety of features, including synchronized pulse control, interrupt inputs, pulse outputs, analog settings, and a clock function. Use the CPM2A CPU as a stand-alone controller for a broad range of machine control applications.

The CPM2A easily communicates with personal computers, other OMRON PLCs, and OMRON Programmable Terminals. These communications capabilities allow the user to design a low-cost distributed production system.



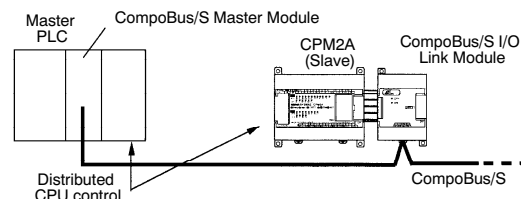
## ■ TIME-PROPORTIONAL CONTROL

The CPM2A performs simple-to-program, time-proportional control using up to three Analog I/O modules (maximum 6 analog inputs and 3 analog outputs) and the PID and PWM expansion instructions. These instructions set the parameters for PID control and a pulse output with variable duty ratio. For increased reliability, an open-circuit detection function can be used with the 1 to 5 VDC and 4 to 20 mA analog input settings.

For temperature monitoring applications, CPM2A accepts up to 6 inputs (two per module) from Temperature Sensor Input modules. The PID instruction can manipulate the input from either thermocouple or platinum resistance thermometer sensors.

## ■ DISTRIBUTED I/O CONTROL

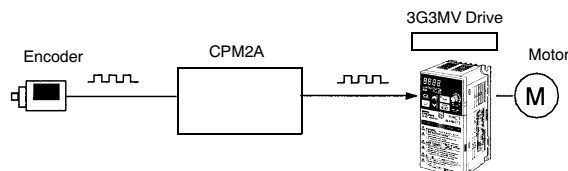
Omron's CompoBus/S Network provides distributed CPU control based on a "PLC + compact PLC" configuration which provides improvements over distributed control based on "PLC + remote I/O" configurations. The distributed CPU control makes equipment module, so designs can be standardized, special needs can be addressed and modules can be replaced easily in the event of breakdown without affecting the main CPU.



## ■ BUILT-IN MOTOR CONTROL CAPABILITY

### Synchronized Pulse Control (transistor output models only)

Synchronized output pulse control provides an easy way to coordinate the operation of a peripheral piece of equipment with the main equipment. The output pulse frequency can be controlled as a multiple of the input pulse frequency, allowing the speed of a peripheral piece of equipment (such as a supply conveyor) to be synchronized with the speed of the main piece of equipment.



Pulses are output as a fixed multiple of the input frequency.

## ■ HIGH-SPEED COUNTERS AND INTERRUPTS

The CPM2A has a total of five high-speed counter inputs. The one high-speed counter input has a response frequency of 20 kHz/5 kHz, and the four interrupt inputs (in counter mode) have a response frequency of 2 kHz.

### Four Input Modes

The high-speed counter can be used in any one of the four input modes: differential phase mode (5 kHz), pulse plus direction input mode (20 kHz), up/down pulse mode (20 kHz), or increment mode (20 kHz). Interrupts can be triggered when the count matches a set value or falls within a specified range.

### Interrupt Inputs

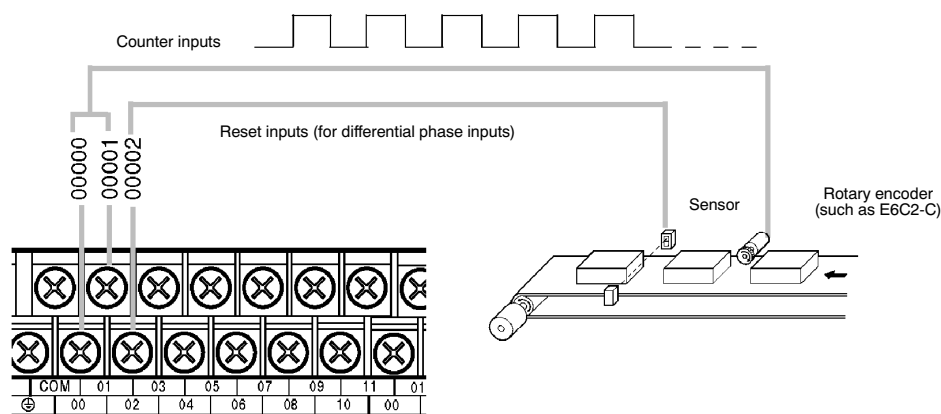
The interrupt inputs (counter mode) can be used for incrementing counters or decrementing counters (2 kHz) and trigger an interrupt (executing the interrupt program) when the count matches the target value. Use this for target-value comparison or range comparison control that is unaffected by the cycle time.

