Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!


## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

OMRON

Programmable Controllers

# CS Series PLC-based Process Control

## Fully Integrated Sequence and Process Control for the Ideal Control System for Every Application

» Down-sizing

» Easy Engineering

» High Reliability

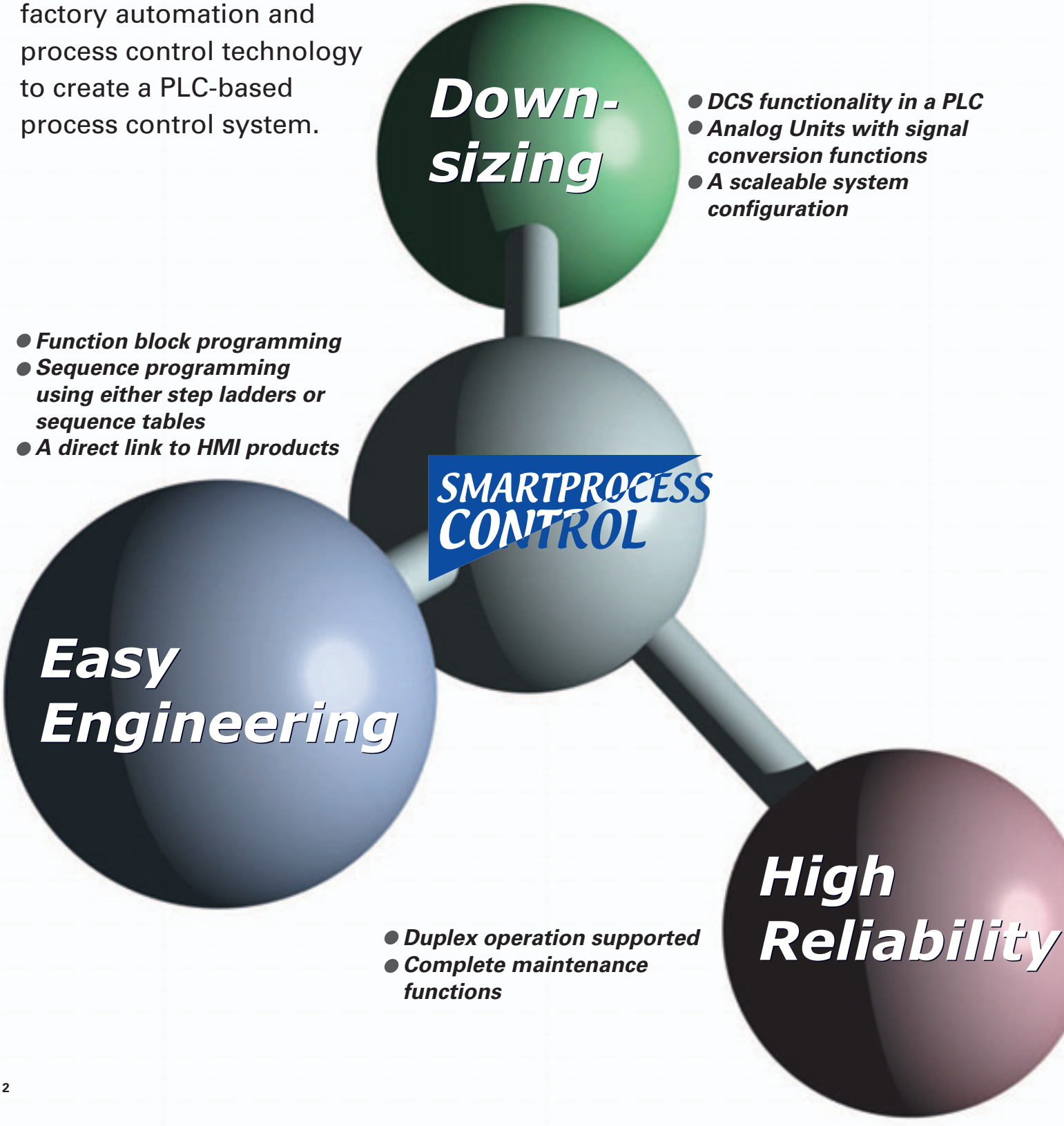
realizing

# OMRON's PLC-based Process Control = Smart Proc

General-purpose PLCs provide everything from simple loop control to advanced process control to

## A Breakthrough

The accelerating wave of globalization calls for rebuilding systems to cope with changes in demand. And now OMRON has taken its wealth of technical know-how in factory automation and process control technology to create a PLC-based process control system.




- *DCS functionality in a PLC*
- *Analog Units with signal conversion functions*
- *A scaleable system configuration*

- *Function block programming*
- *Sequence programming using either step ladders or sequence tables*
- *A direct link to HMI products*

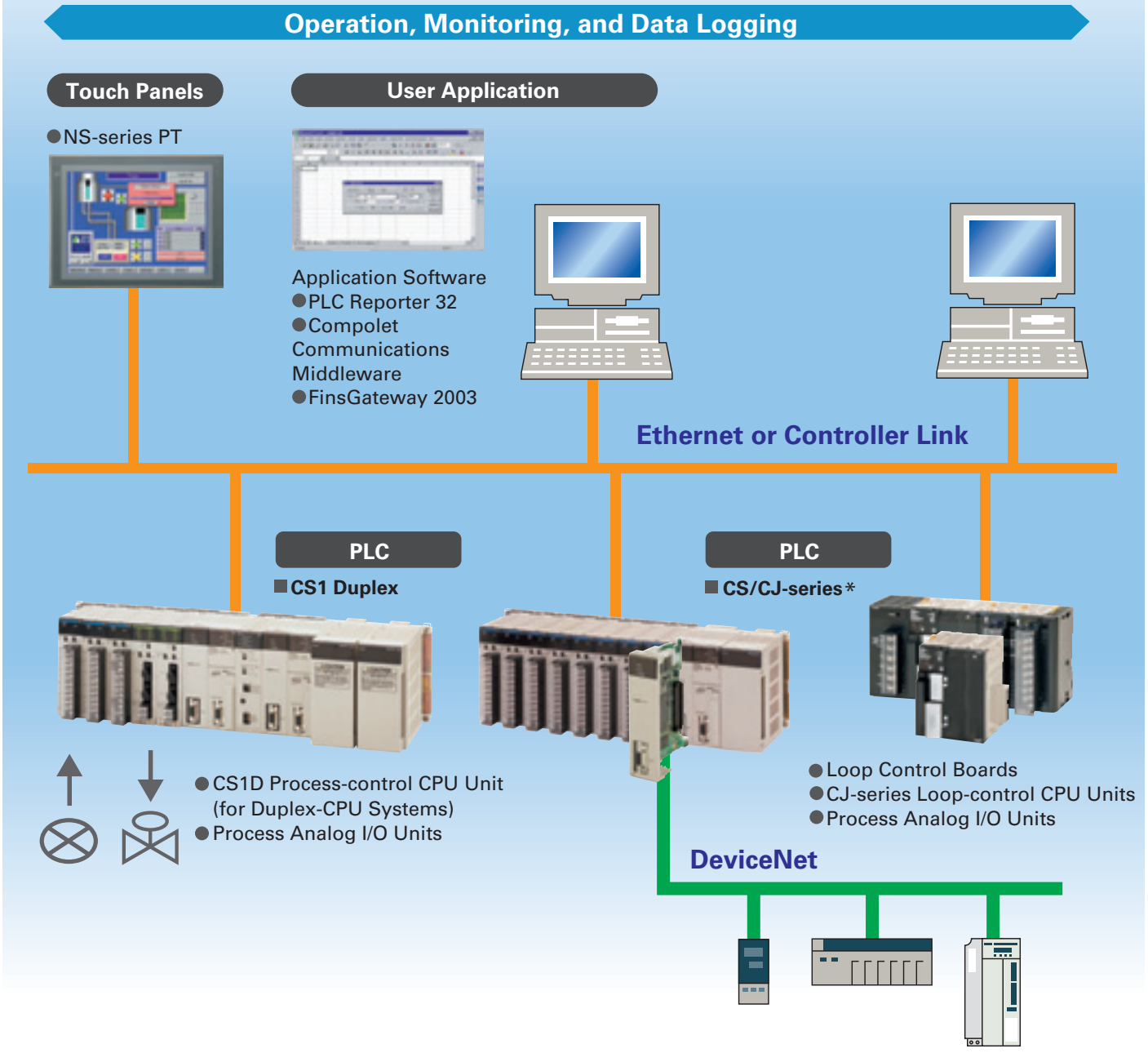
- *Duplex operation supported*
- *Complete maintenance functions*

# ess Control

# meet customer needs.

## The open nature of the PLCs is joined by integrating hardware, software, and networking to meet your needs.

Increasing amounts of information, standardization, and open standards form the basis for achieving hardware and networking capabilities for process control.
A wide range of software that can be easily used by design, development, and maintenance personnel makes operating and maintaining the system far easier.




*For details on the CJ Series, refer to the *Loop-control CPU Units Catalog* (R128-E1-01).

