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|--------------------------------------------------------------------------------------------------------------------------------------------------------|
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| Please read and understand this catalog before purchasing the product. Please consult your OMRON representative if you have any questions or comments. |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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Note: Do not use this document to operate the Unit.

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OMRON



**SYSMAC CJ Series**

Programmable Controllers

**CJ1G-CPU□□P Loop-control CPU Unit**

Unit Version 3.0 (Version Upgrade)

**CJ1W-P□□□□ Process Input Units *NEW***

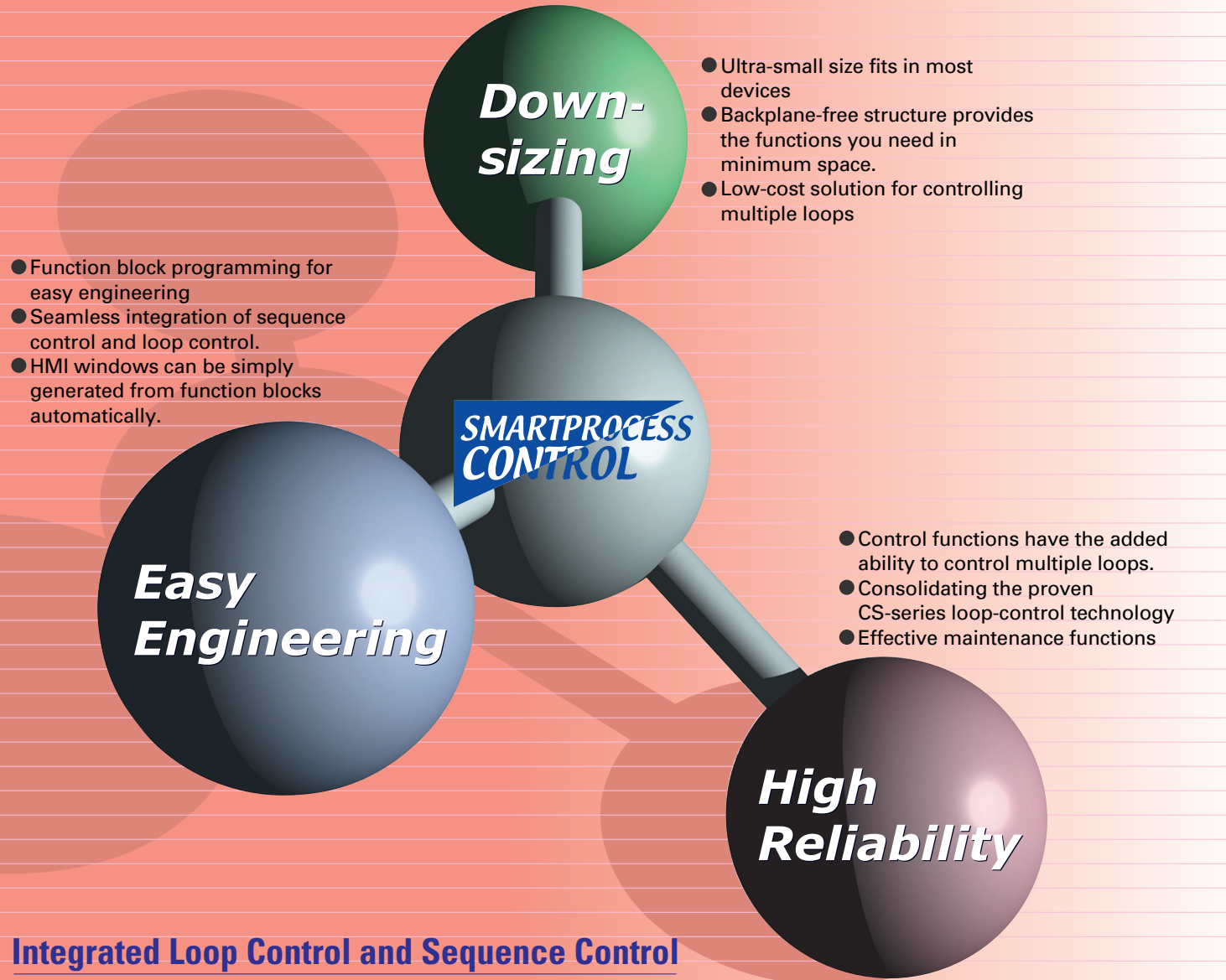
Fully Integrated Sequence and Loop Control  
New Built-in Loop Controller



realizing

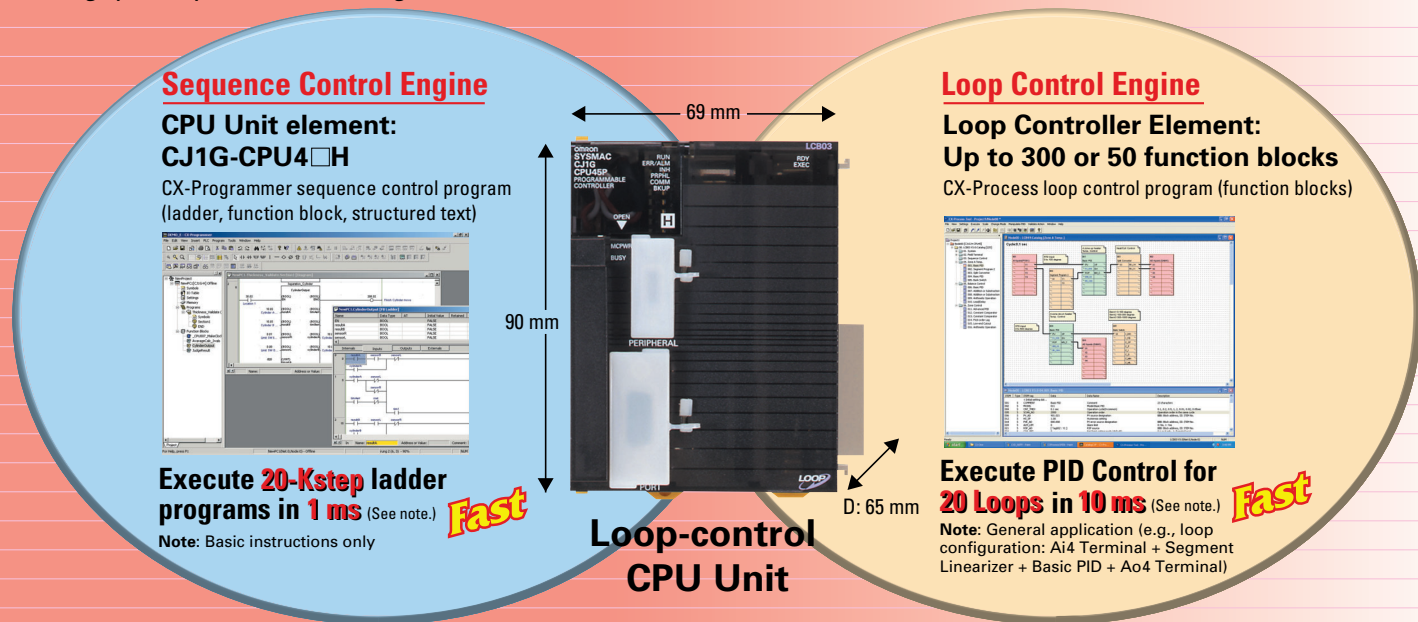
SMARTPROCESS  
CONTROL

# **LOOP** Introducing the New Style of Loop Control Advanced controller functions integrated with the same CJ-series functionality and high-speed capabilities



## **Integrated Loop Control and Sequence Control**

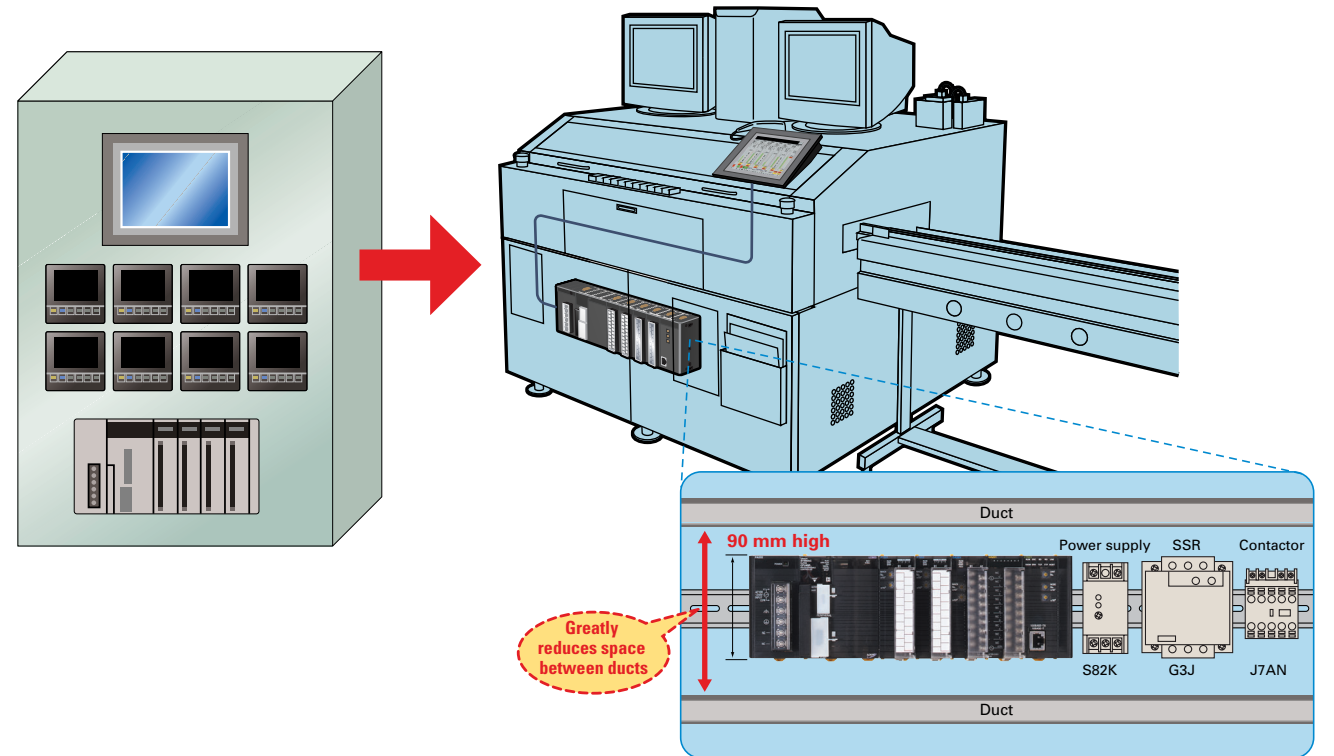
An engine for controlling analog quantities (e.g., temperature, pressure, flowrate) is built into the CPU Unit together with the engine for executing sequence control, delivering high-speed sequence control and high-speed, advanced analog quantity control in a single Unit.



# Down-sizing

## **Small** Super compact: Only 90 mm High and 65 mm Deep, and Backplane-free structure enables flexible width design.

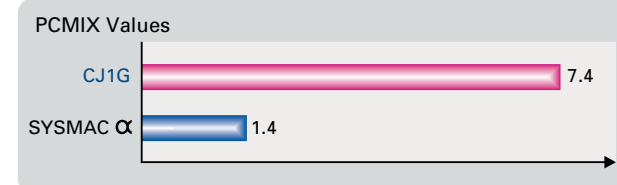
Compact PLC Aids Machine Downsizing by Fitting Just About Anywhere. Wide Array of I/O Units, Special I/O Units, and CPU Bus Units Are Available to Suit Your Application.



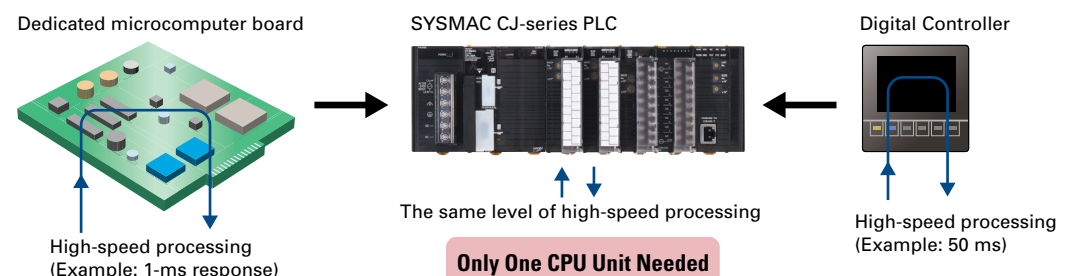
## **Fast** High-speed sequence control functions can be used directly for high-speed, advanced loop control.

- **Sequence control:** Executes 20-Kstep ladder programs in 1 ms (with basic instructions only). PCMIIX = 7.4 LD or OUT executed in 40 ns
- **Loop control:** Executes PID operations for 20 loops in up to 10 ms. This is a guide for general applications. (See note.)

Sequencing



**Note:** Loop configuration: Ai4 Terminal + Segment Linearizer + Basic PID + Ao4 Terminal  
The external I/O response time in the overall system refers to the conversion time.



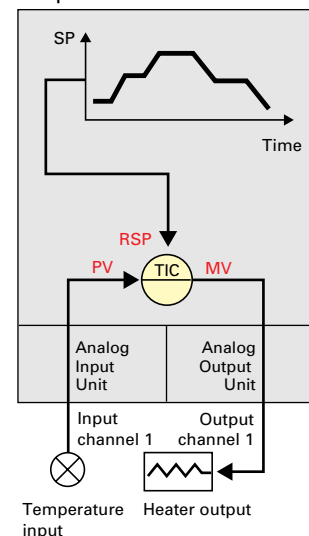
**Easy** Function blocks make loop-control programming easy. You can also create CX-Process Tool tuning windows to help adjust loops. Controller faceplates can be created automatically for touch panel displays.



- **Sequence control programs:** Standardize and simplify programs using structured programming. Special I/O Unit and CPU Bus Unit settings are easy with function blocks (using ladder programming language or structured text).
- **Loop control programs:** By combining function blocks, a wide array of control methods can be easily configured, from basic PID control used by Temperature Controllers to program, cascade, and feed-forward control.

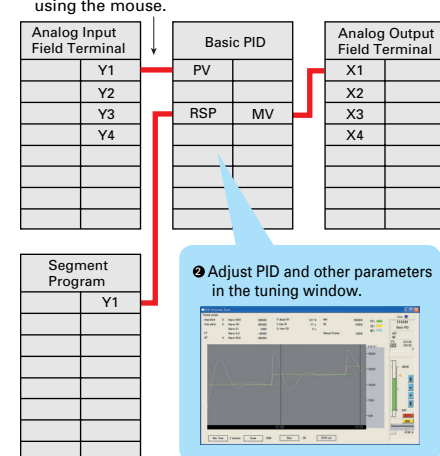
## ● Engineering Example: Program Control

Loop-control CPU Unit



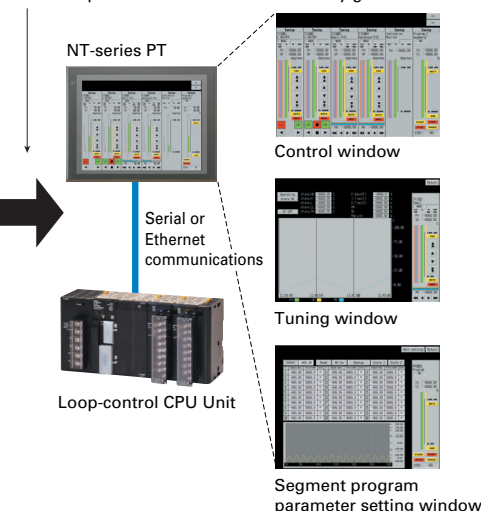
CX-Process Tool (Software for Personal Computer)

- Combine function blocks and connect graphically using the mouse.