### Easy Position Control with Pulse Outputs (transistor output models only)

The CPM2A PLCs with transistor outputs have two outputs that can produce 10 Hz to 10 kHz pulses (single-phase outputs).

When used as single-phase pulse outputs, there can be two outputs with a frequency range of 10 Hz to 10 kHz with a fixed duty ratio or 0.1 to 999.9 Hz with a variable duty ratio (0 to 100% duty ratio).

When used as pulse plus direction or up/down pulse outputs, there can be just one output with a frequency range of 10 Hz to 10 kHz.



| Input | Response frequency | Input mode (count value)                                | Control method                     |
|-------|--------------------|---------------------------------------------------------|------------------------------------|
| 00000 | 5 kHz              | Differential phase input mode (-8,388,608 to 8,388,607) | Target value comparison interrupts |
| 00001 | 20 kHz             | Pulse + direction input mode (-8,388,608 to 8,388,607)  | Range comparison interrupts        |
| 00002 |                    | Up/down pulse input mode (-8,388,608 to 8,388,607)      |                                    |
|       |                    | Increment mode (0 to 16,777,215)                        |                                    |



## ■ HIGH-SPEED INPUT CAPABILITIES FOR MACHINE CONTROL

### High-speed Interrupt Input Function

There are four inputs used for interrupt inputs (shared with quick-response inputs and interrupt inputs in counter mode) with a minimum input signal width of 50  $\mu$ s and a response time of 0.3 ms. When an interrupt input goes ON, the main program is stopped and the interrupt program is executed.

### Quick-response Input Function

There are four inputs used for quick-response inputs (shared with interrupt inputs and interrupt inputs in counter mode) that can reliably read input signals with a signal width as short as 50  $\mu$ s. Quick-response inputs are received into an internal buffer, so signals that change status within a cycle can be processed.

### Stabilizing Input Filter Function

The input time constant for all inputs can be set to 1 ms, 2 ms, 3 ms, 5 ms, 10 ms, 20 ms, 40 ms, or 80 ms. The effects of chattering and external noise can be reduced by increasing the input time constant.

### Interval Timer Interrupts

The interval timer offers a 0.5 and 319,968 ms range and can be set to generate just one interrupt (one-shot mode) or periodic interrupts (scheduled interrupt mode) to match the application.

## ■ OTHER FUNCTIONS

### Analog Settings

There are two controls on the CPU that can be turned to change the analog settings (0 to 200 BCD) of timers and counters. These controls can be used to easily change or fine-tune machine settings such as a conveyor belt's pause time or feed rate.

### Calendar/Clock

The built-in clock (accuracy within 1 minute/month) can be read from the program to show the current year, month, day, day of the week, and time. The clock can be set from a programming device (such as a Programming Console) or the time can be adjusted by rounding up or down to the nearest minute.