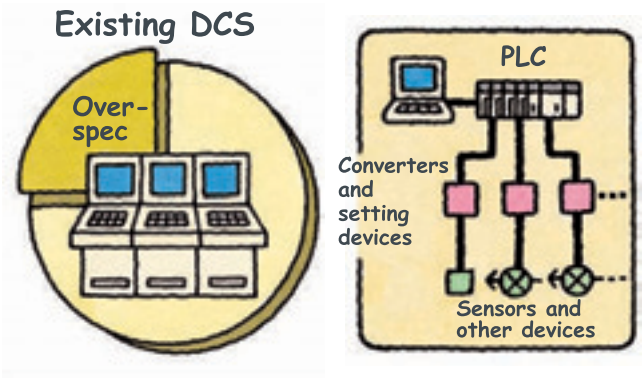
# Going Beyond the Traditional Limits of PLCs with PLC-based Process Control

## Reducing the Total Cost of Ownership from Initial Costs through Running Costs. PLC-based Process Control Meets Customer Needs

### Existing System Problems

**Systems are large, meaning high initial costs.**

The over-spec nature of a distributed control system (DCS) increased costs. PLCs, however, could not provide the required process control capabilities, and signal conversion with isolators and other devices was required for I/O. It was just not possible to achieve the ideal system for a specific application.

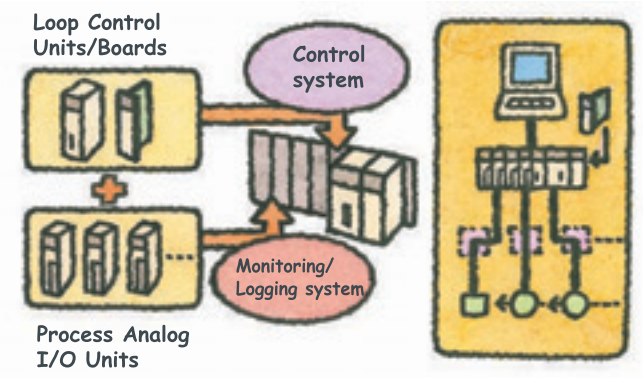



### PLC-based Process Control

**Down Sizing**

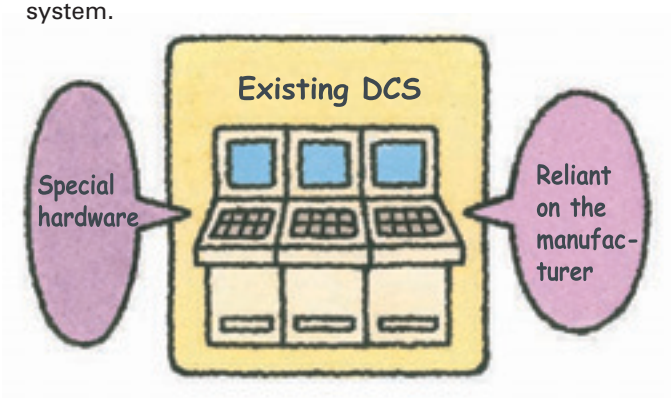
**Cut costs, Save space, Reduce labor**

PLCs provide the some of the functions and performance of DCS while also providing the advanced features of PLCs: Open specs, easy maintenance, and cost performance. A wide range of Isolated-type Analog Units helps to save space and greatly reduces system costs.




**Running costs are high because maintenance and modifications require specialists.**

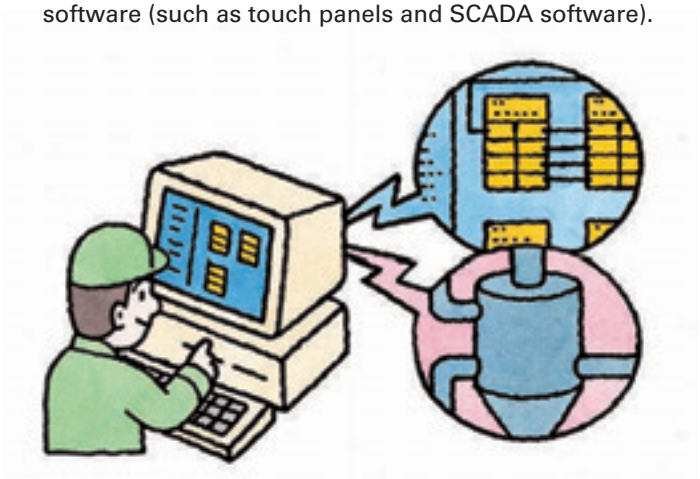
The manufacturer must be relied upon for everything from system construction to maintenance. Even simple changes to parameters cannot be performed in-house. And, it's nearly impossible to use general-purpose devices and software (such as HMI devices or Windows-based software) when modifying the system.




**Easy Engineering**

**Engineering is simple when you can program with function blocks.**

Paste function blocks in a window just like you were creating a flow sheet, and then connect the blocks with the mouse to graphically program a wide range of process control. And with a PLC, it's easy to incorporate general-purpose HMI devices and software (such as touch panels and SCADA software).



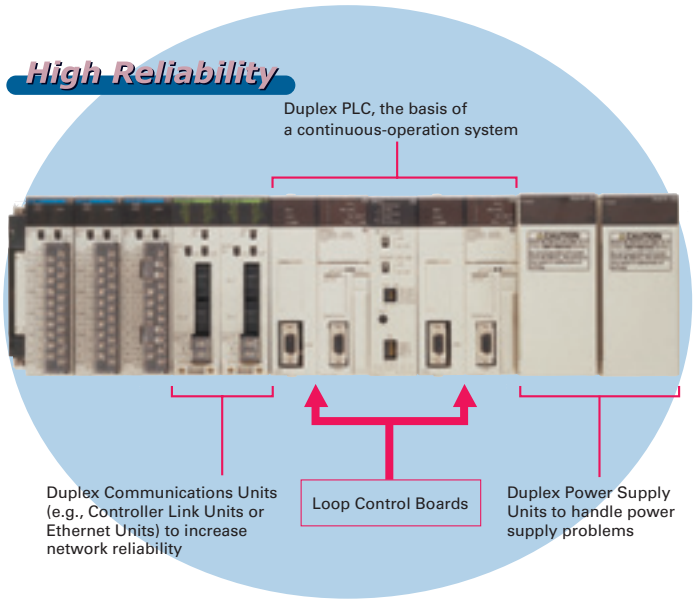
## Avoid Problems and Minimize Risks with a Duplex System

### Increase the reliability of the facilities and devices with a Duplex PLC-based Process Control System.

If an error occurs in the active CPU Unit, the standby CPU Unit takes over in an instant (using the hot standby method) so that system operation continues essentially unaffected. Other duplex variations are also possible. For example, instead of duplexing the CPU Unit, Power Supply Unit, and Controller Link Unit, a system can be constructed with a Single-CPU Unit and only a duplex Power Supply Unit or only a duplex Controller Link Unit.

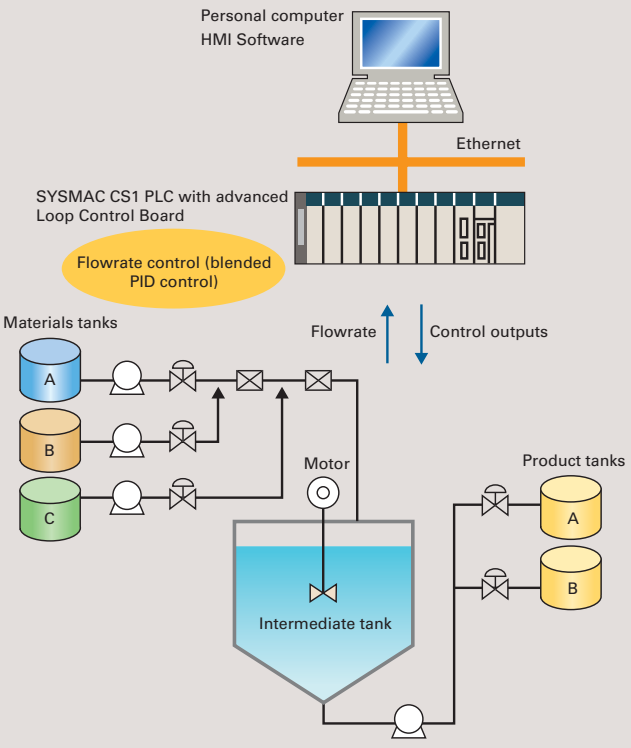
### A duplex system means rapid recovery for errors .

Replace Units with power supplied or even while the system is running, including CPU Units (Duplex-CPU system), Power Supply Units, Communications Units, Basic I/O Units, and Special I/O Units.