Face Plate Auto-Builder for NS

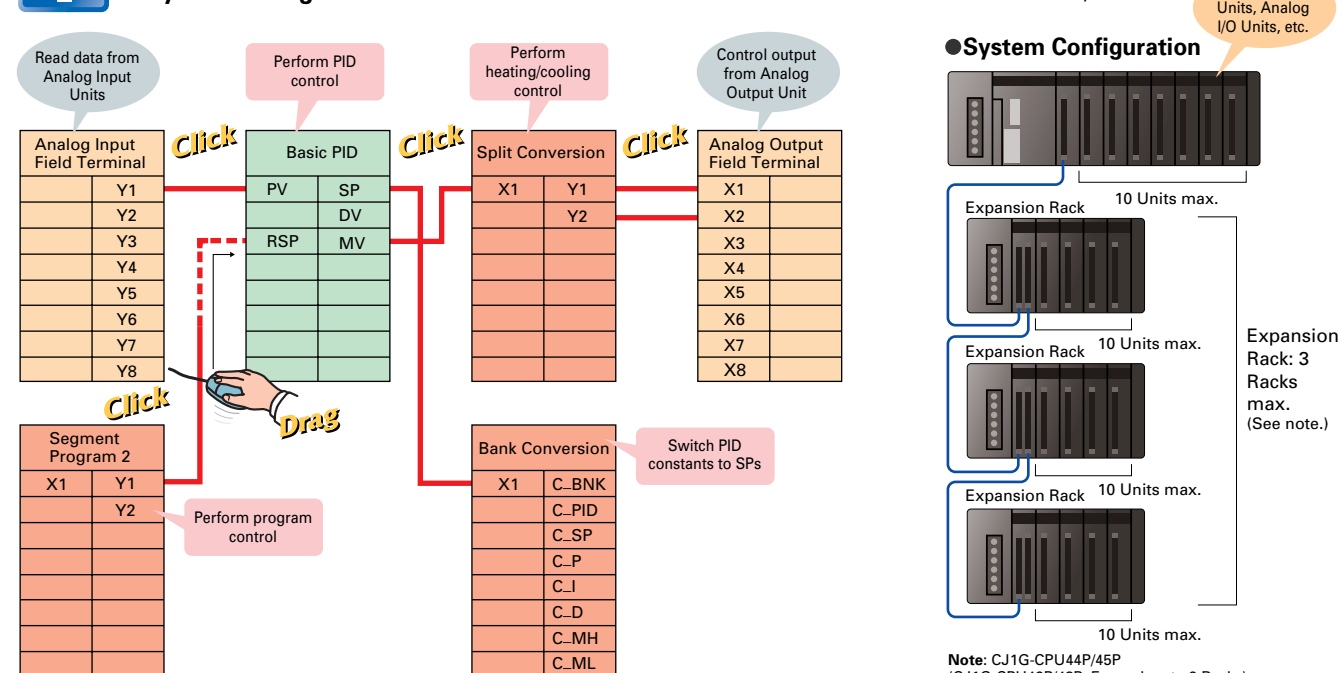
- Touch panel windows are automatically generated.



**Expandability** Lineup includes low-cost models that use up to 50 function blocks and models that allow up to 300 blocks designed for large-scale systems and complicated operations.



- **Loop control:** Programming with function blocks to suit the application.
- **System configuration:** Choose and combine functions from a broad selection of I/O Units.



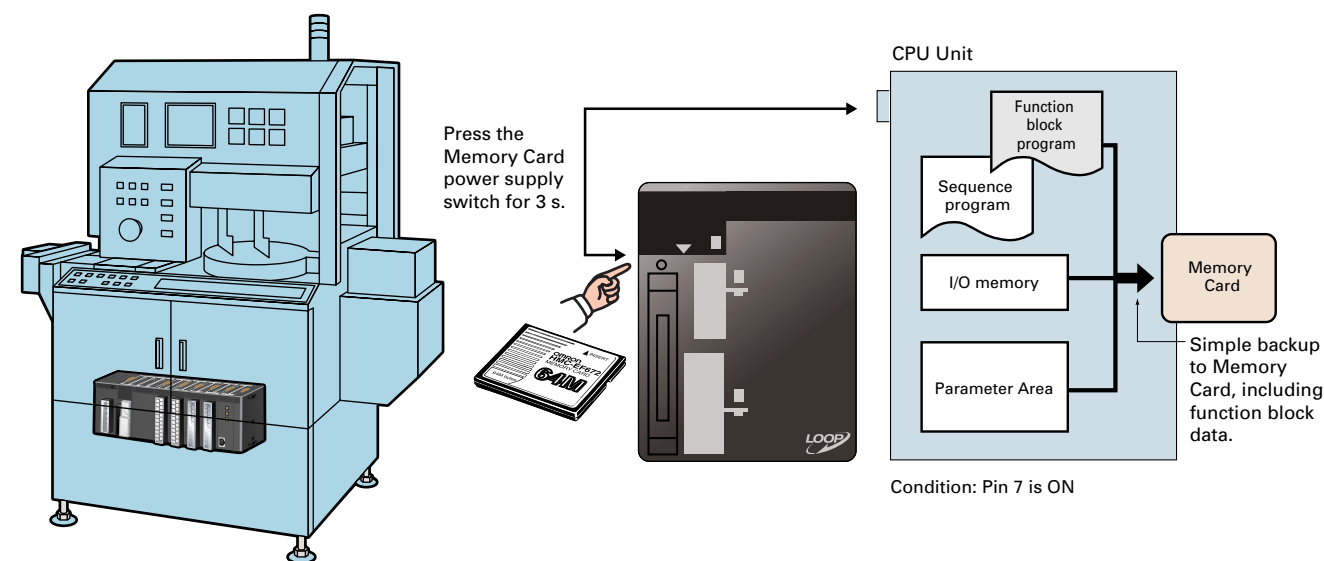
Note: CJ1G-CPU44P/45P  
(CJ1G-CPU42P/43P: Expand up to 2 Racks)

## Maintenance

Simply turn the DIP Switch ON/OFF to save or read the user program including function blocks using the Memory Card.



- Simple backup function enables backup, recovery, and comparison of all PLC data including the function block programs for the Loop Control Board using the Memory Card.
- Save tag settings, comments, annotations, and connection data created using the CX-Process Tool to either a Memory Card or a Loop-control CPU Unit. Note: Supported by unit version 3.0 or later.



## Results

Consolidating OMRON's expertise in temperature and process control cultivated over many years to provide you with effortless solutions using proven algorithms.



- **Loop control:** Proven functionality of Temperature Controllers and CS-series Loop Control Boards (see note 1) in a compact size.

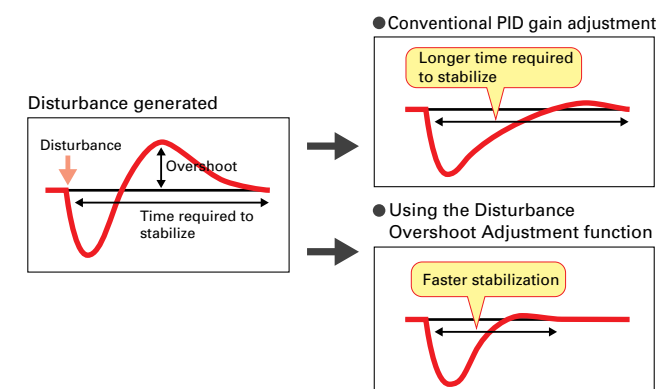
## New Algorithm Further Enhances Control Stability

### Disturbance Overshoot Adjustment

This function restrains overshoot when a disturbance is generated, allowing faster stabilization.

[Example]

- Temperature drops when adding objects to a furnace
- Control disturbances when retooling

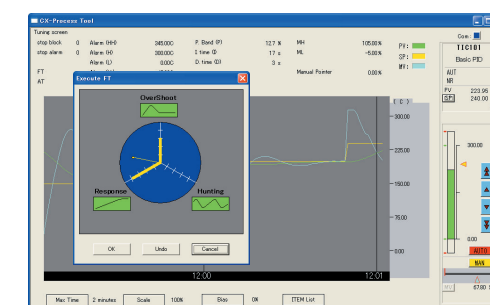


## Optimum Tuning to Suit the Application

### Fine Tuning

Adjust PVs, SPs, and MVs while monitoring, and save data as CSV files from the software tuning window. Autotuning (AT) and fine-tuning functions can also be used for automatically calculating PID constants (see note 2).

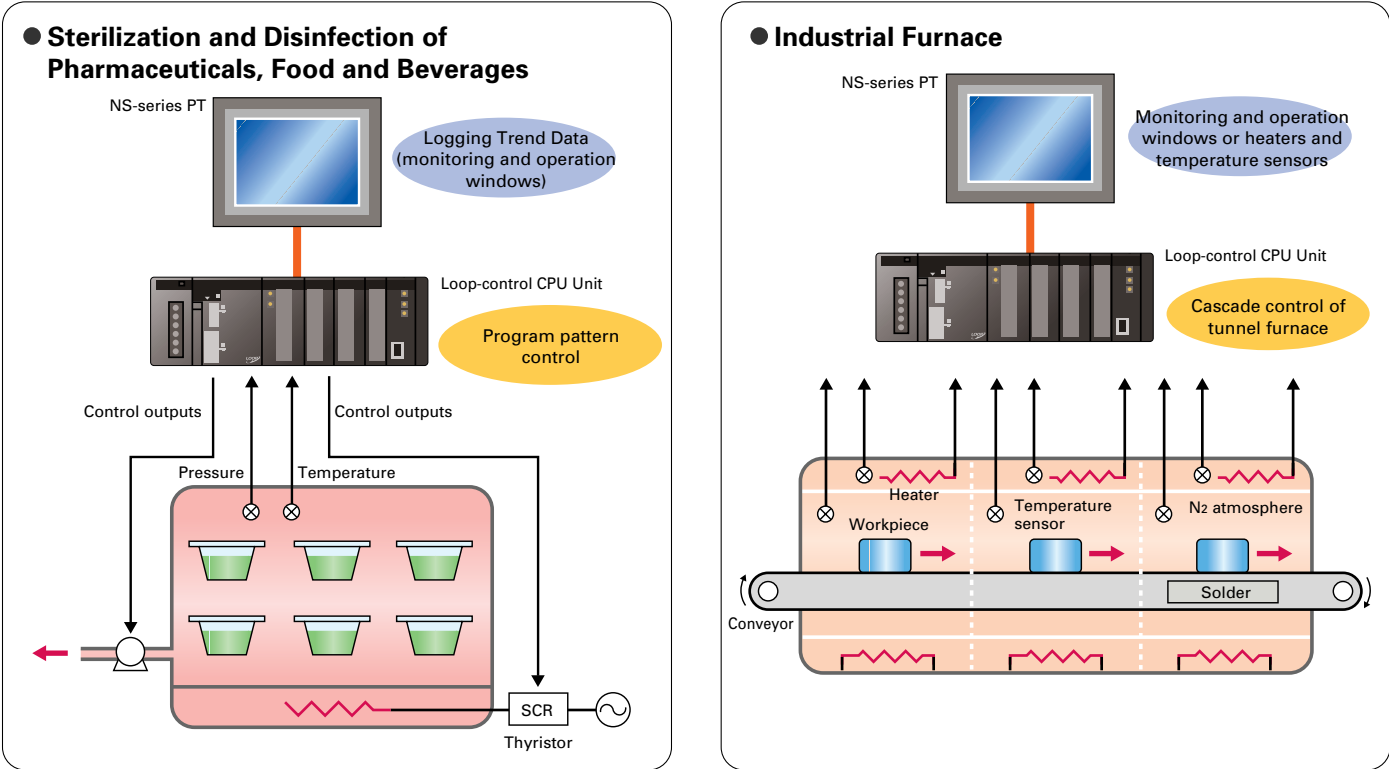
- Note 1: For details on CS-series Loop Control Boards, refer to the PLC-based Process Control Catalog (Cat. No. P051).
- 2: Control can be fine-tuned by automatically tuning PID parameters using previous control parameters and three user-set requirements to execute fuzzy logic.



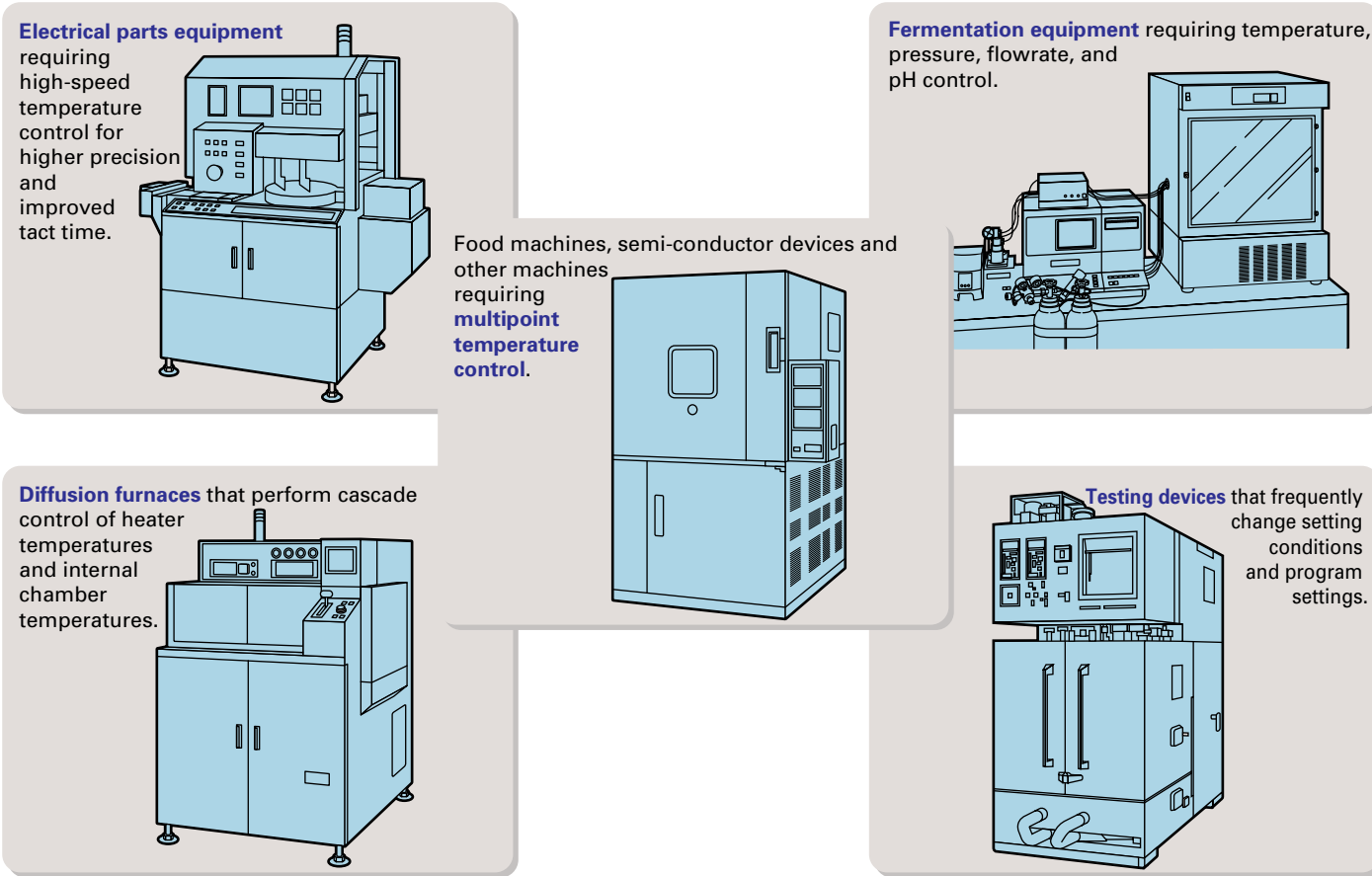
CS-Process Tool Tuning Window

# Applications

The Loop-control CPU Unit Provides You with Solutions for the Complex and Advanced Functions Demanded by Control Devices in an Increasingly Diverse Range of Equipment.