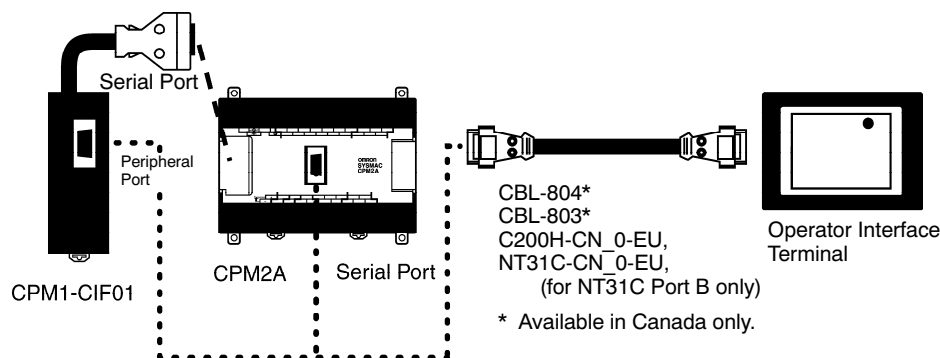
### Long-term Timer

The long-term timer provides an easy way to control equipment scheduling. Use two instructions to set this up. The long-term timer instruction (TIML) lets you set values up to 99,990 seconds (27 hours, 46 minutes, 30 seconds) and the Seconds-to-Hours conversion instruction (HMS) lets you schedule this with other clock functions.

## Communications

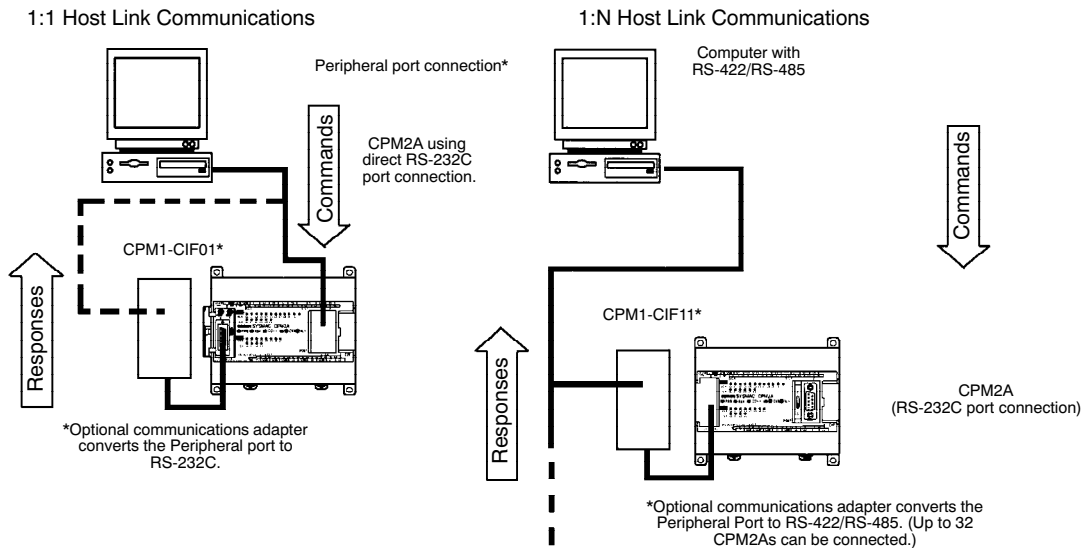
### ■ NT LINK FOR PROGRAMMABLE TERMINALS

The CPM2A can be connected directly to an OMRON NT-Series Programmable Terminal in NT Link mode (1:1) for high-speed transmission of data. No separate drivers are required. Use the RS-232C port for the NT Link connection.



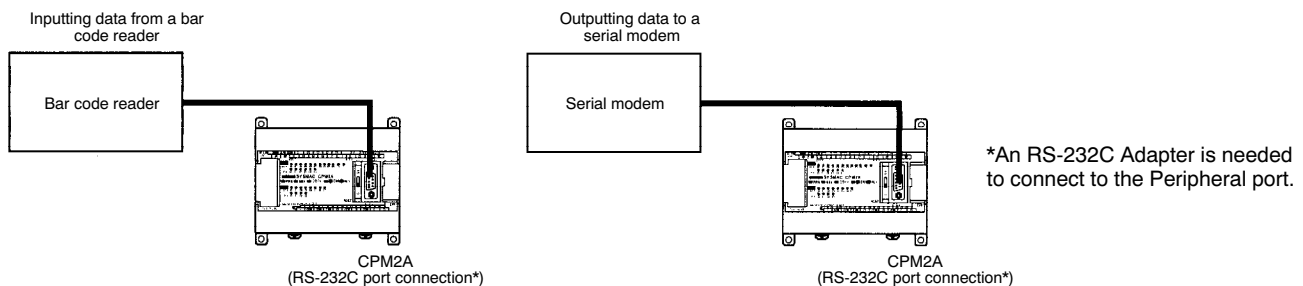
## ■ HOST LINK

A Host Link connection can be made through the CPM2A's RS-232C port or Peripheral port. A personal computer or Programmable Terminal connected in Host Link mode can be used for operations such as reading/writing data in the CPM2A's I/O memory or reading/changing the controller's operating mode.