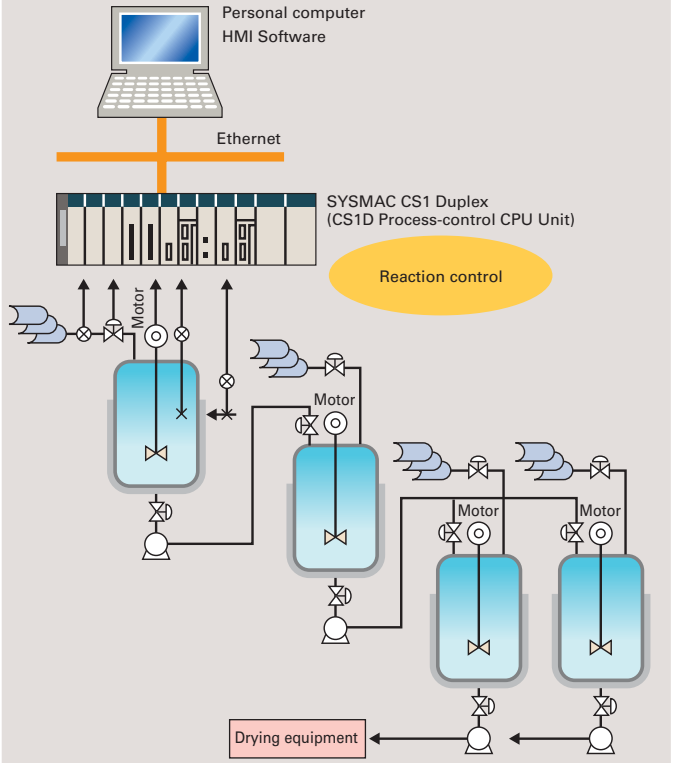



## PLC-based Process Control Application Examples

### Application Example in a Food Plant




### Application Example in a Chemical Plant



# A Revolutionary Solution to Process Control
# Advanced Controller Functions in a PLC

## For easier loop control, for advanced PLC-based analog control: The New SYSMAC CS1-based Solution

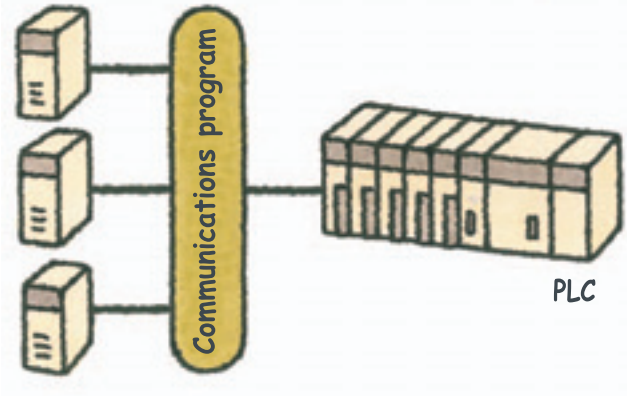
### Existing System Problems

**Excessive installation space is required.**

When using more than one controller for multi-loop control, the control panel is just too big. And specification changes required altering the control panel, making changes difficult.


**Programming communications with the controllers is extremely difficult.**

Communications must be programmed to input data to the PLC. And communications time can restrict control performance. The more controllers that are used, the more difficult maintenance becomes.

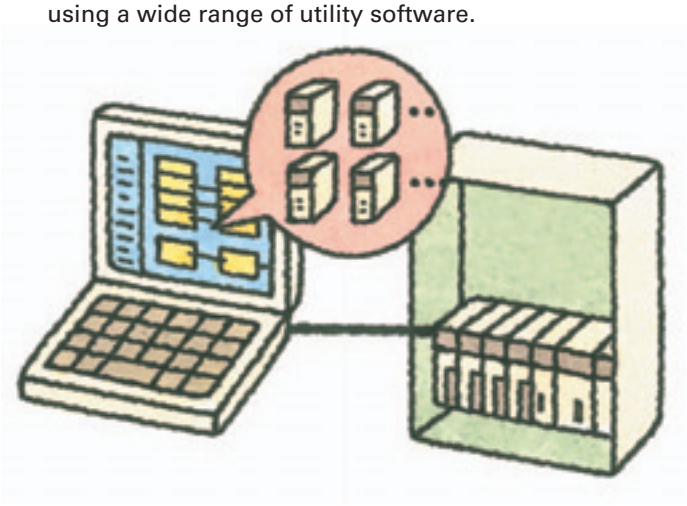



### PLC-based Process Control

*Down Sizing*

**Consolidate the functions of many controllers**

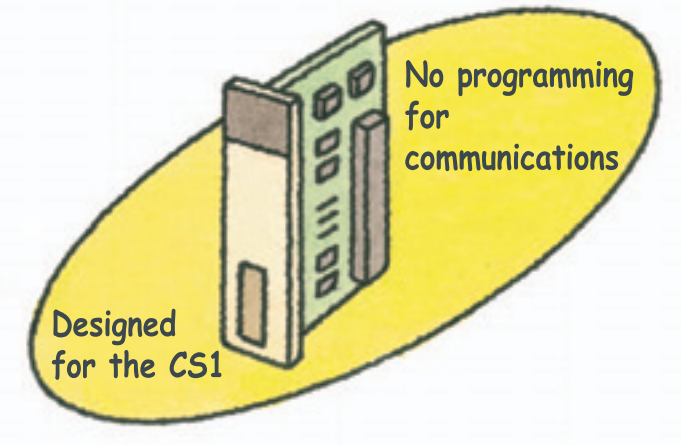
Programming is as simple as combining the function blocks required by the application. To increase the number of controlled loops, just add them to the program. HMI windows can also be created easily using a wide range of utility software.



*Easy Engineering*

**Advanced controller functions are built into the CS1 PLCs. No programming is required for communications.**

The Loop Control Boards and Units were designed for the CS1 PLCs and require no communications programming. High-speed, flexible data links can be created with the PLC to increase control performance.

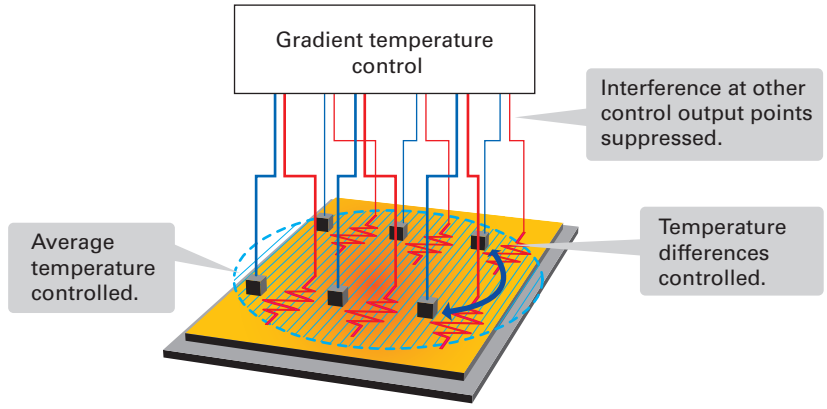


## Gradient Temperature Control for Planar Temperature Control Across Multiple Points

**Note**: CS1W-LCB05-GTC only.

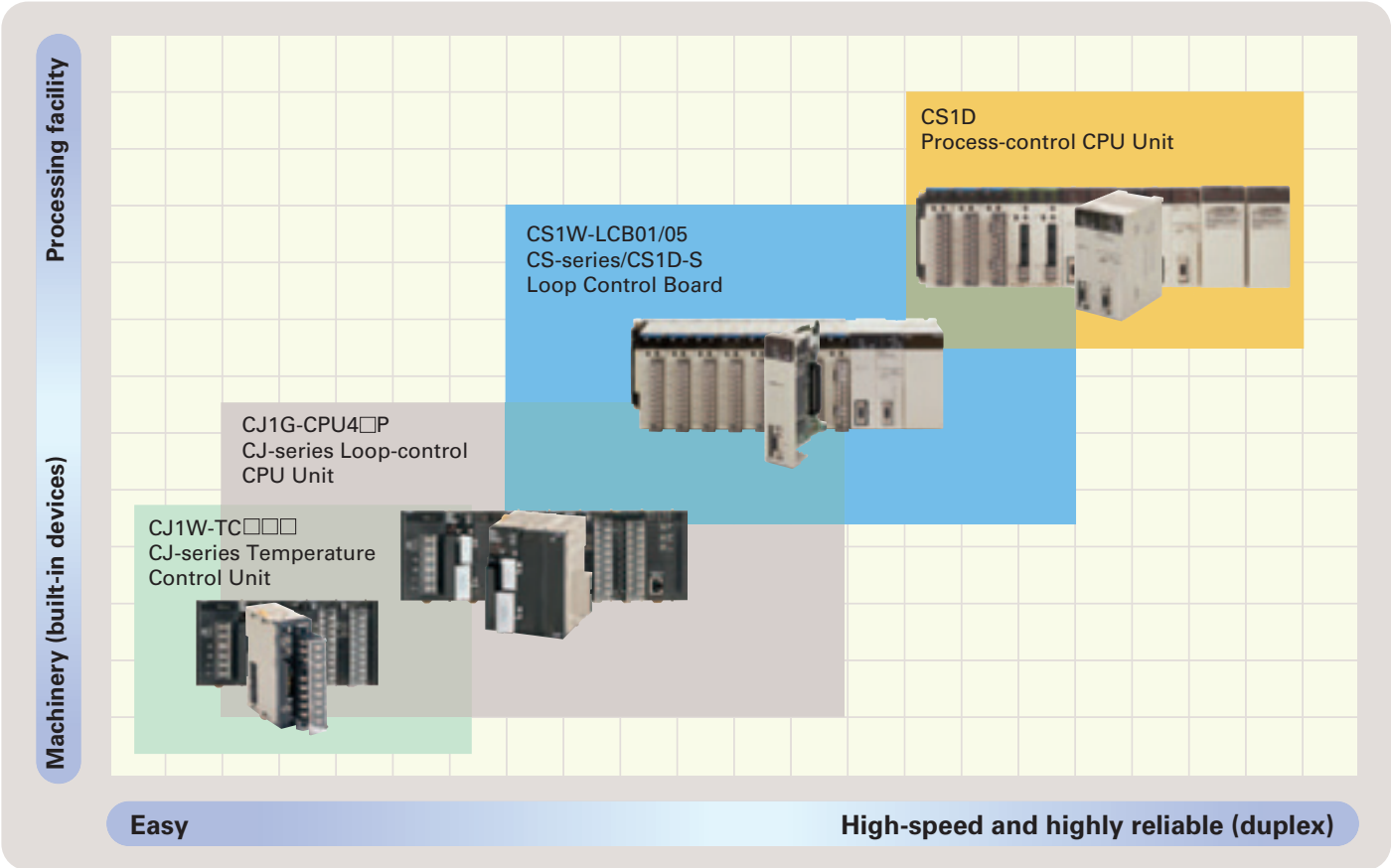
Gradient temperature control equalizes the temperatures at multiple points, providing high-quality heat processing, reducing energy loss until temperatures stabilize, and saving labor in adjustments due to interference between heaters.