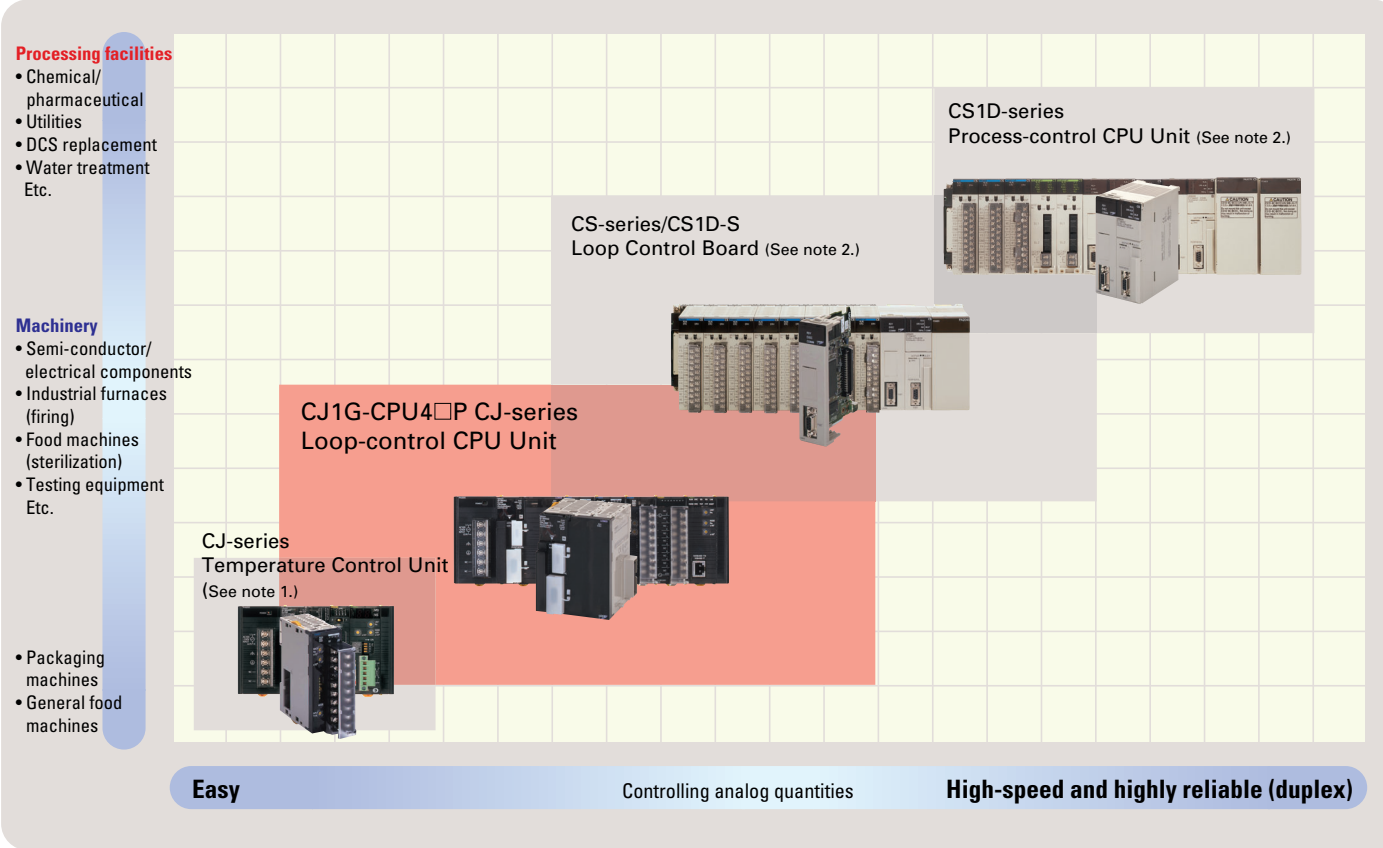
## Providing Solutions to Other Problems



# Loop Control Machines and Product Variations

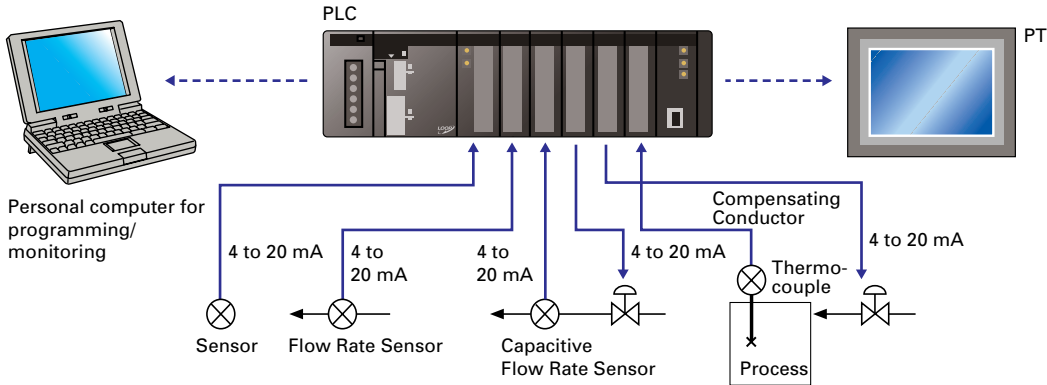
## Model Selection

Compact CJ-series Loop-control CPU units are ideal for equipment with built-in applications. CS-series and CS1D models designed for duplex systems are also available for processing equipment that requires high reliability.



**Note 1:** The Temperature Control Unit integrates control and I/O for either 2 loops or 4 loops. Temperature control is achieved simply by setting parameters. (CX-Process cannot be used.)  
**Note 2:** For details on CS-series Loop Control Boards and Process-control CPU Units, refer to the PLC-based Process Control Catalog (Cat. No. P051).

## System Configuration Example



## Example of Peripheral Devices

| Temperature Sensors                                                                                          | Input                                                                        | Control                                 | Output                                                                                                                                           |                                             |
|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| E52<br>Thermocouples<br>Platinum-resistance<br>Thermometers                                                  | CJ1W-P□□□<br>Analog Process<br>Input Unit<br>CJ1W-AD□□□<br>Analog Input Unit | CJ1G-CPU□□P<br>Loop-control<br>CPU Unit | CJ1W-DA□□□<br>Analog Output Unit<br>(linear output)<br>CJ1W-OD□□□<br>Transistor Output Unit<br>(pulse output)<br>CJ1W-OC□□□<br>Relay Output Unit | • Position Control<br>G3PX Power Controller |
| Analog quantities (e.g., temperature,<br>flowrate, concentration)                                            |                                                                              |                                         | RS-485 communications:<br>Built-in serial port on CPU Unit<br>CJ1W-SCU□1-V1                                                                      | • Cycle Control<br>G32A-EA + G3PA           |
| ES1/ES1B<br>Infrared Thermosensors<br>Flow Rate Sensors,<br>Displacement Sensors,<br>Signal Converters, etc. |                                                                              |                                         |                                                                                                                                                  | • SSR<br>G3PA/B/C, G3NA, etc.               |
|                                                                                                              |                                                                              |                                         |                                                                                                                                                  | • ON/OFF Control                            |
|                                                                                                              |                                                                              |                                         |                                                                                                                                                  | • Optimum Cycle Control<br>G3ZA             |

SYMAC CJ Series

# Peripheral Devices

## Input Devices

### E52-series Temperature Controllers

Plenty of Variation to Suit an Extensive Range of Applications

- Select from a variety of choices in number of elements, shape, protective tubing length, and terminal type.
- Economical models and special models are available as well as general-purpose models. Select from a diverse range of models to suit the application: Models for high temperatures, metal patterns, surface measurement, and room temperatures, waterproof and anti-corrosive models, models for moving parts, and models with double elements.

■ **Model Structure**

**E52-①②③ D=④ ⑤ M**

① Element type                      ④ Protective tubing model  
② Protective tubing length      ⑤ Lead wire length  
③ Terminal type

Example: **E52-CA185A D:3.2 2M**



### ES1/ES1B-series Infrared Thermosensors

Hygienic temperature measurement without damaging the workpiece. Ideal for workpieces on conveyors or other applications in which contact measurement is difficult.

- ES1 Series: Designed for high-precision, small-spot, high-temperature measurements.
- Two types of small spot: 3-mm dia. and 8-mm dia.
- High-precision and high-speed measurement with a repeatability of  $\pm 0.5^{\circ}\text{C}$  and response speed of 0.4 s (95%).
- Models are available for medium ( $-500$  to  $500^{\circ}\text{C}$ ), mid-low ( $-50$  to  $500^{\circ}\text{C}$ ), and high ( $0$  to  $1000^{\circ}\text{C}$ ) temperature ranges.



## Output Devices

### G3PX-series Power Controllers

Single-phase Power Controller for phase control systems requiring precision temperature control. Models with base up and soft start functions also available.

■ **Model Structure**

**G3PX-□□□□-CT□**                      Example: **G3PX-220EUN-CT03**

①   ②   ③   ④   ⑤

① Load power supply voltage      ③ Phase                                      ⑤ Current transformer types  
2: 200/220 V                              D: Three-phase                              03: 30-cm lead  
② Load current                              ④ Function classification              10: 1-m lead  
20: 20 A                                      UN: Single function  
40: 40 A                                      H: Heater burnout detection  
60: 60 A                                      HN: Multiple heater burnout detection  
                                                            C: Constant current

\*Three-phase Power Controllers are also available.



### G3PA/B/C Power Solid-state Relay

**G3PA New Power Solid-state Relay**

- Dielectric strength of 4,000 VAC with a super slim profile and built-in heat sink
- Mount either using screws or DIN Track.

**G3PB Three-phase Solid-state Relay (Contactor)**

- Upgraded heat sink saves space and labor costs.
- 480-VAC models for a broad range of applications.

**G3PC SSR with Failure Detection Function**

- Detects SSR failure, which is difficult to identify in heater temperature control, and outputs alarm signals simultaneously.
- Contributing to safe design and improved maintenance of heater control systems.



For details, refer to the Temperature Controllers Selection Guide (Cat. No. Y101).

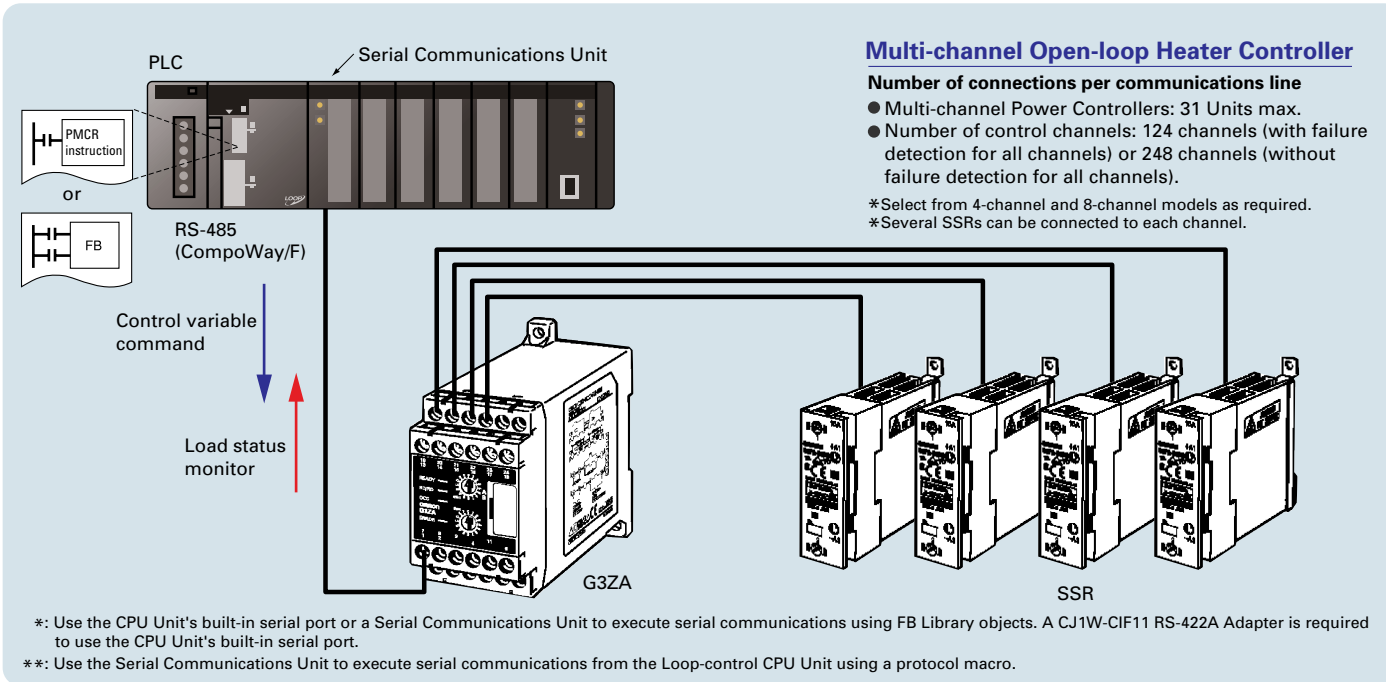
# New Products

## G3ZA Multi-channel Power Controller Catalog No.: J147

Multi-channel Power Controller with Zero-cross SSRs. Receives MVs from the PLC Using RS-485 Serial Communications (via FB\* or Protocol Macro\*\*), and Controls the Heater Power with High Precision Using the SSR.

●**Optimum Cycle Control for High-precision Control with Low Noise**  
Delay control: Energy-efficient, enabling equipment downsizing by using the peak current cut method, which delays the output timing between channels.  
Control variable conversion: Enables processing and output of input control quantities using the internal gradient and internal offset settings.