## No-Protocol Communications

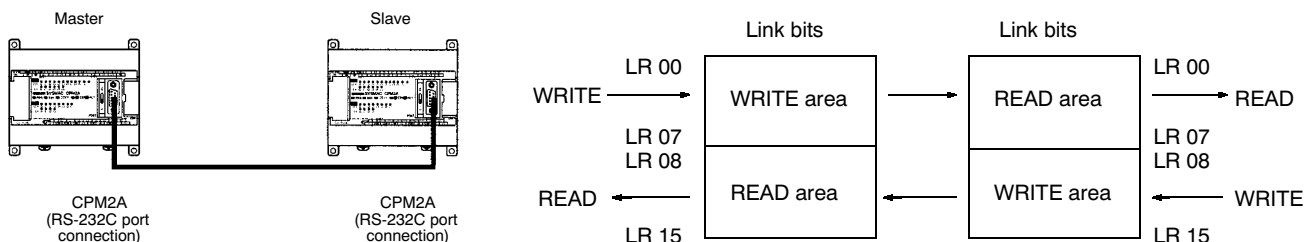
The transmit TXD (48) and receive RXD (47) instructions can be used in No-Protocol mode to exchange data with standard serial devices. For example, data can be received from a bar code reader or transmitted to a serial modem. The serial devices can be connected directly to the RS-232C port or the Peripheral port using the CPM1-CIF01 serial communications adapter.



## ■ 1:1 DATA LINKS

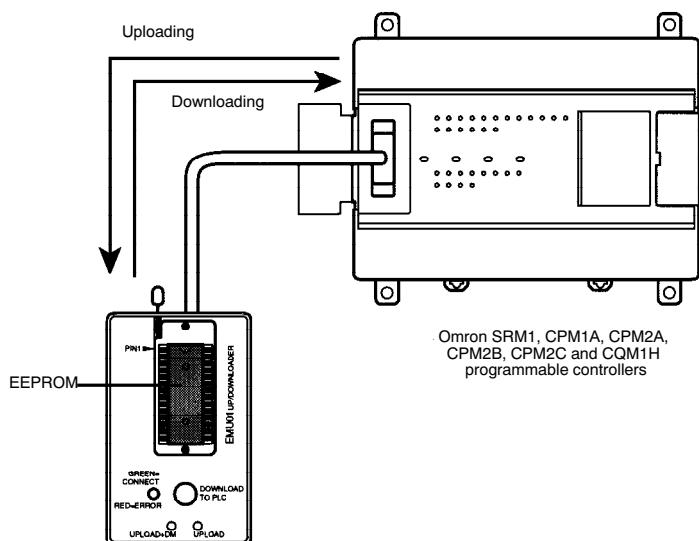
A CPM2A can be linked directly to another CPM2A, CQM1H, CPM1, CPM1A, CPM2C, SRM1(-V2), or a C200HS or C200HX/HG/HE programmable controller. The 1:1 PLC Link allows automatic data link connections or sharing of memory between two Omron CPUs. The controller must be connected through the RS-232C port; it cannot be connected through the Peripheral port.

### Example of a 1:1 Link between CPM2As



## ■ PROGRAM TRANSFER UNIT

Use Omron's EEPROM program transfer unit to update programs in machines or program multiple controllers with the same program. The CPM1-EMU01-V1 Expansion Memory Unit connects to the peripheral port of micro and small PLCs.



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One Commerce Drive  
Schaumburg, IL 60173

**847-843-7900**

For US technical support or other inquiries:

**800-556-6766****OMRON CANADA, INC.**

885 Milner Avenue  
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