Example: Planar Temperature Control of Multi-stage Furnaces, Wafer and Glass Surface Temperatures, and Other Applications.




For details, refer to the *SYSMAC CS/CJ Series Controllers for Gradient Temperature Control Catalog* (R141).

## Compact CJ-series Loop-control CPU Units ideal for equipment built-in controller applications have been added to the series, further expanding the selection to suit the application.

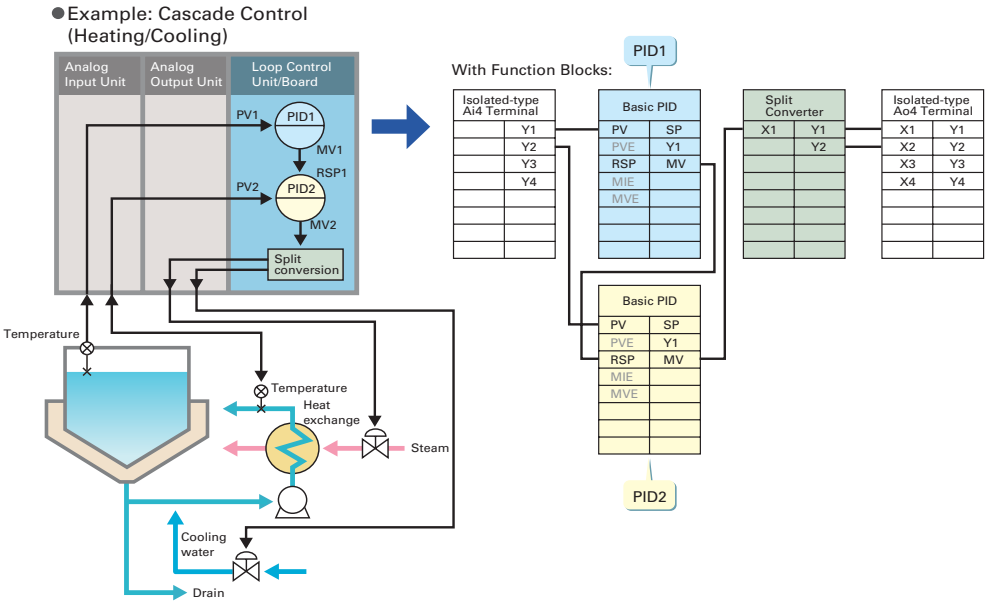



For details on the CJ Series, refer to the *Loop-control CPU Units Catalog* (R128).

# The Smart Products that Configure OMRON P

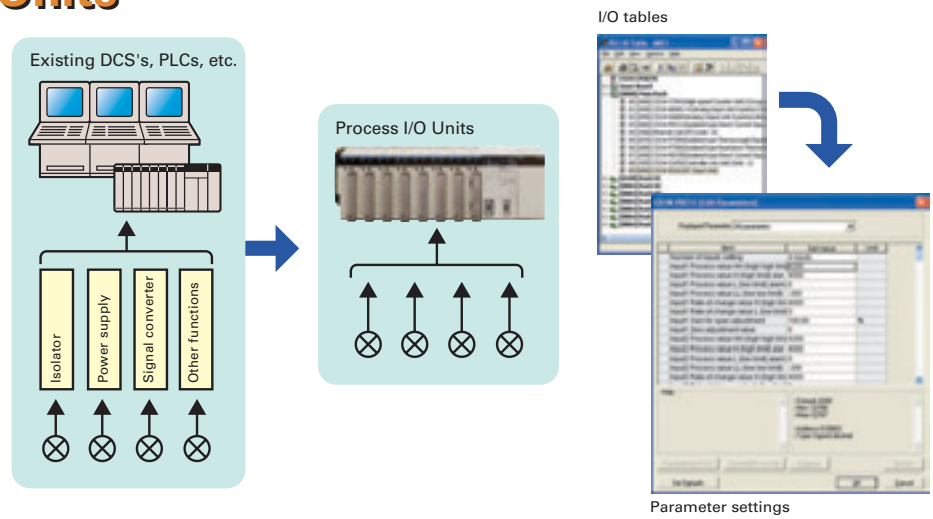
## Loop Control Boards (LCBs)

Packed with complete DCS functionality, the LCBs are programmed with function blocks designed specifically for process control. By combining function blocks, a wide array of control methods, from basic PID control to cascade and feed-forward control can be easily configured.
The LCB is used in combination with I/O Units to perform I/O operations.



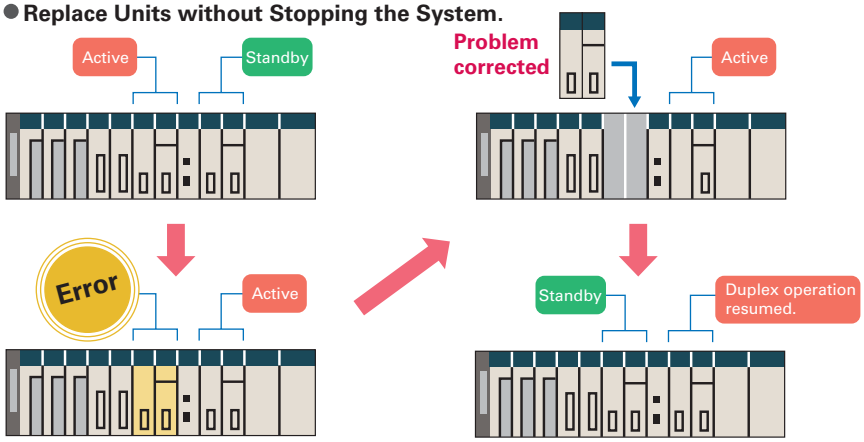

## Process Analog I/O Units

These Analog I/O Units provide the functionality of isolators, power supplies, signal converters, and other devices. The built-in functions, such as measurement value alarms, rate-of-change calculations, and square roots, have enabled major savings in cost and space compared with previous systems. High-resolution Models and 8-point Input Models are also available. By combining the Units, logging/monitoring systems can be constructed, or the Units can be used together with LCBs to construct complete process control systems. Parameters can be easily displayed and set in an easy-to-understand form without special tools.




## SYSMAC CS1D-series Duplex PLCs

Process control system redundancy is easily achieved by mounting Process-control CPU Units to the SYSMAC CS1D system. A duplex system can greatly reduce risk in chemical plants, ship boiler systems, semiconductor utilities, or anywhere reliability is demanded.



# rocess Control

**The required number of engineering steps is reduced by software that enables analog control programming by combining function blocks and easy connection to HMI devices.**

## CX-One

### Integrated Package Tool

The CX-One is an integrated software package that includes the CX-Programmer PLC Support Software and CX-Process Loop Controller Support Software, as well as the CX-Designer PT Support Software. The CX-One provides inter-software information and settings inheritance for complete system-level support. Even advanced parameters from CPU Unit to CPU Bus Unit parameters through FA network startup can be easily set without relying on user manuals.

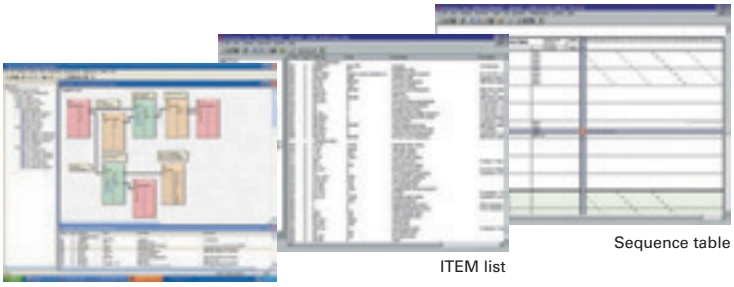
CX-One

Network Support Software:
CX-Integrator

## CX-Process Tool

### Programming

Program graphically by pasting function blocks for PID control, square root calculations, or other functions in a window and then connect them with the mouse. Multiple function blocks can be grouped together to define a single user-defined function block. Function blocks can also be used in sequence tables and step ladders for sequence control programming.