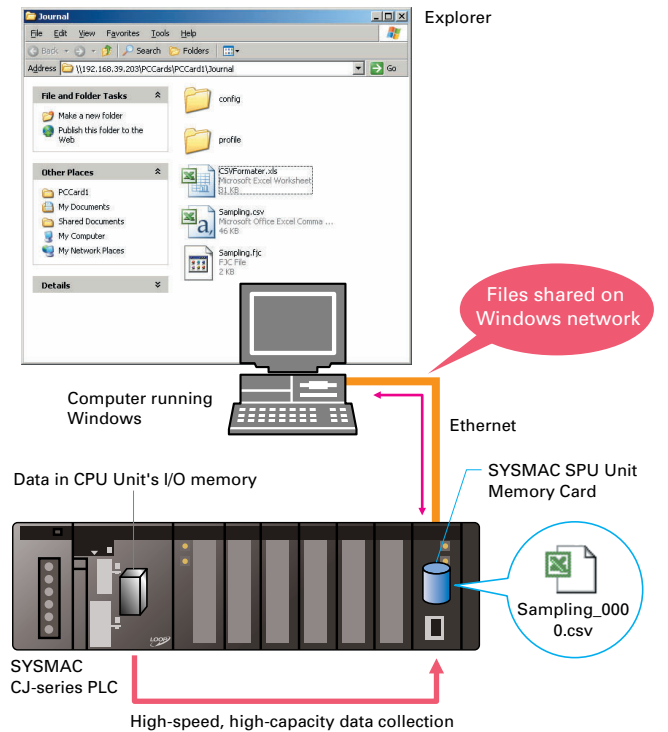
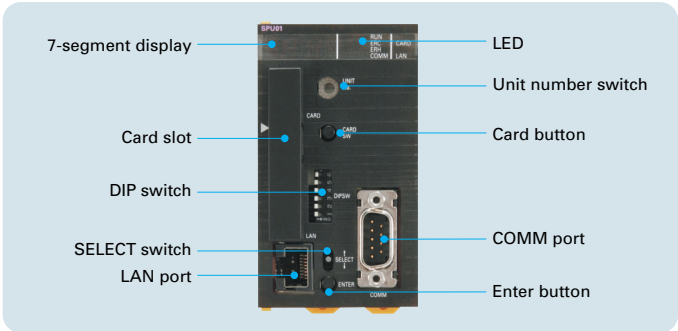
●**Smaller than a Normal Power Controller**  
Same height as G3PA and G3PB, enabling smaller panels and saving space. One Controller can control up to 8 SSRs.  
Models with 8 channels (control points) or with 4 channels and heater burnout detection are available.  
RS-485 communications to set manipulated variables and heater burnout detection.



## CJ1W-SPU01 SYSMAC SPU Unit Catalog No.: V301

The SPU Unit can read the PLC's I/O memory using specific data collection methods, and record the data in CSV files.

- Record Production Histories, Inspection Data, and Process Data**
- Data can be collected by environment-resistant PLC Units, without using a personal computer.
- Because the Unit has a direct bus connection to the PLC and does not require communications, it can collect large quantities of data at high speed.
- Data can be collected by means of a simple settings, with no need to alter the ladder program.
- Collecting Data on Equipment Operation to Analyze Errors and Detect Operating Trends**
- Data collection settings can be changed and collection can be restarted without stopping the PLC.
- Files can be created in the desired data structure for only the required data in the PLC.
- Sampling Mode can be selected for high-speed, detailed sampling, or Data Storage Mode can be selected for data collection at specified times or when a specified events occur.



# Loop-control CPU Units

## Loop-control CPU Units

| Model       | CPU Unit element                     |                  |                                                        |                                   | Loop Controller element   |                      |
|-------------|--------------------------------------|------------------|--------------------------------------------------------|-----------------------------------|---------------------------|----------------------|
|             | I/O bit capacity                     | Program capacity | Data memory capacity                                   | Programming software              | Number of function blocks | Programming software |
| CJ1G-CPU45P | 1,280 bits (Up to 3 Expansion Racks) | 60 Ksteps        | 128 K words (DM: 32 K words, EM: 32 K words × 3 banks) | CX-Programmer, CX-Simulator, etc. | 300 blocks                | CX-Process           |
| CJ1G-CPU44P |                                      | 30 Ksteps        |                                                        |                                   |                           |                      |
| CJ1G-CPU43P | 960 bits (Up to 2 Expansion Racks)   | 20 Ksteps        | 64 K words (DM: 32 K words, EM: 32 K words × 1 bank)   |                                   | 50 blocks                 |                      |
| CJ1G-CPU42P |                                      | 10 Ksteps        |                                                        |                                   |                           |                      |

## Loop Controller Element Specifications

| Item                                                         |                                       | Specification                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name</b>                                                  |                                       | Loop-control CPU Unit                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Model Number</b>                                          |                                       | CJ1G-CPU□□P                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Applicable PLCs</b>                                       |                                       | CJ-series PLCs                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Area for data exchange with CPU Unit</b>                  | <b>CPU Unit's Auxiliary Area</b>      | <ul style="list-style-type: none"> <li>Loop Controller element-to-CPU Unit element: Run Status Flag, PV Error Input Flag, MV Error Input Flag, Execution Error Flag, Function Block Database (RAM) Error Flag, Automatic Cold Start Execution Flag, Backup during Operation Flag, Function Block Changed Flag, etc.</li> <li>CPU Unit element-to-Loop Controller element: Start Mode at Power ON: Hot/Cold Start bit.</li> </ul> |
|                                                              | <b>User allocations in I/O Memory</b> | User link tables are used to allocate function block ITEM data in any part of I/O memory in the CPU Unit. (CIO, Work, Holding, or DM Areas, or EM Area bank 0)                                                                                                                                                                                                                                                                   |
|                                                              | <b>Allocations for all data</b>       | HMI function used to allocate function block ITEM data for Control, Operation, External Controller, and System Common blocks in the specified bank of the EM Area in the CPU Unit.                                                                                                                                                                                                                                               |
| <b>Settings</b>                                              |                                       | None                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Indicators</b>                                            |                                       | Two LED indicators: RUN and ready                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Super capacitor backup data</b>                           |                                       | All function block data (including sequence tables, step ladder program commands), stored error log data                                                                                                                                                                                                                                                                                                                         |
| <b>Super capacitor backup time</b>                           |                                       | 5 minutes at 25°C                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Data stored in flash memory</b>                           |                                       | Function block data                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Backup from RAM to flash memory</b>                       |                                       | Executed from CX-Process Tool (as required).                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Recovery from flash memory to RAM</b>                     |                                       | Automatically transferred when power to CPU Unit is turned ON if startup mode is set for a cold start, or executed from CX-Process Tool (as required).                                                                                                                                                                                                                                                                           |
| <b>Influence on CPU Unit cycle time</b>                      |                                       | 0.8 ms max. (depends on function block data contents)                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Current consumption (supplied from Power Supply Unit)</b> |                                       | 1.06 A for 5 VDC (current consumption for Loop-control CPU Unit including CPU Unit element and Loop Controller element)<br><b>Note:</b> Increased by 150 mA when NT-AL001 Link Adapter is used.                                                                                                                                                                                                                                  |

# Loop Controller Element Specifications

| Item                                                 |                              |                                                                                                                                                                                                  | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
|------------------------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------|-----------------|-------------------------|--------|----------|-------|--------------------------|--------|---------------------|-------|--------|---------------------|-----|-------|----------------------|-----|
| Model                                                |                              |                                                                                                                                                                                                  | CJ1G-CPU42P                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CJ1G-CPU43/44/45P                                                                                                                                          |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| Operation method                                     |                              |                                                                                                                                                                                                  | Function block method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| Loop Controller element                              |                              |                                                                                                                                                                                                  | LCB01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | LCB03                                                                                                                                                      |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| Function block analog operations                     | Control and operation blocks | PID and other control functions, square root operation, time operations, pulse train operation, and other operation functions for various processes.                                             | 50 blocks max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 300 blocks max.                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| Sequence control                                     | Step ladder program blocks   | Logic sequence and step sequence functions                                                                                                                                                       | 20 blocks max.<br>2,000 commands total<br>100 commands max. per block<br>Separable into 100 steps max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 200 blocks max.<br>4,000 commands total<br>100 commands max. per block<br>Separable into 100 steps max.                                                    |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| I/O blocks                                           | Field terminal blocks        | Analog I/O function with Analog I/O Unit, contact I/O function with Basic I/O Unit                                                                                                               | 30 blocks max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | CJ1G-CPU43P: 30 blocks max.<br>CJ1G-CPU44/45P: 40 blocks max.                                                                                              |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
|                                                      | User link tables             | Analog data I/O and contact data I/O function for CPU Unit                                                                                                                                       | 2,400 data items max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
|                                                      | HMI function                 | I/O function for the specified bank of the EM Area in the CPU Unit for function block ITEM data used for Control, Operation, External Controller, and System Common blocks for the HMI function. | Allocated 1 EM Area bank<br>Operation and Control blocks:<br>50 blocks max. × 20 send/receive words<br><br>System Common blocks:<br>20 send/receive words                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Allocated 1 EM Area bank<br>Operation and Control blocks:<br>300 blocks max. × 20 send/receive words<br><br>System Common blocks:<br>20 send/receive words |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
|                                                      | System Common block          | System common operation cycle setting, run/stop command, load rate monitor, etc.                                                                                                                 | Single block                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| Method for creating and transferring function blocks |                              |                                                                                                                                                                                                  | Created using CX-Process Tool (purchased separately) and transferred to Loop Controller.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| External I/O response time                           |                              |                                                                                                                                                                                                  | The time from external input of analog signals up to external output of analog signals on a single control loop depends on the function block's operation cycle and the CPU Unit's cycle time.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| Operation cycle                                      |                              |                                                                                                                                                                                                  | 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, or 2 s (default: 1 s) (See note.)<br>Can be set for each function block.<br><b>Note:</b> 0.01, 0.02, and 0.05 s cannot be set for some blocks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| Internal operation                                   |                              | Number of control loops                                                                                                                                                                          | <div>• The maximum number of loops that can be used if the LCB load rate is 80% for a standard applications (e.g., with each loop consisting of one Ai4 Terminal, Segment Linearizer, Basic PID, and A04 terminal) is shown in the following table.</div> <table><tr><th>Operation cycle</th><th>Maximum number of loops</th><th>Operation cycle</th><th>Maximum number of loops</th></tr><tr><td>0.01 s</td><td>20 loops</td><td>0.2 s</td><td rowspan="4">150 loops<br/>(See note.)</td></tr><tr><td>0.02 s</td><td>35 loops (see note)</td><td>0.5 s</td></tr><tr><td>0.05 s</td><td>70 loops (see note)</td><td>1 s</td></tr><tr><td>0.1 s</td><td>100 loops (see note)</td><td>2 s</td></tr></table> <div><b>Note:</b> Loop Controller element LCB01: 25 loops max.</div> |                                                                                                                                                            | Operation cycle | Maximum number of loops | Operation cycle | Maximum number of loops | 0.01 s | 20 loops | 0.2 s | 150 loops<br>(See note.) | 0.02 s | 35 loops (see note) | 0.5 s | 0.05 s | 70 loops (see note) | 1 s | 0.1 s | 100 loops (see note) | 2 s |
| Operation cycle                                      | Maximum number of loops      | Operation cycle                                                                                                                                                                                  | Maximum number of loops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| 0.01 s                                               | 20 loops                     | 0.2 s                                                                                                                                                                                            | 150 loops<br>(See note.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| 0.02 s                                               | 35 loops (see note)          | 0.5 s                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| 0.05 s                                               | 70 loops (see note)          | 1 s                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| 0.1 s                                                | 100 loops (see note)         | 2 s                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| Control method                                       |                              | PID control method                                                                                                                                                                               | PID with 2 degrees of freedom                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
|                                                      |                              | Control combinations                                                                                                                                                                             | Any of the following function blocks can be combined:<br>Basic PID control, cascade control, feed-forward control, sample PI control, Smith dead time compensation control, PID control with differential gap, override control, program control, time-proportional control, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
| Alarms                                               |                              | PID block internal alarms                                                                                                                                                                        | 4 PV alarms (upper upper-limit, upper limit, lower limit, lower lower-limit) and 1 deviation alarm per PID block                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |
|                                                      |                              | Alarm blocks                                                                                                                                                                                     | High/low alarm blocks, deviation alarm blocks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                            |                 |                         |                 |                         |        |          |       |                          |        |                     |       |        |                     |     |       |                      |     |

# List of Function Blocks

## System Common Block

| Type | Block Name    | Function                                                                         |
|------|---------------|----------------------------------------------------------------------------------|
| ---  | System Common | Makes settings common to all function blocks and outputs signals for the system. |

## Control Blocks

| Type       | Block Name                           | Function                                                                                                                                     |
|------------|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Controller | 2-position ON/OFF (See note.)        | 2-position type ON/OFF controller                                                                                                            |
|            | 3-position ON/OFF (See note.)        | 3-position type ON/OFF controller for heating/cooling ON/OFF control                                                                         |
|            | Basic PID (See note.)                | Performs basic PID control.                                                                                                                  |
|            | Advanced PID (See note.)             | Performs advanced PID control for enabling deviation/MV compensation, MV tracking, etc.                                                      |
|            | Blended PID                          | Performs PID control on the cumulative value (cumulative deviation) between the accumulated value PV and accumulated value Remote Set Point. |
|            | Batch Flowrate Capture               | Functions to open the valve at a fixed opening until a fixed batch accumulated value is reached.                                             |
|            | Fuzzy Logic                          | Outputs up to 2 analog outputs based on fuzzy logic performed on up to 8 analog inputs.                                                      |
|            | Indication and Setting (See note.)   | Manual setter with PV indication and SP setting functions                                                                                    |
|            | Indication and Operation (See note.) | Manual setter with PV indication and MV setting functions                                                                                    |
|            | Ratio Setting (See note.)            | Ratio and bias setter with PV indication and ratio setting function                                                                          |
|            | Indicator (See note.)                | PV indicator with PV alarm                                                                                                                   |