Sequence table

ITEM list

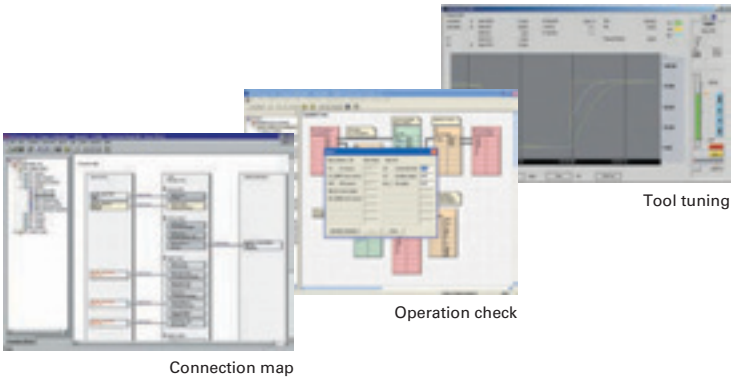
Block connection diagrams

### Operation and Debugging

Engineering is simplified by a host of debugging functions that help in setting up the program.

- ITEM lists for individual function blocks can be monitored or settings can be changed.
- Parameters can be easily monitored or changed on tuning windows (up to 4 windows can be started simultaneously).
- Tuning data can be saved in CSV format.
- Individual function blocks can be added or deleted during operation.
- Connection, tag, and comment data can be downloaded to or uploaded from a Memory Card in a Loop Control Board (see note) or CPU Unit.

**Note**: Except for CS1D Process-control CPU Units.



Tool tuning

Operation check

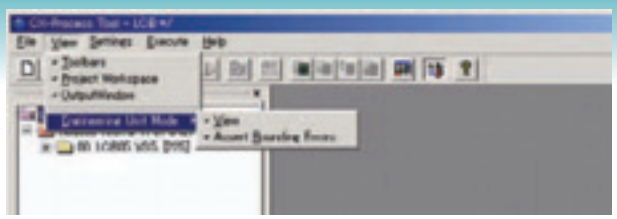
Connection map

Progressively Easier Handling

# New Functions for the LCB01/05 Unit Ver. 3.5 with CX-Process Tool Ver. 5.2

## Even Easier to Use
## Display Values in Engineering Units

With a simple setting, analog data in the PLC can easily be converted to any engineering unit for display. There is no longer any need for a program to convert from normalized data (0% to 100%) to engineering data.



Engineering Unit Mode Switching Function

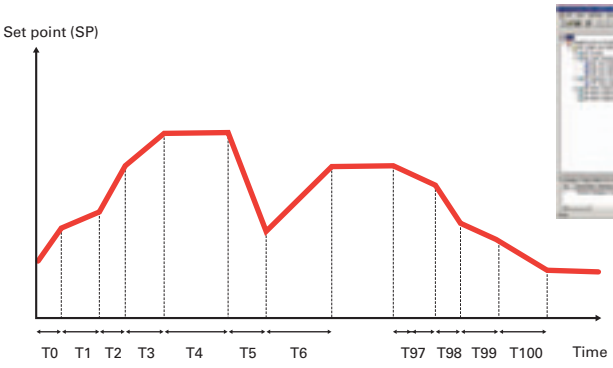
ITEM Setting Window

## Even Easier to Use
## Segment Program 3

The maximum number of steps has been increased from 30 to 100 to support a wider range of temperature control applications.

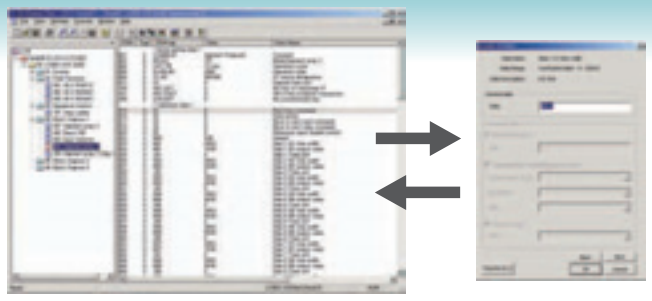
●Up to 100 Steps for Program Operation

Set the set point, time width, and PID bank (PID set) for up to 100 steps in the Loop Controller to automatically switch these parameters at the specified times. Setting up to 100 steps makes program control ideal for controlling complex batch processing. And uploading and downloading program data makes it easy to save and update parameter settings.




## Even Easier to Use
## Segment Program Edit Window

The display format of the Segment Program Setting Window has been changed to the table format, making it easier to understand intuitively and thus saving time.



Previous Program Setting Window

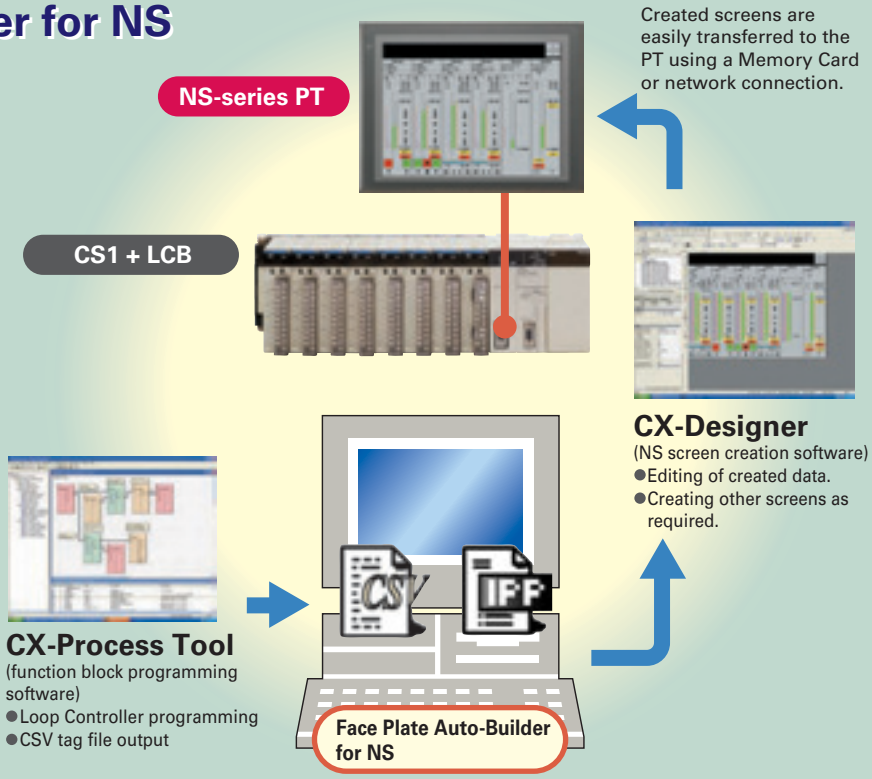
New Program Setting Window

# Utility Software

## Face Plate Auto-Builder for NS

Engineering steps can be drastically reduced by combining a Loop Controller with an NS-series Programmable Terminal (PT).

- Automatically Generate Control and Tuning Windows The software generates NS touch panel screen data from tag information created on the CX-Process Tool (tag names, tag comments, scaling, I/O allocations, etc.).
- There is no need for troublesome communications address settings on the PT or ladder programming.
- The generated data can be edited on the CX-Designer (NS screen creation software) as required. (Some screens cannot be edited.)



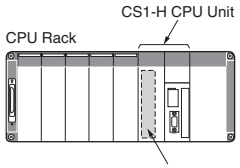
# System Configuration

## Mounting Position

### Loop Control Boards/Units

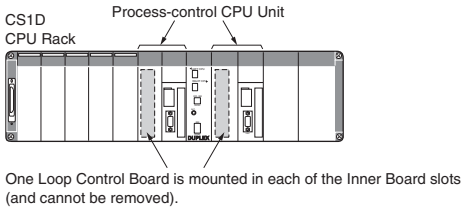
#### CS1W-LCB01/05(-GTC)

The CS1W-LCB01/05(-GTC) Loop Control Board is an Inner Board for CS-series CPU Units. Only one Loop Control Board can be mounted to a CS1□-CPU□□H or CS1D-CPU□□S CPU Unit.



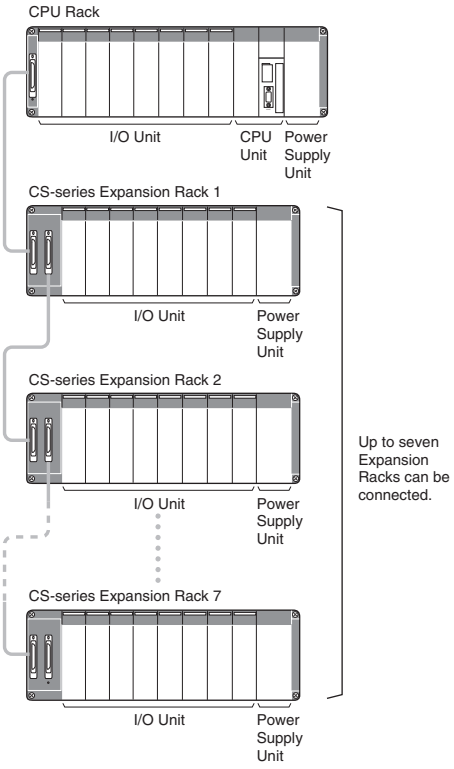

#### CS1D-CPU6□P

The LCB05D Duplex Loop Control Board is mounted in the Inner Board slot of the CS1D-CPU6□H and cannot be removed.



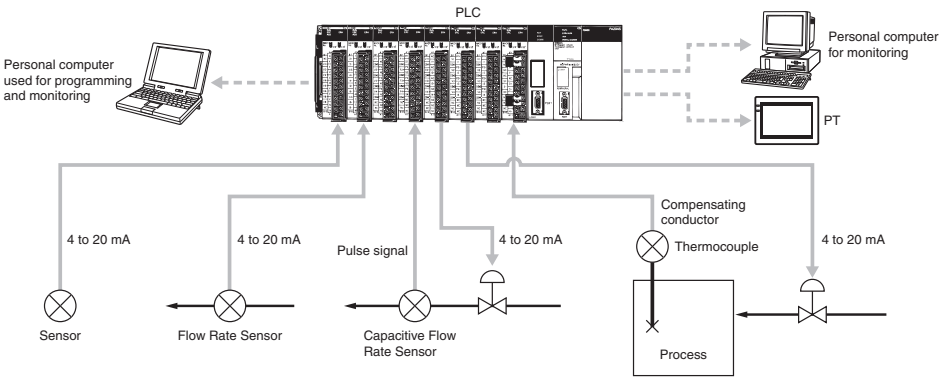

### Process Analog I/O Units

Process Analog I/O Units are classified as CS-series Special I/O Units and are mounted to the CPU Rack or a CS-series Expansion Rack. The number of Units that can be mounted to a single Rack (CPU Rack or Expansion Rack) depends on the maximum supply current of the Power Supply Unit and the current consumption of other Units mounted to the Rack. Process Analog I/O Units can be mounted in any position on the Racks.




## PLC-based Process Control Configuration Example

The process control system is configured using Loop Control Boards, Process Analog I/O Units, and Analog I/O Units to control the functions of the peripheral instruments.



# Loop Control Boards

## General Specifications

| Item | | Specification | | |
|---|---|---|---|---|
| Name | | Loop Control Boards | | |
| Unit classification | | CS-series Inner Boards | | |
| Model number | | **CS1W-LCB01**: Standard Inner Board | **CS1W-LCB05(-GTC)**: Special Inner Board | **LCB05D**: Duplex Inner Board |
| Applicable CPU Units | | CS1G/H-CPU□□H<br>CS1D-CPU□□S<br>(See note 1.) | CS1G/H-CPU□□H<br>CS1D-CPU□□S<br>(See note 1.) | Built into the CS1D-CPU6□P. |
| Mounting location | | Inner Board slot in CPU Unit | | |
| Number of Boards/ Units | | 1 Board max. per CPU Unit | | |
| Data exchange with CPU Unit | I/O memory | User Link Tables: ITEM data for function blocks can be allocated in any part of I/O memory (CIO, WR, HR, or DM Areas, or EM Area bank 0). | | |
| | All data | HMI function used to allocate function block ITEM data for Control, Operation, and External Controller blocks in the specified bank of the EM Area in the CPU Unit. (Default: Bank 0) | | |
| Setting switches | | None | | |
| Indicators | | 3 LEDs: RUN, ready, and communications port send/receive | | |
| Front panel connections | | RS-232C port x 1 (The CS1D-LCB05D cannot be used to connect to the ES100X Controller.) | | |
| Data backup | | By super capacitor: All function block data (including sequence tables and step ladder instructions) | | |
| Battery/capacitor life | | 24 hours at 25°C (life shortened by use at higher temperatures) | | |
| Data storage in flash memory | | Function block data (RAM data backup and recovery can be performed whenever necessary.)<br>Error log data | | |
| Effect on CPU Unit cycle time | | 0.8 ms max. | | 25 ms max.<br>(See note 2.) |
| Current consumption (supplied from Power Supply Unit) | | 220 mA at 5 V DC (Increased by 150 mA when NT-AL001-E Link Adapter is used.) | | |
| Dimensions | | 34.5 × 130 × 100.5 mm (W × H × D) | | |
| Weight | | 100g max. | | |
| Standard accessories | | None | | |

**Note: 1.** A Loop Control Board Unit Ver. 1.5 or later is required for use. Do not use a Loop Control Board with a unit version earlier than 1.5.

**2.** During duplex initialization: 2.1 s max.

# Function Specifications

| Item | | | Specification | |
|---|---|---|---|---|
| Model numbers | | | **CS1W-LCB01** | **CS1W-LCB05(-GTC)<br>LCB05D<br>(Built into the CS1D-CPU6□P.)** |
| Operation method | | | Function block method | |
| Operation cycle | | | Settable cycles:<br>0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, or 2 s (default: 1 s) (See note 1.)<br>Can be set for each function block. | |
| Number of function blocks | Analog operation | Control blocks (See note 2.) | 50 blocks max. | 500 blocks max. |
| | | Operation blocks (See note 3.) | | |
| | | External controller blocks | 32 blocks max. (LCB05D not included). | |
| | Sequence control | Sequence tables | None | 200 tables max.<br>32 conditions and 32 actions per table max. (expandable to 64 conditions and 64 actions per table)<br>6,400 rules total max. |
| | | Step ladder program blocks | 20 blocks max.<br>2,000 commands total<br>100 commands max. per block<br>Separable into a 100 steps max. | 200 blocks max.<br>4,000 commands total<br>100 commands max. per block<br>Separable into a 100 steps max. |
| | I/O blocks | Field terminal blocks | 80 blocks max | |
| | | User link tables | 2,400 data items max. | |
| | | All data | HMI functions<br>Allocated 1 EM Area bank | |
| | | CPU terminal blocks | None | |
| | | Node terminal blocks | None | |
| | System common blocks | | 1 block max. | |
| Method for creating and transferring function blocks | | | Created and transferred using CX-Process Tool (included in CX-One Package). | |
| Control methods | PID control method | | PID with 2 degrees of freedom (with auto-tuning) | |
| | 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 | |

**Note: 1.** Operation cycles of 0.01, 0.02, and 0.05 s cannot be set for the LCB05D.

**2.** Control blocks such as those for PID control.

**3.** Operation blocks for process control such as those for alarms, square roots, time/date calculations, and pulse-train computations.

# CX-Process Tool and Monitor

## Software Specifications

| Item | | CX-Process Tool |
|---|---|---|
| Name | | CX-Process Tool (Included in CX-One Package) |
| Model number | | **CXONE-AL□□D-V□** |
| Applicable PLCs | | CS/CJ-series PLCs |
| Applicable Units | | CJ-series Loop-control CPU Units<br>CS-series Loop Control Boards<br>CS1D Process-control CPU Units |
| Compatible computers | OS | Microsoft Windows XP (Service Pack 3 or higher), Vista, 7 or 8 |
| | CPU (See note2.) | Processor recommended by Microsoft. |
| | Memory | Memory recommended by Microsoft. |
| | Hard disk storage | Minimum: 350 Mbytes free space<br>(Including approximately 280 Mbytes used for communications middleware and other purposes) |
| | Monitor | Minimum: XGA<br>Recommended: SXGA 65,536 colors or more |
| Communica-tions method | Connection with CPU Unit (or Serial Communications Board/Unit) | When FinsGateway Serial Unit driver is used:<br>Communications protocol with PLC: Host Link or Peripheral Bus (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) |
| | 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 |
|---|---|
| | CX-Process Tool |
| Offline functions | ITEM data settings for function blocks<br>• Software connections for analog signals<br>• Displaying and printing text strings (annotation) pasted on function block diagrams and ladder diagrams.<br>• Instructions for step ladder blocks and commands for sequence table blocks<br>• Tag settings for CX-Process Monitor<br>• Engineering unit display setting<br>• Segment Program parameter setting |
| Online functions | • Transfer of function block data (Downloading/Uploading for Loop Control Boards.)<br>• Starting/stopping all function blocks (LCB)<br>• Monitoring system operation: Monitoring and controlling the System Common block (including LCB load rates)<br>• Validating LCB operation: Checking function block connections (including starting and starting individual function blocks), validating ladder diagrams and sequence tables, and monitoring ITEMs<br>• Tuning PID constants and other parameters (fine tuning and autotuning)<br>• Initialization of Loop Control Unit memory (RAM)<br>• External backup specifications |

**Note: 1.** The CX-Process Tool functions that can be used depend on the version. For details, refer to the *operation manuals* (Cat. No.: W372-E1-□ and W373-E1-□).

**2.** CX-One Operating System Precaution:
1) System requirements and hard disk space may vary with the system environment.
2) Except for Windows XP 64-bit version.