## Operation Blocks

| Type                           | Block Name                                      | Function                                                                                                                                                        |
|--------------------------------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Alarm/Signal restrictions/Hold | High/Low Alarm (See note.)                      | Provides the alarm contact outputs for the high and low limits of single analog signals.                                                                        |
|                                | Deviation Alarm (See note.)                     | Provides the alarm contact outputs for the deviation of two analog signals.                                                                                     |
|                                | Rate-of-change Operation and Alarm (See note.)  | Provides the alarm contact outputs for the high and low limits of rate-of-change operation when the analog signal rate-of-change is output.                     |
|                                | High/Low Limit (See note.)                      | Limits the high and low limits of single analog signals.                                                                                                        |
|                                | Deviation Limit (See note.)                     | Calculates the deviation between two analog signals, and limits the deviation within that range.                                                                |
|                                | Analog Signal Hold (See note.)                  | Holds the maximum, minimum or instantaneous value of single analog signals.                                                                                     |
| Arithmetic                     | Addition or Subtraction (See note.)             | Performs addition/subtraction with gain and bias on up to 4 analog signals.                                                                                     |
|                                | Multiplication (See note.)                      | Performs multiplication with gain and bias on up to 2 analog signals.                                                                                           |
|                                | Division (See note.)                            | Performs division with gain and bias on up to 2 analog signals.                                                                                                 |
|                                | Arithmetic Operation (See note.)                | Performs various math operation (trigonometric, logarithmic, etc.) on floating-point decimal values converted (to industrial units) from up to 8 analog inputs. |
|                                | Range Conversion (See note.)                    | Easily converts up to 8 analog signals simply by inputting the 0% and 100% input values and 0% and 100% output values.                                          |
|                                | Functions                                       |                                                                                                                                                                 |
| Time Function                  | Square Root (See note.)                         | Performs square root extraction (with low end cut-out) on single analog signals.                                                                                |
|                                | Absolute Value (See note.)                      | Outputs the absolute value of single analog signals.                                                                                                            |
|                                | Non-linear Gain (Dead Band) (See note.)         | Performs non-linear (3 gain values) operation on single analog signals. Analog signals can also set as a dead band (with different gap).                        |
|                                | Low-end Cutout (See note.)                      | Sets output to zero close to the zero point of single analog signals.                                                                                           |
|                                | Segment Linearizer (See note.)                  | Converts single analog signals to 15 segments before the signals are output.                                                                                    |
|                                | Temperature and Pressure Correction (See note.) | Performs temperature and pressure correction.                                                                                                                   |
|                                | First-order Lag (See note.)                     | Performs first-order lag operation on single analog signals.                                                                                                    |
|                                | Rate-of-change Limit (See note.)                | Performs rate-of-change restriction on single analog signals.                                                                                                   |
|                                | Moving Average (See note.)                      | Performs moving average operation on single analog signals.                                                                                                     |
|                                | Lead/Delay (See note.)                          | Performs lead/delay operation on single analog signals.                                                                                                         |
|                                | Dead Time (See note.)                           | Performs dead time and first-order lag operations on single analog signals.                                                                                     |
|                                | Dead Time Compensation                          | Used for Smith's dead time compensation PID control.                                                                                                            |
|                                | Accumulator for instantaneous value input       | Accumulates analog signals, and outputs 8-digit accumulated value signals.                                                                                      |
|                                | Run Time Accumulator                            | Accumulates the operating time, and outputs the pulse signal per specified time.                                                                                |
|                                | Time Sequence Data Statistics (See note.)       | Records time sequence data from analog signals and calculates statistics, such as averages and standard deviations.                                             |
|                                | Ramp Program                                    | Ramp program setter for combining ramps for time and hold values.                                                                                               |
|                                | Segment Program                                 | Segment program setter setting the output values with respect to time.                                                                                          |
|                                | Segment Program 2                               | Segment program setting with wait function for setting the output values with respect to time.                                                                  |

**Note:** The Function Blocks dealing with high-speed operation (operation cycle: 0.01, 0.02, and 0.05 seconds is possible).

# List of Function Blocks

| Type                        | Block Name                               | Function                                                                                                                                                                                                    |
|-----------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Signal Selection/Switching  | Rank Selector (See note.)                | Selects the rank of up to 8 analog signals.                                                                                                                                                                 |
|                             | Input Selector (See note.)               | Selects the specified analog signals specified by the contact signal from up to 8 analog signals.                                                                                                           |
|                             | 3-input Selector (See note.)             | Selects and outputs one of three analog input signals.                                                                                                                                                      |
|                             | 3-output Selector (See note.)            | Outputs one analog input signal in three switched directions.                                                                                                                                               |
|                             | Constant Selector (See note.)            | Selects 8 preset constants by the contact signal.                                                                                                                                                           |
|                             | Constant Generator (See note.)           | Outputs 8 independent constants.                                                                                                                                                                            |
|                             | Ramped Switch                            | Switches two analog inputs (or constants) with a ramp.                                                                                                                                                      |
|                             | Bank Selector                            | Records the PID parameters (SP, P, I, D, MH, ML) in up to 8 sets in advance, and switches the PID parameter for Basic/Advanced/Blended PID Blocks according to the analog input range (zone) or input bits. |
| Constant ITEM Setting       | Split Converter                          | Inputs the MV from the Basic PID block or Advanced PID block, converts the MV into two analog outputs for V characteristics or parallel characteristics (e.g., MV for heating or cooling) and outputs them. |
|                             | Constant ITEM Setting (See note.)        | Writes the constant to the specified ITEM at the rising edge of the send command contact.                                                                                                                   |
|                             | Variable ITEM Setting (See note.)        | Writes the analog signal to the specified ITEM at the rising edge of the send command contact.                                                                                                              |
| Pulse Train Operation       | Batch Data Collector (See note.)         | Stores each of max. 8 analog inputs to buffer by a certain timing within sequential processing.                                                                                                             |
|                             | Accumulated Value Input Adder            | Adds up to four accumulated value signals.                                                                                                                                                                  |
|                             | Accumulated Value Analog Multiplier      | Multiplies analog signals by the accumulated value signals.                                                                                                                                                 |
|                             | Accumulator for accumulated value input  | Converts 4-digit accumulated value signals to 8 digits.                                                                                                                                                     |
|                             | Contact input/Accumulated value output   | Counts low-speed contact pulses, and outputs 8-digit accumulated signals.                                                                                                                                   |
| Others                      | Accumulated Value Input/Contact Output   | Converts 4-digit accumulated value signals to low-speed contact pulses before they are output.                                                                                                              |
|                             | Analog/Pulse Width Converter (See note.) | Changes the ON/OFF duration ratio in a constant cycle duration so that it is proportional to the analog signal.                                                                                             |
| Sequence Operation          | Contact Distributor                      | Connect contact signals between function blocks in a 1:1 connection.                                                                                                                                        |
|                             | Constant Comparator (See note.)          | Compares up to eight sets of analog signals and constants, and outputs the comparison results as contacts.                                                                                                  |
|                             | Variable Comparator (See note.)          | Compares up to eight pairs of analog signals, and outputs the comparison results as contacts.                                                                                                               |
|                             | Timer (See note.)                        | 2-stage output type addition timer for forecast values and reached values. Can also output the present value.                                                                                               |
|                             | ON/OFF Timer (See note.)                 | Timer for performing ON-OFF operation at preset ON and OFF times.                                                                                                                                           |
|                             | Clock Pulse (See note.)                  | Outputs a clock pulse at the setting time interval for a single operation cycle.                                                                                                                            |
|                             | Counter (See note.)                      | 2-stage output type addition timer for forecast values and arrival values. Can also output the current value.                                                                                               |
|                             | Internal Switch (See note.)              | Temporary storage contact for accepting relays in the Step Ladder Program block.<br><b>Note:</b> (One internal switch is already allocated as "temporary storage" in CX-Process Tool.)                      |
|                             | Level Check (See note.)                  | Checks an analog input for 8 levels and outputs a contact corresponding to the level. The level number is also output as an analog value at the same time.                                                  |
|                             | ON/OFF Valve Manipulator                 | Manipulates and monitors ON/OFF valves with open/close limit switches.                                                                                                                                      |
| Contact Type Control Target | Motor Manipulator                        | Manipulates and monitors motor operation.                                                                                                                                                                   |
|                             | Reversible Motor Manipulator             | Manipulates and monitors reversible motor operation.                                                                                                                                                        |
|                             | Motor Opening Manipulator                | Inputs a target opening, and manipulates an electric positional-proportional motor.                                                                                                                         |

**Note:** The Function Blocks dealing with high-speed operation (operation cycle: 0.01, 0.02, and 0.05 seconds is possible).

## Sequence Control

| Type | Block Name                      | Function                                              |
|------|---------------------------------|-------------------------------------------------------|
| ---  | Step Ladder Program (See note.) | Performs logic sequence and step progression control. |

## Field Terminals

| Type                    | Block Name                             | Function                                                                                                                                                                                    |
|-------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Contact I/O (See note.) | DI 8-point Terminal                    | Inputs 8 contacts from 8-point Input Unit.                                                                                                                                                  |
|                         | DI 16-point Terminal                   | Inputs 16 contacts from 16-point Input Unit.                                                                                                                                                |
|                         | DI 32-point Terminal                   | Inputs 32 contacts from 32-point Input Unit.                                                                                                                                                |
|                         | DI 64-point Terminal                   | Inputs 64 contacts from 64-point Input Unit.                                                                                                                                                |
|                         | DO 8-point Terminal                    | Outputs 8 contacts from 8-point Output Unit.                                                                                                                                                |
|                         | DO 16-point Terminal                   | Outputs 16 contacts from 16-point Output Unit.                                                                                                                                              |
|                         | DO 32-point Terminal                   | Outputs 32 contacts from 32-point Output Unit.                                                                                                                                              |
|                         | DO 64-point Terminal                   | Outputs 64 contacts from 64-point Output Unit.                                                                                                                                              |
|                         | DI 16-point/DO16-point Terminal        | Inputs and outputs 16 contacts each from 16-point Input/16-point Output Units.                                                                                                              |
|                         | AI 4-point Terminal (PTS51)            | Inputs 4 analog signals from CJ1W-PTS51 (Isolated-type Thermocouple Input Unit)                                                                                                             |
| Analog I/O (See note.)  | AI 4-point Terminal (PTS52)            | Inputs 4 analog signals from CJ1W-PTS52 (Isolated-type Temperature Resistance Input Unit).                                                                                                  |
|                         | AI 2-point Terminal (PTS15/16, PDC15)  | Inputs 2 analog signals from CJ1W-PTS15 (Isolated-type Thermocouple Input Unit), CJ1W-PTS16 (Isolated-type Temperature Resistance Input Unit), or CJ1W-PDC15 (Isolated-type DC Input Unit). |
|                         | AI 8-point Terminal (AD081)            | Inputs 8 analog signals from the CJ1W-AD081(-V1).                                                                                                                                           |
|                         | AO 8-point Terminal (DA08V/C)          | Outputs 8 analog signals from the CJ1W-DA08V/DA08C.                                                                                                                                         |
|                         | AI 4-point Terminal (AD041)            | Inputs 4 analog signals from the CJ1W-AD041(-V1).                                                                                                                                           |
|                         | AO 4-point Terminal (DA041)            | Outputs 4 analog signals from the CJ1W-DA041(-V1).                                                                                                                                          |
|                         | AO 2-point Terminal (DA021)            | Outputs 4 analog signals from the CJ1W-DA021.                                                                                                                                               |
|                         | AI 4-point/AO 2-point Terminal (MAD42) | Inputs 4 analog signals and outputs 2 analog signals each from the CJ1W-MAD42.                                                                                                              |
|                         | AI 4-point Terminal (DRT1-AD04)        | Inputs 4 analog signals from a DRT1-AD04 DeviceNet Slave Analog Input Unit.                                                                                                                 |
|                         | AO 2-point Terminal (DRT1-DA02)        | Outputs two analog signals from a DRT1-DA02 DeviceNet Slave Analog Output Unit.                                                                                                             |

# CX-Process Tool and Monitor

## Software Specifications

| Item                  |                                                                | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                           |
|-----------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
|                       |                                                                | CX-Process Tool                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CX-Process Monitor Plus                                                                                   |
| Name                  |                                                                | CX-Process                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | CX-Process Monitor Plus                                                                                   |
| Model number          |                                                                | WS02-LCTC1-EV5                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | WS02-LCMC1-E                                                                                              |
| Applicable PLCs       |                                                                | CS-series PLCs<br>CJ-series PLCs                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                           |
| Applicable Units      |                                                                | CJ-series Loop-control CPU Units<br>CS-series Loop Control Units/Boards<br>CS1D Process-control CPU Units                                                                                                                                                                                                                                                                                                                                                                                 | CJ-series Loop-control CPU Units<br>CS-series Loop Control Units/Boards<br>CS1D Process-control CPU Units |
| Compatible computers  | Computer                                                       | IBM PC/AT or compatible                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                           |
|                       | CPU                                                            | Minimum: Pentium 133 MHz min.<br>Recommended: Celeron 400 MHz min.                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                           |
|                       | OS                                                             | Microsoft Windows 2000 (Service Pack 3 or higher), NT4.0 (Service Pack 6a), 98SE, Me (See note 2), or XP                                                                                                                                                                                                                                                                                                                                                                                  | Microsoft Windows 2000, NT4.0 or XP                                                                       |
|                       | Memory                                                         | Minimum: 32 Mbytes<br>Recommended: 64 Mbytes min.                                                                                                                                                                                                                                                                                                                                                                                                                                         | Minimum: 96 Mbytes<br>Recommended: 128 Mbytes min.                                                        |
|                       | Hard disk storage                                              | Minimum: 50 Mbytes free space<br>Recommended: 100 Mbytes min. free space                                                                                                                                                                                                                                                                                                                                                                                                                  | Minimum: 400 Mbytes free space<br>Recommended: 500 Mbytes min. free space                                 |
|                       | Monitor                                                        | Minimum: XGA<br>Recommended: SXGA 65,536 colors or more                                                                                                                                                                                                                                                                                                                                                                                                                                   | Minimum requirement: XGA<br>(XGA or above recommended)                                                    |
|                       | CD-ROM drive                                                   | 1 drive min.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                           |
|                       | Sound board                                                    | ---                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1                                                                                                         |
|                       | Mouse                                                          | Recommended: Microsoft mouse or compatible pointing device                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                           |
| Communications method | Connection with CPU Unit (or Serial Communications Board/Unit) | When FinsGateway Serial Unit driver is used:<br>Communications protocol with PLC: Host Link Host Link (Peripheral Bus is not supported.) (See note 3.)<br>• Connect the computer to the peripheral port or built-in RS-232C port of the CPU Unit, or to the RS-232C port of the Serial Communications Board/Unit.<br>• Connecting cable:<br>For connecting to peripheral port of CPU Unit: CS1W-CN□□□ (2 m or 6 m)<br>For connecting to RS-232C port of CPU Unit: XW2Z-□□□-□ (2 m or 5 m) |                                                                                                           |
|                       |                                                                | When CX-Server is used:<br>Communications protocol with PLC: Host Link or Peripheral Bus<br>Connecting Cable:<br>• For connecting to peripheral port of CPU Unit: CS1W-CN□□□ (2 m or 6 m)<br>For connecting to RS-232C port of CPU Unit: XW2Z-□□□-□ (2 m or 5 m)                                                                                                                                                                                                                          | CX-Server is not supported.                                                                               |
|                       | Connection via Controller Link                                 | When FinsGateway Controller Link driver or CX-Server is used:<br>Install the software in a computer with a Controller Link Support Board to communicate with a PLC with a Controller Link Unit mounted.                                                                                                                                                                                                                                                                                   |                                                                                                           |
|                       | Connection via Ethernet                                        | When FinsGateway ETN_UNIT driver or CX-Server is used:<br>Install the software in a computer with an Ethernet Board to communicate with a PLC with an Ethernet Unit mounted.                                                                                                                                                                                                                                                                                                              |                                                                                                           |

| Item              | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Offline functions | ITEM data settings for function blocks <ul style="list-style-type: none"> <li>• Software connections for analog signals</li> <li>• Displaying and printing text strings (annotation) pasted on function block diagrams and ladder diagrams.</li> <li>• Instructions for step ladder blocks and commands for sequence table blocks</li> <li>• Tag settings for CX-Process Monitor</li> </ul>                                                                                                                                                                                                                                                                                                   | Construction of user screens                                                                                                                                                                                                                                                                                                                                                             |
| Online functions  | <ul style="list-style-type: none"> <li>• Transfer of function block data (Downloading/Uploading for Loop Control Boards/Units.)</li> <li>• Starting/stopping all function blocks (LCU/LCB)</li> <li>• Monitoring system operation: Monitoring and controlling the System Common block (including LCB/LCU load rates)</li> <li>• Validating LCB/LCU operation: Checking function block connections (including starting and starting individual function blocks), validating ladder diagrams and sequence tables, and monitoring ITEMS</li> <li>• Tuning PID constants and other parameters (fine tuning and autotuning)</li> <li>• Initialization of Loop Control Unit memory (RAM)</li> </ul> | User screens <ul style="list-style-type: none"> <li>• Overview screen</li> <li>• Control screen</li> <li>• Tuning screen</li> <li>• Trend screen</li> <li>• Graphic screen</li> <li>• Operating guide message screen</li> </ul> System screens <ul style="list-style-type: none"> <li>• Alarm history screen</li> <li>• System monitor screen</li> <li>• Operation log screen</li> </ul> |

- Note:** 1. The CX-Process functions that can be used depend on the version. For details, refer to the operation manuals (Cat. No.: W372-E1-□ and W373-E1-□).
2. When using Windows Me, the CPU must be a Pentium 150 MHz or higher.
3. Peripheral Bus cannot be used when FinsGateway V3 is used.