**3.** Peripheral Bus cannot be used when FinsGateway V3 is used.

# Function Blocks (Unit Ver. 3.5)

## System Common Blocks

| Type | Block Name | Function |
|---|---|---|
| System | 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 1.) | 2-position type ON/OFF controller |
| | 3-position ON/OFF (See note 1.) | 3-position type ON/OFF controller for heating/cooling ON/OFF control |
| | Basic PID (See note 1.) | Performs basic PID control. |
| | Advanced PID (See note 1.) | Performs PID with two degrees of freedom control for enabling deviation/MV compensation, MV tracking, etc. |
| | Blended PID (See note 2.) | Performs PID control on the cumulative value (cumulative deviation) between the accumulated value PV and accumulated value Remote Set Point. |
| | Batch Flowrate Capture (See note 2.) | Functions to open the valve at a fixed opening until a fixed batch accumulated value is reached. |
| | Fuzzy Logic (See note 2.) | Outputs up to two analog outputs based on fuzzy logic performed on up to 8 analog inputs. |
| | Indication and Setting (See note 1.) | Manual setter with PV indication and SP setting functions |
| | Indication and Operation (See note 1.) | Manual setter with PV indication and MV setting functions |
| | Ratio Setting (See note 1.) | Ratio and bias setter with PV indication and ratio setting function |
| | Indicator (See note 1.) | PV indicator with PV alarm |

**Note: 1.** High-speed control of function blocks is supported (the operation cycle can be set to 0.01 s, 0.02 s, or 0.05 s), except when using the LCB05D.

**2.** Cannot be used with the CS1W-LCB05-GTC.

## External Controller Blocks

| Type | Block Name | Function |
|---|---|---|
| External Controller Block | ES100X Controller Terminal (See note.) | Performs monitoring and setting for an ES100X Controller connected directly to the RS-232C port on the Loop Control Unit. |

**Note:** LCB05D not supported.

# Operation Blocks

| Type | Block Name | Function |
|---|---|---|
| Alarm/ Signal restrictions/Hold | 4-Point Warning Indicator | Provides the alarm contact outputs for the high/high, high, low, and low/low limits of single analog signals. This function block provides the same function as the Indicator block (model 034). |
| | High/Low Alarm (See note 1.) | Provides the alarm contact outputs for the high and low limits of single analog signals. |
| | Deviation Alarm (See note 1.) | Provides the alarm contact outputs for the deviation of two analog signals. |
| | Rate-of-change Operation and Alarm (See note 1.) | 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 1.) | Limits the high and low limits of single analog signals. |
| | Deviation Limit (See note 1.) | Calculates the deviation between two analog signals, and limits the deviation within that range. |
| | Analog Signal Hold (See note 1.) | Holds the maximum, minimum or instantaneous value of single analog signals. |
| Arithmetic | Addition or Subtraction (See note 1.) | Performs addition/subtraction with gain and bias on up to 4 analog signals. |
| | Multiplication (See note 1.) | Performs multiplication with gain and bias on up to 2 analog signals. |
| | Division (See note 1.) | Performs division with gain and bias on up to 2 analog signals. |
| | Range Conversion (See note 1.) | Easily converts up to 8 analog signals simply by inputting the 0% and 100% input values and 0% and 100% output values. |
| | Arithmetic Operation (See note 1.) | Performs various math operation (trigonometric. logarithmic, etc.) on floating-point decimal values converted (to industrial units) from up to 8 analog inputs. |
| Functions | Square Root (See note 1.) | Performs square root extraction (with low-end cutout) on single analog signals. |
| | Absolute Value (See note 1.) | Outputs the absolute value of single analog signals. |
| | Non-linear Gain (Dead Band) (See note 1.) | 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 1.) | Sets output to zero close to the zero point of single analog signals. |
| | Segment Linearizer (See note 1.) | Converts single analog signals to 15 segments before the signals is output. |
| | Temperature And Pressure Correction (See note 1.) | Performs temperature and pressure correction. |
| Time Function | First-order Lag (See note 1.) | Performs first-order lag operation on single analog signals. |
| | Rate-of-change Limit (See note 1.) | Performs rate-of-change restriction on single analog signals. |
| | Moving Average (See note 1.) | Performs moving average operation on single analog signals. |
| | Lead/Delay (See note 1.) | Performs lead/delay operation on single analog signals. |
| | Dead Time (See note 1.) | 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 1.) | 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 |
| | Segment Program 3 (See note 4.) | |
| Signal Selection/ Switching | Rank Selector (See note 1.) | Selects the rank of up to 8 analog signals. |
| | Input Selector (See note 1.) | Selects the specified analog signals specified by the contact signal from up to 8 analog signals. |
| | 3-input Selector (See note 1.) | Selects and outputs one of three analog input signals. |

# Function Blocks (Unit Ver. 3.5)

| Type | Block Name | Function |
|---|---|---|
| Signal Selection/ Switching | 3-output Selector (See note 1.) | Outputs one analog input signal in one of three switched directions. |
| | Constant Selector (See note 1.) | Selects 8 preset constants by the contact signal. |
| | Constant Generator (See note 1.) | Outputs 8 independent constants. |
| | Ramped Switch | Switches two analog inputs (or constants) with a ramp. |
| | Bank Selector (See note 3.) | Stores a maximum of eight sets of PID parameters (SP, P, I, D, MH, ML) in advance, and switches them to basic PID, advanced PID, or blended PID parameters in response to the analog input zone or input bit. |
| | Split Converter (See note 3.) | Takes an operating amount input from a basic PID or advanced PID block and converts the V characteristics or parallel characteristics into two analog outputs (e.g., heating and cooling operating amounts). |
| ITEM Settings | Constant ITEM Setting (See note 1.) | Writes the constant to the specified ITEM at the rising edge of the send command contact. |
| | Variable ITEM Setting (See note 1.) | Writes the analog signal to the specified ITEM at the rising edge of the send command contact. |
| | Batch Data Collector (See note 1.) | Stores each of max. 8 analog inputs to buffer by a certain timing within sequential processing. |
| Pulse Train Operation | 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. |
| | Accumulated Value Input/ Contact Output | Converts 4-digit accumulated value signals to low-speed contact pulses before they are output. |
| Others | Analog/Pulse Width Converter (See note 1.) | 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 1.) | Compares up to eight sets of analog signals and constants, and outputs the comparison results as contacts. |
| | Variable Comparator (See note 1.) | Compares up to eight pairs of analog signals, and outputs the comparison results as contacts. |
| | Timer (See note 1.) | 2-stage output type addition timer for forecast values and reached values. Can also output the present value. |
| | ON/OFF Timer (See note 1.) | Timer for performing ON-OFF operation at preset ON and OFF times. |
| | Clock Pulse (See note 1.) | Manipulates and monitors ON/OFF valves with open/close limit switches. |
| | Counter (See note 1.) | 2-stage output type addition timer for forecast values and arrival values. Can also output the current value. |
| | Internal Switch (See note 1.) | Temporary storage contact for accepting relays in the Step Ladder Program block. (**Note:** One internal switch is already allocated as “temporary storage” in CX-Process Tool.) |
| | Level Check (See note 1.) | 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. |
| Contact Type Control Target | ON/OFF Valve Manipulator | Manipulates and monitors ON/OFF valves with open/close limit switches. |
| | 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. |
| | Switch Meter (See note 2.) | Manipulates and monitors multiple (up to 8) devices such as ON/OFF valves, motors, or pumps. |

**Note: 1.** High-speed control of function blocks is supported (the operation cycle can be set to 0.01 s, 0.02 s, or 0.05 s), except when using the LCB05D.

**2.** Cannot be used with the CS1W-LCB05-GTC.

**3.** LCB05D not supported.

**4.** Supported by the CS1W-LCB01/05 only.

# Sequence Control Blocks

| Type | Block Name | Function |
|---|---|---|
| Sequence Control | Step Ladder Program (See note.) | Performs logic sequence and step progression control. |
| | Sequence Table (See note.) | Performs logic sequence and step progression control based on conditions and actions listed in tabular form. |

**Note:** High-speed control of function blocks is supported (the operation cycle can be set to 0.01 s, 0.02 s, or 0.05 s), except when using the CS1D-LCB05D.