## Connections to PLC

The following 4 methods can be used to connect to a PLC.

| Communications network |                                                                                            | Communication driver                                 |                                        |                         |
|------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------|-------------------------|
|                        |                                                                                            | FinsGateway V3                                       | FinsGateway Version 2003 (See note 1.) | CX-Server V2.2          |
| Host Link              | Connection via PLC's peripheral port or RS-232C port                                       | Supported (Serial Unit version is used.)             |                                        | Supported (See note 2.) |
| Peripheral Bus         |                                                                                            | Not supported                                        | Supported                              | Supported (See note 2.) |
| Controller Link        | Connection to PLC with Controller Link Unit via Controller Link Support Board (PCI board). | Supported (See note 3.) (CLK (PCI) version is used.) |                                        | Supported               |
|                        | Connection to PLC with Controller Link Unit via Controller Link Support Board (ISA board). | Supported (CLK (ISA) version is used.)               |                                        | Supported               |
| Ethernet               | Connection to PLC with Ethernet Unit via Ethernet Board.                                   | Supported (Ethernet version is used.)                |                                        | Supported               |

- Note:** 1. The Windows 2000 and XP operating systems are supported. (Windows 95, 98, and Me are not supported.)
2. When CX-Server is used for communications, CX-Programmer can be simultaneously connected via the same COM port.
3. The Windows 95 operating system cannot be used.

# Utility Software

## Touch Panel Software

### ■ Face Plate Auto-Builder for NS

Simply specify the CSV tag file created using the CX-Process Tool to automatically create a project constructed with a Face Plate for Loop-control CPU Units for use with OMRON's NS-series Programmable Terminals.

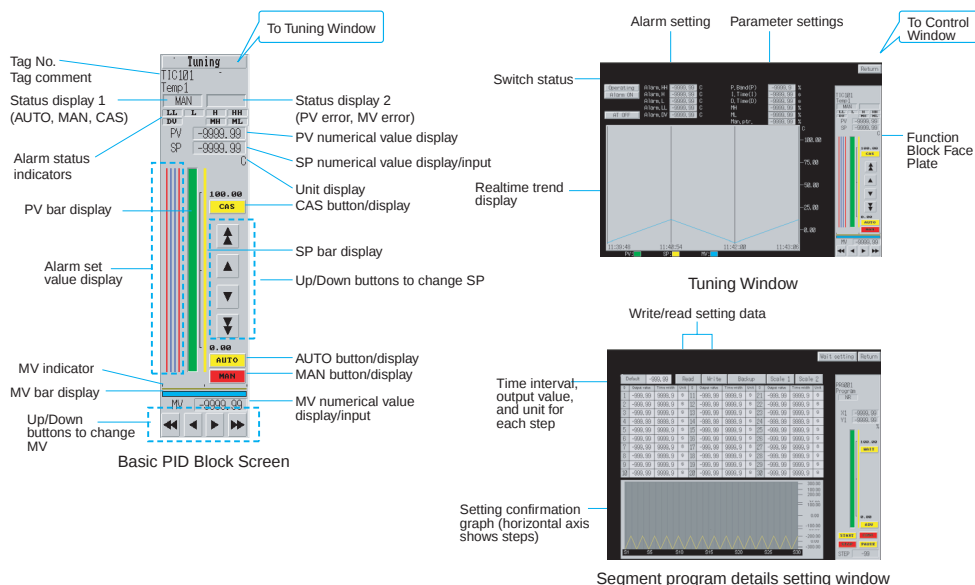
#### Function Overview

- Create windows for monitoring and tuning PID and other function blocks for up to 100 loops (NS System version 4 or higher).
- NS project files for monitoring multiple Loop-control CPU Units from a single NS-series PT can be generated from CX-Process projects for up to 32 multiple nodes.
- When a Segment Program 2 function block is used for program operation, the Detailed Setting Windows (Time Interval vs. Output Value Setting Window, Wait Interval Setting Window) used for the parameter settings are also automatically generated.

#### Basic Specifications

| Item                    |                   | Specifications                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                    |                   | Face Plate Auto-Builder for NS                                                                                                                                                                                                                                                                                                                                                                                           |
| Model number            |                   | WS02-NSFC1-EV2                                                                                                                                                                                                                                                                                                                                                                                                           |
| Applicable PLC products |                   | CJ-series Loop-control CPU Units<br>CS-series Loop Control Boards (unit version 1.0 or later)<br>CS-series Loop Control Units (unit version 2.0 or later)<br>CS1D Process-control CPU Units                                                                                                                                                                                                                              |
| Applicable PTs          |                   | NS-series NS12, NS10, and NS8 (PT version 2.0 or later)<br>CX-Designer                                                                                                                                                                                                                                                                                                                                                   |
| System requirements     | Computer          | IBM PC/AT or compatible                                                                                                                                                                                                                                                                                                                                                                                                  |
|                         | CPU               | Celeron 400 MHz or better recommended                                                                                                                                                                                                                                                                                                                                                                                    |
|                         | OS                | Microsoft Windows 95 (see note.), 98, Me, NT4.0, 2000, or XP                                                                                                                                                                                                                                                                                                                                                             |
|                         | Memory            | Recommended: 32 Mbytes min.                                                                                                                                                                                                                                                                                                                                                                                              |
|                         | Hard disk storage | Recommended: 200 Mbytes free space min.                                                                                                                                                                                                                                                                                                                                                                                  |
|                         | Monitor           | Minimum: 640 x 480 dots                                                                                                                                                                                                                                                                                                                                                                                                  |
| Basic functions         |                   | Number of generated loops: 100 max., control windows and tuning windows<br>Applicable face plates: 2-position ON/OFF, 3-position ON/OFF, Basic PID, Advanced PID, Indication and Operation, Indicator, Segment Program 2 (includes the parameter setting windows)<br>Number of loops in control windows: 6 loops per window for NS12, 4 loops per window for NS10/NS8<br>Realtime trend in tuning window: 1-second cycle |

#### Example of Automatically Created Windows



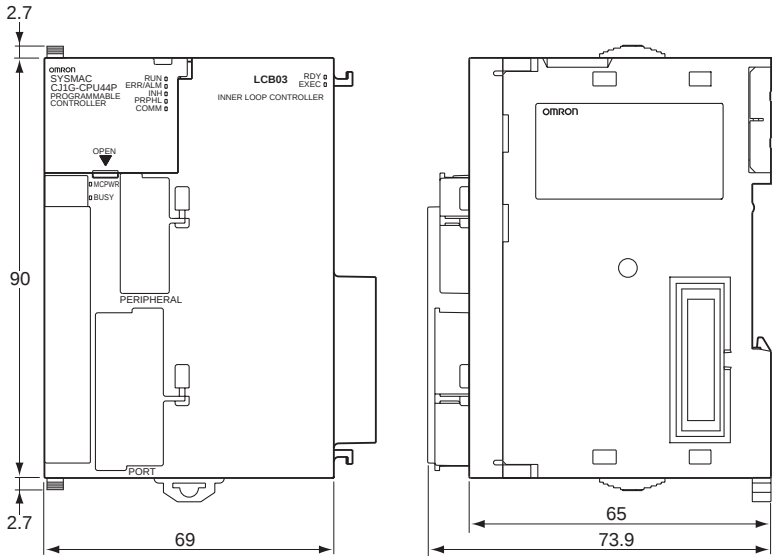
Dimensions

# Dimensions

## CPU Units

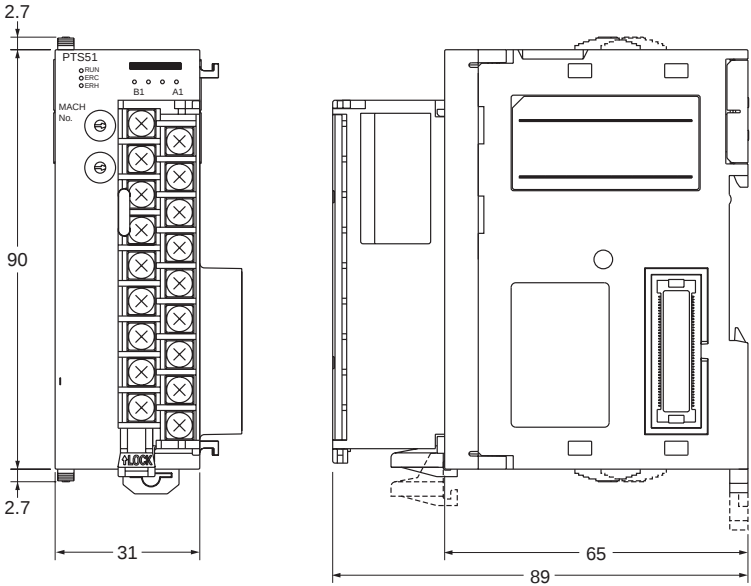
### ■ Loop-control CPU Units

CJ1G-CPU42P  
CJ1G-CPU43P  
CJ1G-CPU44P  
CJ1G-CPU45P



### ■ Process Input Units

CJ1W-P□□□□



# Ordering Information

## Basic Configuration Units

| Name                                    | Specifications                                                                                          |                  |                                                        |                               |                           | Model                    | Standards     |  |  |  |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------------|-------------------------------|---------------------------|--------------------------|---------------|--|--|--|
| Loop-control CPU Unit                   | I/O bits                                                                                                | Program capacity | Data memory capacity                                   | LD instruction execution time | Number of function blocks | ---                      | ---           |  |  |  |
|                                         | 1,280 (3 Expansion Racks)                                                                               | 60 Ksteps        | 128 K words (DM: 32K words, EM: 32 K words × 3 banks)  | 0.04 μs                       | 300 blocks                | CJ1G-CPU45P              | UC1, CE, N    |  |  |  |
|                                         |                                                                                                         | 30 Ksteps        | 64 K words (DM: 32K words, EM: 32 K words × 1 bank)    |                               |                           | CJ1G-CPU44P              |               |  |  |  |
|                                         | 960 (2 Expansion Racks)                                                                                 | 20 Ksteps        |                                                        |                               | 50 blocks                 | CJ1G-CPU43P              |               |  |  |  |
|                                         |                                                                                                         | 10 Ksteps        |                                                        |                               |                           | CJ1G-CPU42P              |               |  |  |  |
| CPU Units (without Loop Control Engine) | I/O bits                                                                                                | Program capacity | Data memory capacity                                   | LD instruction execution time | Built-in I/O              | ---                      | ---           |  |  |  |
|                                         | 2,560 (3 Expansion Racks)                                                                               | 250 Ksteps       | 448 K words (DM: 32K words, EM: 32 K words x 13 banks) | 0.02 μs                       | ---                       | CJ1H-CPU67H              | UC1, CE, N, L |  |  |  |
|                                         |                                                                                                         | 120 Ksteps       | 256 K words (DM: 32K words, EM: 32K words × 7 banks)   |                               |                           | CJ1H-CPU66H              |               |  |  |  |
|                                         |                                                                                                         | 60 Ksteps        | 128 K words (DM: 32K words, EM: 32K words × 3 banks)   |                               |                           | CJ1H-CPU65H              |               |  |  |  |
|                                         | 1,280 (3 Expansion Racks)                                                                               | 30 Ksteps        | 64 K words (DM: 32K words, EM: 32K words × 1 bank)     | 0.04 μs                       |                           | CJ1G-CPU45H              |               |  |  |  |
|                                         |                                                                                                         | 20 Ksteps        |                                                        |                               |                           | CJ1G-CPU44H              |               |  |  |  |
|                                         | 960 (2 Expansion Racks)                                                                                 | 10 Ksteps        |                                                        |                               |                           | CJ1G-CPU43H              |               |  |  |  |
|                                         |                                                                                                         |                  |                                                        |                               |                           | CJ1G-CPU42H              |               |  |  |  |
|                                         | 640 (1 Expansion Rack)                                                                                  | 20 Ksteps        | 32 K words (DM: 32K words, no EM)                      | 0.1 μs                        | 10 inputs and 6 outputs   | CJ1M-CPU13               |               |  |  |  |
|                                         | 320 (no expansion)                                                                                      | 10 Ksteps        |                                                        |                               |                           | CJ1M-CPU12               |               |  |  |  |
|                                         | 160 (no expansion)                                                                                      | 5 Ksteps         |                                                        |                               |                           | CJ1M-CPU11               |               |  |  |  |
|                                         | 640 (1 Expansion Rack)                                                                                  | 20 Ksteps        |                                                        |                               |                           | CJ1M-CPU23 (See note 1.) |               |  |  |  |
|                                         | 320 (no expansion)                                                                                      | 10 Ksteps        |                                                        |                               |                           | CJ1M-CPU22 (See note 1.) |               |  |  |  |
|                                         | 160 (no expansion)                                                                                      | 5 Ksteps         |                                                        |                               |                           | CJ1M-CPU21 (See note 1.) |               |  |  |  |
|                                         |                                                                                                         |                  |                                                        |                               |                           |                          |               |  |  |  |
| Power Supply Units                      | 100 to 240 V AC (with RUN output), Output capacity: 5 A, 5 V DC                                         |                  |                                                        |                               |                           | CJ1W-PA205R              |               |  |  |  |
|                                         | 100 to 240 V AC, Output capacity: 2.8 A, 5 V DC                                                         |                  |                                                        |                               |                           | CJ1W-PA202               |               |  |  |  |
|                                         | 24 V DC, Output capacity: 5 A, 5 V DC                                                                   |                  |                                                        |                               |                           | CJ1W-PD025               |               |  |  |  |
| RS-422A Adapter                         | Converts RS-232C to RS-422A/RS-485.                                                                     |                  |                                                        |                               |                           | CJ1W-CIF11               |               |  |  |  |
| I/O Control Unit                        | Mount 1 Unit on the CJ-series CPU Rack when connecting a CJ-series Expansion Rack.                      |                  |                                                        |                               |                           | CJ1W-IC101               |               |  |  |  |
| I/O Interface Unit                      | 1 required on each CJ-series Expansion Rack                                                             |                  |                                                        |                               |                           | CJ1W-II101               |               |  |  |  |
| I/O Connecting Cable                    | For connecting CJ-series Expansion Racks to the CJ-series CPU Rack or another CJ-series Expansion Rack. |                  |                                                        | Cable length: 0.3 m           |                           | CS1W-CN313               | L, CE         |  |  |  |
|                                         |                                                                                                         |                  |                                                        | Cable length: 0.7 m           |                           | CS1W-CN713               |               |  |  |  |
|                                         |                                                                                                         |                  |                                                        | Cable length: 2 m             |                           | CS1W-CN223               |               |  |  |  |
|                                         |                                                                                                         |                  |                                                        | Cable length: 3 m             |                           | CS1W-CN323               |               |  |  |  |
|                                         |                                                                                                         |                  |                                                        | Cable length: 5 m             |                           | CS1W-CN523               |               |  |  |  |
|                                         |                                                                                                         |                  |                                                        | Cable length: 10 m            |                           | CS1W-CN133               |               |  |  |  |
|                                         |                                                                                                         |                  |                                                        | Cable length: 12 m            |                           | CS1W-CN133-B2            |               |  |  |  |
| Memory Cards                            | Flash memory, 30 MB                                                                                     |                  |                                                        |                               |                           | HMC-EF372 (See note 2.)  |               |  |  |  |
|                                         | Flash memory, 64 MB                                                                                     |                  |                                                        |                               |                           | HMC-EF672 (See note 2.)  |               |  |  |  |
|                                         | Memory Card Adapter (for computer PCMCIA slot)                                                          |                  |                                                        |                               |                           | HMC-AP001                | CE            |  |  |  |

- Note:** 1. The CJ1M-CPU23/22's connector for built-in I/O is not included. Purchase one of the connectors in the following table separately.
2. The HMC-EF172, HMC-EF372, and HMC-EF672 Memory Cards cannot be used with the following products. The following CPU Units with lot numbers of 020108 or earlier (manufactured 8 January 2002 or earlier): CS1G-CPU□□H, CS1H-CPU□□H, CJ1G-CPU□□H, and CJ1H-CPU□□H, and NS7-series PTs with lot numbers of 0852 or earlier (manufactured 8 May 2002 or earlier).

## Programming Devices

| Name                                                      |                                                                                                                                                                                                 | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                               | Model                                                                     | Standards   |    |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------|----|
| Programming Consoles                                      |                                                                                                                                                                                                 | An English Keyboard sheet (CS1W-KS001-E) is required.<br><b>Note:</b> Connects to peripheral port on CPU Unit only (cannot be connected to RS-232C port).                                                                                                                                                                                                                                                                                                    | CQM1H-PRO01-E                                                             | U, C, CE    |    |
|                                                           |                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CQM1-PRO01-E                                                              | U, C, N, CE |    |
|                                                           |                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | C200H-PRO27-E                                                             |             |    |
| Programming Console Key Sheet                             |                                                                                                                                                                                                 | For CQM1H-PRO01-E, CQM1-PRO01-E, and C200H-PRO27-E                                                                                                                                                                                                                                                                                                                                                                                                           | CS1W-KS001-E                                                              | CE          |    |
| Programming Console Connecting Cables                     |                                                                                                                                                                                                 | Connects the CQM1-PRO01-E Programming Console. (Length: 0.05 m)                                                                                                                                                                                                                                                                                                                                                                                              | CS1W-CN114                                                                |             |    |
|                                                           |                                                                                                                                                                                                 | Connects the C200H-PRO27-E Programming Console. (Length: 2.0 m)                                                                                                                                                                                                                                                                                                                                                                                              | CS1W-CN224                                                                |             |    |
|                                                           |                                                                                                                                                                                                 | Connects the C200H-PRO27-E Programming Console. (Length: 6.0 m)                                                                                                                                                                                                                                                                                                                                                                                              | CS1W-CN624                                                                |             |    |
| CX-One Integrated Tool Package Ver. 1.1                   | 1 license                                                                                                                                                                                       | CX-One is a package that integrates Support Software for OMRON PLCs and components. It can be run in a Windows 98SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or later) or XP environment.<br><br>CX-One includes CX-Programmer Ver. 6.□, CX-Simulator Ver. 1.□, CX-Protocol Ver. 1.□, CX-Process Tool Ver. 5.□, CX-Designer Ver. 1.□, and NS-series Face Plate Auto Builder Ver. 2.□. Refer to the CX-One catalog (R134) for details. (See note.) | CXONE-AL01C-E                                                             | ---         |    |
|                                                           | 3 license                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CXONE-AL03C-E                                                             |             |    |
|                                                           | 10 licenses                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CXONE-AL10C-E                                                             |             |    |
|                                                           | 30 licenses                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CXONE-AL30C-E                                                             |             |    |
|                                                           | 50 licenses                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CXONE-AL50C-E                                                             |             |    |
|                                                           | The CX-Programmer, CX-Simulator, CX-Protocol, CX-Process Tool, CX-Designer, and NS-series Face Plate Auto Builder can still be ordered separately, using the following model numbers as before. |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                           |             |    |
| CX-Programmer Ver. 6.□                                    | 1 license                                                                                                                                                                                       | Windows-based Support Software                                                                                                                                                                                                                                                                                                                                                                                                                               | WS02-CXPC1-E-V6□                                                          | ---         |    |
|                                                           | 3 licenses                                                                                                                                                                                      | OS: Windows 98SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or later), or XP                                                                                                                                                                                                                                                                                                                                                                        | WS02-CXPC1-EL03-V6□                                                       |             |    |
|                                                           | 10 licenses                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | WS02-CXPC1-EL10-V6□                                                       |             |    |
| CX-Process Tool Ver. 5.□                                  | 1 license                                                                                                                                                                                       | Support Software for loop control<br>OS: Windows 98SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or later), or XP                                                                                                                                                                                                                                                                                                                                   | WS02-LCTC1-EV5                                                            | ---         |    |
| CX-Simulator Ver. 1.□                                     | 1 license                                                                                                                                                                                       | Support Software for simulation of ladder program operation<br>OS: Windows 98SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or later), or XP                                                                                                                                                                                                                                                                                                         | WS02-SIMC1-E                                                              | ---         |    |
| CX-Protocol Ver. 1.□                                      | 1 license                                                                                                                                                                                       | Support Software for creating protocol macros<br>Use with CJ1G/CJ1H Ver. 1.2 or later, or CJ1M Ver. 1.3 or later.<br>OS: Windows 98SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or later), or XP                                                                                                                                                                                                                                                   | WS02-PSTC1-E                                                              | ---         |    |
| CX-Designer Ver. 1.□                                      | 1 license                                                                                                                                                                                       | NS-series PT screen design software<br>OS: Windows 98SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or later), or XP<br>CX-Designer Ver. 1.0 includes Ladder Monitor software.<br><br><b>Note:</b> Ladder Monitor software is NS-series PT software for monitoring ladder programs in CS/CJ-series PLCs. To use it, a Memory Card and Memory Card Adaptor must be ordered separately.                                                                | NS-CXDC1-V1                                                               | ---         |    |
| NS-series Face Plate Auto Builder Ver. 2.□                | 1 license                                                                                                                                                                                       | NS-series PT software for automatic generation of screen data<br>OS: Windows 98SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or later), or XP                                                                                                                                                                                                                                                                                                       | WS02-NSFC1-EV2                                                            | ---         |    |
| CX-Process Monitor Plus                                   | 1 license                                                                                                                                                                                       | Loop control monitoring software for Windows NT4.0, 2000, or XP.                                                                                                                                                                                                                                                                                                                                                                                             | WS02-LCMC1-E                                                              | ---         |    |
|                                                           | 3 licenses                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | WS02-LCMC1-EL03                                                           |             |    |
|                                                           | 10 licenses                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                              | WS02-LCMC1-EL10                                                           |             |    |
| Peripheral Device Connecting Cables (for peripheral port) |                                                                                                                                                                                                 | Connects DOS computers, D-Sub 9-pin receptacle (Length: 0.1 m)                                                                                                                                                                                                                                                                                                                                                                                               | <b>Note:</b> Conversion cable to connect RS-232C cable to peripheral port | CS1W-CN118  | CE |
|                                                           |                                                                                                                                                                                                 | Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Note:</b> Peripheral bus or Host Link                                  | CS1W-CN226  |    |
|                                                           |                                                                                                                                                                                                 | Connects DOS computers, D-Sub 9-pin (Length: 6.0 m)                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                           | CS1W-CN626  |    |

**Note:** Site licenses are also available for users that need to use the CX-One on many computers. Ask your OMRON representative for details.

# Ordering Information

## Basic I/O Units

| Name                                                   | Specifications                                                                                                                                                                                                                                                           | Model        | Standards |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| Peripheral Device Connecting Cables (for RS-232C port) | Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)                                                                                                                                                                                                                      | XW2Z-200S-CV | ---       |
|                                                        | Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)                                                                                                                                                                                                                      |              |           |
|                                                        | Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)                                                                                                                                                                                                                      | XW2Z-200S-V  |           |
|                                                        | Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)                                                                                                                                                                                                                      | XW2Z-500S-V  |           |
| USB-Serial Conversion Cable                            | USB-to-RS-232C Conversion Cable (Length: 0.5 m) and PC driver (on CD-ROM), Complies with USB Specification 1.1<br>On personal computer end: USB (A plug connector, male)<br>On PLC end: RS-232C (D-sub 9-pin, male)<br>Driver: Provided for Windows 98, Me, 2000, and XP | CS1W-CIF31   |           |

## Basic I/O Units

| Classification                                                                     | Name                    | Specifications                                                                                                      | Model                                             | Standards                    |            |
|------------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------------------------------|------------|
| Input Units                                                                        | DC Input Units          | 12 to 24 VDC, 8 inputs, 10 mA                                                                                       | CJ1W-ID201                                        | UC, CE, N, L                 |            |
|                                                                                    |                         | 24 V DC, 16 inputs, 7 mA                                                                                            | CJ1W-ID211                                        | UC1, CE, N, L                |            |
|                                                                                    |                         | 24 V DC, 32 inputs, 4.1 mA (Fujitsu-compatible connector)                                                           | CJ1W-ID231 (See note 1.)                          |                              |            |
|                                                                                    |                         | 24 V DC, 32 inputs, 4.1 mA (MIL connector)                                                                          | CJ1W-ID232 (See note 1.)                          |                              |            |
|                                                                                    |                         | 24 V DC, 64 inputs, 4.1 mA (Fujitsu-compatible connector)                                                           | CJ1W-ID261 (See note 1.)                          |                              |            |
|                                                                                    |                         | 24 V DC, 64 inputs, 4.1 mA (MIL connector)                                                                          | CJ1W-ID262 (See note 1.)                          |                              |            |
|                                                                                    | AC Input Units          | 100 to 120 V AC, 7 mA (100 V, 50 Hz), 16 inputs, terminal block                                                     | CJ1W-IA111                                        |                              |            |
|                                                                                    |                         | 200 to 240 V AC, 10 mA (200 V, 50 Hz), 8 inputs, terminal block                                                     | CJ1W-IA201                                        |                              |            |
|                                                                                    | Interrupt Input Unit    | 24 VDC, 7 mA, 16 inputs, terminal block                                                                             | CJ1W-INT01                                        |                              |            |
|                                                                                    | High-speed Input Unit   | 24 VDC, 7 mA, 16 inputs, terminal block                                                                             | CJ1W-IDP01                                        |                              |            |
| Output Units                                                                       | Relay Bit Output Units  | 250 V AC/24 V DC, 2 A, independent contacts, 8 outputs max.                                                         | CJ1W-OC201                                        |                              |            |
|                                                                                    |                         | 250 V AC/24 V DC, 2 A, independent contacts, 16 outputs max.                                                        | CJ1W-OC211                                        |                              |            |
|                                                                                    | Transistor Output Units | 250 V AC/24 V DC, 2 A, independent contacts, 8 outputs max.                                                         | CJ1W-OD201                                        |                              |            |
|                                                                                    |                         | 24 V DC, 2 A, 8 outputs, sourcing, load short-circuit protection, alarm, terminal block                             | CJ1W-OD202                                        |                              |            |
|                                                                                    |                         | 12 to 24 V DC, 0.5 A, 8 outputs, sinking, terminal block                                                            | CJ1W-OD203                                        |                              |            |
|                                                                                    |                         | 24 V DC, 0.5 A, 8 outputs, sourcing, load short-circuit protection, alarm, terminal block                           | CJ1W-OD204                                        |                              |            |
|                                                                                    |                         | 12 to 24 V DC, 0.5 A, 16 outputs, sinking, terminal block                                                           | CJ1W-OD211                                        |                              |            |
|                                                                                    |                         | 24 V DC, 0.5 A, 16 outputs, sourcing, load short-circuit protection, disconnection detection, alarm, terminal block | CJ1W-OD212                                        |                              |            |
|                                                                                    |                         | 12 to 24 V DC, 0.5 A, 32 outputs, sinking, Fujitsu-compatible connector                                             | CJ1W-OD231 (See note 1.)                          |                              |            |
|                                                                                    |                         | 24 VDC, 0.5 A, 32 outputs, sourcing, load short-circuit protection, alarm, MIL connector                            | CJ1W-OD232 (See note 1.)                          |                              |            |
|                                                                                    |                         | 12 to 24 VDC, 0.5 A, 32 outputs, sinking, MIL connector                                                             | CJ1W-OD233 (See note 1.)                          |                              |            |
|                                                                                    |                         | 12 to 24 VDC, 0.3 A, 64 outputs, sinking, Fujitsu-compatible connector                                              | CJ1W-OD261 (See note 1.)                          |                              |            |
|                                                                                    |                         | 24 VDC, 0.3 A, 64 outputs, sourcing, MIL connector                                                                  | CJ1W-OD262 (See note 1.)                          |                              |            |
|                                                                                    |                         | 12 to 24 VDC, 0.3 A, 64 outputs, sinking, MIL connector                                                             | CJ1W-OD263 (See note 1.)                          |                              |            |
|                                                                                    | Triac Output            | Unit 250 VAC, 0.6 A, 8 outputs, terminal block                                                                      | CJ1W-OA201                                        |                              |            |
|                                                                                    | I/O Units               | DC Input/Transistor Output Units                                                                                    | 16 inputs, 24 V DC, 7 mA                          | Fujitsu-compatible connector | UC1, CE, N |
|                                                                                    |                         |                                                                                                                     | 16 outputs, 12 to 24 V DC, 0.5 A, sinking outputs |                              |            |
|                                                                                    |                         |                                                                                                                     | 16 inputs, 24 V DC, 7 mA                          | MIL connector                |            |
| 16 outputs, 24 V DC, 0.5 A, sourcing outputs, load short-circuit protection, alarm |                         |                                                                                                                     |                                                   |                              |            |
| 16 inputs, 24 V DC, 7 mA                                                           |                         |                                                                                                                     | MIL connector                                     |                              |            |
| 16 outputs, 12 to 24 V DC, 0.5 A, sinking outputs                                  |                         |                                                                                                                     |                                                   |                              |            |
| 32 inputs, 24 V DC, 4.1 mA                                                         |                         |                                                                                                                     | Fujitsu-compatible connector                      |                              |            |
| 32 outputs, 12 to 24 V DC, 0.3 A, sinking outputs                                  |                         |                                                                                                                     |                                                   |                              |            |
| 32 inputs, 24 V DC, 4.1 mA                                                         |                         |                                                                                                                     | MIL connector                                     |                              |            |
| 32 outputs, 12 to 24 V DC, 0.3 A, sinking outputs                                  |                         |                                                                                                                     |                                                   |                              |            |
| TTL I/O Unit                                                                       |                         | 32 inputs, 5 V DC, 35 mA                                                                                            | MIL connector                                     | CJ1W-MD563 (See note 1.)     |            |
|                                                                                    |                         | 32 outputs, 5 V DC, 35 mA                                                                                           |                                                   |                              |            |

# Ordering Information

## Special I/O Units

| Classification      | Name | Specifications       | Model      | Standards |
|---------------------|------|----------------------|------------|-----------|
| B7A Interface Units |      | 64 inputs            | CJ1W-B7A14 | CE        |
|                     |      | 64 outputs           | CJ1W-B7A04 |           |
|                     |      | 32 inputs/32 outputs | CJ1W-B7A22 |           |

- Note:** 1. Connectors are not provided with these connector models. Either purchase one of the following 40-pin Connectors, or use an OMRON XW2□ Connector-Terminal Block Conversion Unit or a G7□ I/O Relay Terminal.
2. Connectors are not provided with these connector models. Either purchase one of the following 20-pin or 24-pin Connectors, or use an OMRON XW2□ Connector-Terminal Block Conversion Unit or a G7□ I/O Relay Terminal.

This eco label is displayed only on products that satisfy stringent environmental standards established by OMRON.



## Special I/O Units

| Type              | Name                                         | Specifications                                                                                                                                                              | Model                 | Standards     |
|-------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|
| Special I/O Units | Analog Input Units                           | 8 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA)<br>Resolution: 1/8000, Conversion speed: 250 μs/point max.<br>(Settable to 1/4000 and 1 ms/point.)        | CJ1W-AD081-V1         | UC1, CE, N, L |
|                   |                                              | 4 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA)<br>Resolution: 1/8000, Conversion speed: 250 μs/point max.<br>(Settable to 1/4000 and 1 ms/point.)        | CJ1W-AD041-V1         |               |
|                   | Analog Output Units                          | 8 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V)<br>Resolution: 1/4000, Conversion speed: 1 ms/point max.<br>(Settable to 1/8000, 250 μs/point)                       | CJ1W-DA08V            |               |
|                   |                                              | 8 outputs (4 to 20 mA)<br>Resolution: 1/4000, Conversion speed: 1 ms/point max.<br>(Settable to 1/8000, 250 μs/point)                                                       | CJ1W-DA08C            | UC1, CE, N    |
|                   |                                              | 4 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA)<br>Resolution: 1/4,000, Conversion speed: 1 ms/point max.                                                | CJ1W-DA041            | UC1, CE, N, L |
|                   |                                              | 2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA)<br>Resolution: 1/4000, Conversion speed: 1 ms/point max.                                                 | CJ1W-DA021            |               |
|                   | Analog I/O Units                             | 4 inputs, 2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA)<br>Resolution: 1/4000, Conversion speed: 1 ms/point max.<br>(Settable to 1/8000, 250 μs/point) | CJ1W-MAD42            | UC1, CE       |
|                   | Process Input Units (High Resolution Models) | 2 inputs, B, E, J, K, L, N, R, S, T, U; WRe5-26; PL II; ±100 mV<br>Resolution: 1/64,000; Conversion speed: 10 ms/Unit                                                       | CJ1W-PTS15 <b>NEW</b> |               |
|                   |                                              | 2 inputs, Pt 100 Ω (JES, IEC), JPt 100 Ω, Pt 50 Ω, Ni 508 Ω<br>Resolution: 1/64,000; Conversion speed: 10 ms/Unit                                                           | CJ1W-PTS16 <b>NEW</b> |               |
|                   |                                              | 2 inputs, 0 to 100 V, ±10 V, 0 to 5 V, ±5 V, 0 to 1.25 V, ±1.25 V<br>Resolution: 1/64,000; Conversion speed: 10 ms/Unit                                                     | CJ1W-PDC15 <b>NEW</b> |               |
|                   | Process Input Units (Economy Models)         | 4 inputs, R, S, K, J, T, L, B; Conversion speed: 250 ms/4 inputs                                                                                                            | CJ1W-PTS51            |               |
|                   |                                              | 4 inputs, Pt 100 Ω (JIS, IEC), JPt100 Ω, Conversion speed: 250 ms/4 inputs                                                                                                  | CJ1W-PTS52            |               |
|                   | Temperature Control Units                    | 4 loops, thermocouple input, NPN output                                                                                                                                     | CJ1W-TC001            | UC1, CE, N L  |
|                   |                                              | 4 loops, thermocouple input, PNP output                                                                                                                                     | CJ1W-TC002            |               |
|                   |                                              | 2 loops, thermocouple input, NPN output, heater burnout detection function                                                                                                  | CJ1W-TC003            |               |
|                   |                                              | 2 loops, thermocouple input, PNP output, heater burnout detection function                                                                                                  | CJ1W-TC004            |               |
|                   |                                              | 4 loops, platinum resistance thermometer input, NPN output                                                                                                                  | CJ1W-TC101            |               |
|                   |                                              | 4 loops, platinum resistance thermometer input, PNP output                                                                                                                  | CJ1W-TC102            |               |
|                   |                                              | 2 loops, platinum resistance thermometer input, NPN output, heater burnout detection function                                                                               | CJ1W-TC103            |               |
|                   |                                              | 2 loops, platinum resistance thermometer input, PNP output, heater burnout detection function                                                                               | CJ1W-TC104            |               |
|                   | High-speed Counter Unit                      | 2 inputs, max. input frequency: 500 kpps                                                                                                                                    | CJ1W-CT021            | ---           |
|                   | CompoBus/S Master Unit                       | CompoBus/S remote I/O, 256 points max.                                                                                                                                      | CJ1W-SRM21            |               |
|                   | ID Sensor Units (See note.)                  | For V600 Series, 1 R/W Head                                                                                                                                                 | CJ1W-V600C11          |               |
|                   |                                              | For V600 Series, 2 R/W Heads                                                                                                                                                | CJ1W-V600C12          |               |

**Note:** Refer to the FA System Devices Group Catalog for details on the V600 Series RFID System.

## CPU Bus Units

| Type          | Name                                  | Specifications                                                                     | Model           | Standards     |
|---------------|---------------------------------------|------------------------------------------------------------------------------------|-----------------|---------------|
| CPU Bus Units | <b>Controller Link Units</b>          | Wired (Shielded twisted-pair cable)                                                | CJ1W-CLK21-V1   | UC1, CE, N, L |
|               | <b>Controller Link Relay Terminal</b> | Wired<br>Includes 5 Terminals                                                      | CJ1W-TB101      | ---           |
|               | <b>Controller Link Support Board</b>  | Twisted pair, PCI bus (wired), with Support Software                               | 3G8F7-CLK21-EV1 | CE            |
|               | <b>Controller Link Repeater Units</b> | Wired-wired type                                                                   | CS1W-RPT01      | UC1, CE       |
|               |                                       | Wired-optical (H-PCF) type                                                         | CS1W-RPT02      |               |
|               |                                       | Wired-optical (GI) type                                                            | CS1W-RPT03      |               |
|               | <b>Serial Communications Units</b>    | 1 RS-232C port and 1 RS-422/485 port                                               | CJ1W-SCU41-V1   | UC1, CE, N, L |
|               |                                       | 2 RS-232C ports                                                                    | CJ1W-SCU21-V1   |               |
|               | <b>Ethernet Units</b>                 | 10Base-T                                                                           | CJ1W-ETN11      | UC1, CE, N, L |
|               |                                       | 100Base-TX                                                                         | CJ1W-ETN21      |               |
|               | <b>FL-net Unit</b>                    | 100Base-TX                                                                         | CJ1W-FLN22      | UC1, CE       |
|               | <b>DeviceNet Unit</b>                 | Functions as master and/or slave; allows control of 32,000 points max. per master. | CJ1W-DRM21      | UC1, CE, N, L |
|               | <b>Position Control Unit</b>          | Equipped with MECHATROLINK-II, multiple axis control for 16 axes max.              | CJ1W-NCF71      | ---           |

## NS-series Programmable Terminals

| Model name    |                                    | Specifications |            | Model number    | Standards                 |
|---------------|------------------------------------|----------------|------------|-----------------|---------------------------|
|               |                                    | Ethernet       | Case color |                 |                           |
| NS12          | 12-inch TFT, 800 × 600 dots        | No             | Ivory      | NS12-TS00-V2    | CU, CE                    |
|               |                                    |                | Black      | NS12-TS00B-V2   |                           |
|               |                                    | Yes            | Ivory      | NS12-TS01-V2    |                           |
|               |                                    |                | Black      | NS12-TS01B-V2   |                           |
| NS10          | 10-inch TFT, 640 × 480 dots        | No             | Ivory      | NS10-TV00-V2    |                           |
|               |                                    |                | Black      | NS10-TV00B-V2   |                           |
|               |                                    | Yes            | Ivory      | NS10-TV01-V2    |                           |
|               |                                    |                | Black      | NS10-TV01B-V2   |                           |
| NS8           | 8-inch TFT, 640 × 480 dots         | No             | Ivory      | NS8-TV00-V2     |                           |
|               |                                    |                | Black      | NS8-TV00B-V2    |                           |
|               |                                    | Yes            | Ivory      | NS8-TV01-V2     |                           |
|               |                                    |                | Black      | NS8-TV01B-V2    |                           |
| NS5           | 5-inch STN, 320 × 240 dots         | No             | Ivory      | NS5-SQ00-V2     |                           |
|               |                                    |                | Black      | NS5-SQ00B-V2    |                           |
|               |                                    | Yes            | Ivory      | NS5-SQ01-V2     |                           |
|               |                                    |                | Black      | NS5-SQ01B-V2    |                           |
|               | 5-inch TFT, 320 × 240 dots         | No             | Ivory      | NS5-TQ00-V2     |                           |
|               |                                    |                | Black      | NS5-TQ00B-V2    |                           |
|               |                                    | Yes            | Ivory      | NS5-TQ01-V2     |                           |
|               |                                    |                | Black      | NS5-TQ01B-V2    |                           |
|               | 5-inch, monochrome, 320 × 240 dots | No             | Ivory      | NS5-MQ00-V2     |                           |
|               |                                    |                | Black      | NS5-MQ00B-V2    |                           |
|               |                                    | Yes            | Ivory      | NS5-MQ01-V2     |                           |
|               |                                    |                | Black      | NS5-MQ01B-V2    |                           |
| NS5 Hand-held | 5-inch STN, 320 × 240 dots         | No             | Black      | NSH5-SQR001B-V2 | CE, CU (approval pending) |

# Ordering Information

Ordering Information

| Model name                 | Specifications                                    |             | Model number   |
|----------------------------|---------------------------------------------------|-------------|----------------|
| Cable (See note 1.)        | Screen transfer cable for DOS/V                   |             | XW2Z-S002      |
|                            | USB Host Cable, cable length: 5 m                 |             | NS-US52 (5 m)  |
|                            | USB Host Cable, cable length: 2 m                 |             | NS-US22 (2 m)  |
|                            | USB-RS-232C Conversion Cable, cable length: 0.5 m |             | CS1W-CIF31     |
| NSH5 Cables                | RS-422A cable (loose wires), Cable length: 10 m   |             | NSH5-422CW-10M |
|                            | RS-232C cable (loose wires), Cable length: 3 m    |             | NSH5-232CW-3M  |
|                            | RS-232C cable (loose wires), Cable length: 10 m   |             | NSH5-232CW-10M |
| PT-to-PLC Connecting Cable | PT connection: 9 pins                             | Length: 2 m | XW2Z-200T      |
|                            | PLC connection: 9 pins                            | Length: 5 m | XW2Z-500T      |
| NSH5 Wall-mounting Bracket |                                                   |             | NSH5-ATT02     |

**Note:** 1. Use an OMRON USB Host Cable to connect an NS-series PT to a printer.

2. Site licenses are also available for users that need to use the CX-One on many computers. Ask your OMRON representative for details.

## Options

| Model name      | Specifications                                                                                                                                                                               |         | Model number |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------|
| RS-422A Adapter | Transmission distance: 500 m total length<br><b>Note:</b> Use this model when connecting PT models without a V□ suffix.<br><b>Note:</b> PT models with a suffix of V□ can also be connected. |         | NS-AL002     |
|                 | Transmission distance: 50 m total length<br><b>Note:</b> Only PT models with a suffix of V□ are connectable. Use the NS-002 to connect models without a V□ suffix.                           |         | CJ1W-CIF11   |
| Sheet/Cover     | Anti-reflection Sheets (5 surface sheets)                                                                                                                                                    | NS12/10 | NS12-KBA04   |
|                 |                                                                                                                                                                                              | NS8     | NS7-KBA04    |
|                 |                                                                                                                                                                                              | NS5     | NT30-KBA04   |
|                 | Protective Covers (5 pack)<br>(anti-reflection coating)                                                                                                                                      | NS12/10 | NS12-KBA05   |
|                 |                                                                                                                                                                                              | NS8     | NS7-KBA05    |
|                 |                                                                                                                                                                                              | NS5     | NT31C-KBA05  |
|                 | Protective Covers (5 covers included)<br>(Transparent)                                                                                                                                       | NS12/10 | NS12-KBA05N  |
|                 |                                                                                                                                                                                              | NS8     | NS7-KBA05N   |
|                 |                                                                                                                                                                                              | NS5     | NT31C-KBA05N |

# Ordering Information

## International Standards

- The standards indicated in the "Standards" column are those current for UL, CSA, cULus, cUL, NK, and Lloyd standards and EC Directives as of the end of September 2004. The standards are abbreviated as follows: U: UL, UR: UL Recognition Mark, U1: UL Class I Division 2 Products for Hazardous Locations, C: CSA, UC: cULus, UC1: cULus Class I Division 2 Products for Hazardous Locations, CU: cUL, N: NK, L: Lloyd, and CE: EC Directives.
- Ask your OMRON representative for the conditions under which the standards were met.

## EMC Directives

### Applicable Standards

**EMI: EN61000-6-4**

**EMS: EN61131-2 and EN61000-6-2 (See note.)**

PLCs are electrical devices that are incorporated in machines and manufacturing installations. OMRON PLCs conform to the related EMC standards so that the devices and machines into which they are built can more easily conform to EMC standards. The actual PLCs have been checked for conformity to EMC standards. Whether these standards are satisfied for the actual system, however, must be checked by the customer.

EMC-related performance will vary depending on the configuration, wiring, and other conditions of the equipment or control panel in which the PLC is installed. The customer must, therefore, perform final checks to confirm that the overall machine or device conforms to EMC standards.

**Note:** The applicable EMS standard depends on the product.

## Low Voltage Directive

### Applicable Standard: EN61131-2

Devices that operate at voltages from 50 to 1,000 V AC or 75 to 150 V DC must satisfy the appropriate safety requirements. With PLCs, this applies to Power Supply Units and I/O Units that operate in these voltage ranges.

These Units have been designed to conform to EN61131-2, which is the applicable standard for PLCs.