# Field Terminal Blocks

| Type | Block Name | Function |
|---|---|---|
| Contact I/O | DI 8-point Terminal (See note.) | Inputs 8 contacts from 8-point Input Unit. |
| | DI 16-point Terminal (See note.) | Inputs 16 contacts from 16-point Input Unit. |
| | DI 32-point Terminal (See note.) | Inputs 32 contacts from 32-point Input Unit. |
| | DI 64-point Terminal (See note.) | Inputs 64 contacts from 64-point Input Unit. |
| | DO 5-point Terminal (See note.) | Outputs 5 contacts from 5-point Output Unit. |
| | DO 8-point Terminal (See note.) | Outputs 8 contacts from 8-point Output Unit. |
| | DO12-point Terminal (See note.) | Outputs 12 contacts from 12-point Output Unit. |
| | DO16-point Terminal (See note.) | Outputs 16 contacts from 16-point Output Unit. |
| | DO32-point Terminal (See note.) | Outputs 32 contacts from 32-point Output Unit. |
| | DO64-point Terminal (See note.) | Outputs 64 contacts from 64-point Output Unit. |
| | DI 16-point/DO 16-point Terminal (See note.) | Inputs and outputs 16 contacts each from 16-point Input/16-point Output Units. |
| | DI 96-point Terminal (See note.) | Inputs 96 contacts from 96-contact Input Units. |
| | DO 96-point Terminal (See note.) | Outputs 96 contacts from 96-contact Output Units. |
| | DI 48-point/DO 48-point Terminal (See note.) | Inputs and outputs 48 contacts each from 48-point Input/48-point Output Units. |
| Analog I/O | AI 8-point Terminal (AD003) (See note.) | Inputs 8 analog signals from the C200H-AD003. |
| | AO 8-point Terminal (DA003/4) (See note.) | Inputs 8 analog signals from the C200H-DA003/DA004. |
| | AI 2-point/AO 2-point Terminal (MAD01) (See note.) | Inputs and outputs 2 analog signals each from the C200H-MAD01. |
| | AI 4-point Terminal (PTS01-V1/02/03, PDC01, PTW01) (See note.) | Inputs 4 analog signals from one of CS1W-PTS01-V1 (Isolated-type Thermocouple Input Unit), CS1W-PTS02/03 (Isolated-type Temperature-resistance Thermometer Input Unit), CS1W-PDC01 (Isolated-type Analog Input Unit) or CS1W-PTW01 (2-lead Transmitter Input Unit). |
| | PI 4-point Terminal (PPS01) (See note.) | Inputs 4 instantaneous values and accumulated values each from CS1W-PPS01 (Isolated-type Pulse Input Unit). |
| | AO 4-point Terminal (PMV01) (See note.) | Outputs 4 analog signals from CS1W-PMV01 (Isolated-type Control Output Unit). |
| | AI 8-point Terminal (PTR01/02) (See note.) | Inputs 8 analog signals from CS1W-PTR01 (Power Transducer Input Unit) or CS1W-PTR02 (Analog Input Unit (100 mV)). |
| | AO 4-point Terminal (PMV02) (See note.) | Outputs 4 analog signals from CS1W-PMV02 (Isolated-type Control Output Unit). |
| | AI 4-point Terminal (PTS51) (See note.) | Inputs 4 analog signals from CS1W-PTS51 or CJ1W-PTS51 (isolated-type thermocouple Input Unit). |
| | AI 4-point Terminal (PTS52) (See note.) | Inputs 4 analog signals from CS1W-PTS52 or CJ1W-PTS52 (isolated-type thermocouple input Unit). |

| Type | Block Name | Function |
|---|---|---|
| Analog I/O | AI 8-point Terminal (PTS55) (See note.) | Inputs 8 analog signals from CS1W-PTS55 (isolated-type thermocouple Input Unit). |
| | AI 8-point Terminal (PTS56) (See note.) | Inputs 8 analog signals from CS1W-PTS56 (isolated-type thermocouple Input Unit). |
| | AI 8-point Terminal (PDC55) (See note.) | Inputs 8 analog signals from CS1W-PDC55 (Direct current Input Unit). |
| | AI 4-point/AO 4-point Terminal (MAD44) (See note.) | Inputs and outputs 4 analog signals each from the CS1W-MAD44. |
| | AI 16-point Terminal (AD161) (See note.) | Inputs 16 analog signals from CS1W-AD161. |
| | AI 8-point Terminal (AD081) (See note.) | Inputs 8 analog signals from the CS1W-AD081(-V1) or CJ1W-AD081(-V1). |
| | AO 8-point Terminal (DA08V/C) (See note.) | Outputs 8 analog signals from the CS1W-DA08V/C or CJ1W-DA08V/C. |
| | AI 4-point Terminal (AD041) (See note.) | Inputs 4 analog signals from the CS1W-AD041(-V1) or CJ1W-AD041(-V1). |
| | AO 4-point Terminal (DA041) (See note.) | Outputs 4 analog signals from the CS1W-DA041 or CJ1W-DA041. |
| | AI 4-point Terminal (DRT1-AD04) (See note.) | Inputs four analog signals from a DRT1-AD04 DeviceNet Slave Analog Input Unit. Input Unit. |
| | AO 2-point Terminal (DRT1-DA02) (See note.) | Outputs two analog signals from a DRT1-DA02 DeviceNet Slave Analog Output Unit. |

**Note:** High-speed control of function blocks is supported (the operation cycle can be set to 0.01 s, 0.02 s, or 0.05 s), except when using the LCB05D.

# Node Terminal Blocks

| Type | Block Name | Function |
|---|---|---|
| Send to Computer | DO to Computer | Sends 128 contacts to the send-to-computer area. When CX-Process Monitor is used, the contact signals to be monitored are connected to this function block. |
| | AO to Computer | Sends 16 analog values to the send-to-computer area. When CX-Process Monitor is used, the analog signals to be monitored are connected to this function block. |
| | 1-Block Send Terminal to Computer | Sends a specified 1 block to the send-to-computer area. When CX-Process Monitor is used, the 1 block to be monitored are connected to this function block. |
| | 4-Block Send Terminal to Computer | Sends a specified 4 block to the send-to-computer area. When CX-Process Monitor is used, the 4 block to be monitored are connected to this function block. |
| Send to All Nodes | DO Terminal to All Nodes | Sends 32 contacts to nodes on the Controller Link Data Link. |
| | AO Terminal to All Nodes | Sends 2 analog values to nodes on the Controller Link Data Link. |
| | DO Terminal Settings from Computer | Receives 32 contacts sent from the computer. (Can also be downloaded to the send-to-all nodes area.) |
| | AO Terminal Settings from Computer | Receives 2 analog values sent from the computer. (Can also be downloaded to the send-to-all nodes area.) |
| Receive from All Nodes | DI Terminal from All Nodes | Receives 32 contacts sent from nodes on the Controller Link Data Link. |
| | AI Terminal from All Nodes | Receives 2 analog values sent from nodes on the Controller Link Data Link. |

# CPU Unit Terminal Blocks

| Type | Block Name | Function |
|---|---|---|
| CPU Unit Terminals | DI Terminal from CPU Unit | Inputs max. 128 points from any leading address in CPU Unit I/O memory (one of CIO, WR, HR, DM and EM area types). (read) |
| | DO Terminal to CPU Unit | Outputs max. 128 points from any leading address in CPU Unit I/O memory (one of CIO, WR, HR, DM and EM area types). (read and write) |
| | AI Terminal from CPU Unit | Inputs max. 8 words from any leading address in CPU Unit I/O memory (one of CIO, WR, HR, DM and EM area types). (read) |
| | AO Terminal to CPU Unit | Outputs max. 8 words from any leading address in CPU Unit I/O memory (one of CIO, WR, HR, DM and EM area types). (read and write) |

# SCADA Interface Blocks

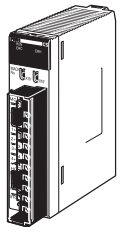
| Type | Block Name | Function |
|---|---|---|
| Expanded CPU Unit Terminals | Expanded DI Terminal from CPU Unit | Inputs any contact data in CPU Unit I/O Memory, and writes max. 64 points on another function block. |
| | Expanded DO Terminal from CPU Unit | Inputs the contact data of another function block, and writes max. 64 points on any I/O Memory in the CPU Unit. |
| | Expanded AI Terminal from CPU Unit | Inputs any analog data in CPU Unit I/O Memory, and writes max. 64 words on another function block. |
| | Expanded AO Terminal from CPU Unit | Inputs the analog data of another function block, and writes max. 64 words on any CPU Unit I/O Memory. |
| Send/ Receive All Blocks | Receive All Blocks | Reads ITEM data specified for Send/ Receive All Blocks for up to 32 Control Blocks, 249 Operation Blocks, and 32 External Controller Blocks starting from a specified address in the I/O memory of the CPU Unit. |
| | Send All Blocks | Writes ITEM data specified for Send/ Receive All Blocks for up to 32 Control Blocks, 249 Operation Blocks, and 32 External Controller Blocks starting to a specified address in the I/O memory of the CPU Unit. |

**Note:** The CS1□-LCB□□□ supports User Link Tables and an HMI instead.

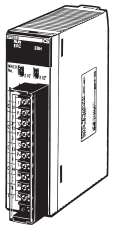
# Process and Analog I/O Units

## Overview

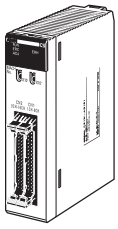
A wide range of 25 I/O Units, including 16 Isolated-type Units, covers almost all typical applications. Also featuring high-speed (10 ms) and high-resolution (1/64,000) types, this line-up meets a diverse array of potential uses, from data logging to high-speed measurement control.



CS1W-PTS11



CS1W-PTS12



CS1W-AD161

## Features

- Dramatic reductions in installation cost, space, and set-up steps are attained by eliminating the need for external setters and converters.
- Process value alarms and rate-of-change calculations can be executed from temperature and analog inputs.
- Rate-of-change limits and high/low output limits calculated for analog output.
- Peak/bottom hold and top/valley hold functions can be used for process values (CS1W-P□□1□ only).
- Zero point and span can be adjusted for any specified range, and adjustment days and times can be automatically saved. The adjustment deadline and adjustment deadline expiration notice can also be set and notification given (CS1W-P□□1□ only).
- Changes exceeding a set threshold can be counted, and analog input values can be integrated (CS1W-P□□1□ only).
- Reduced wiring with MIL connectors (CS1W-AD161 only).
  XW2D-34G6 Connector-Terminal Block Conversion Unit can be used.

## Overview of Process Analog I/O Units

| Name | Model | Number of I/O | I/O type | Main specifications (See note.) | Main functions |
|---|---|---|---|---|---|
| Isolated-type Thermocouple Input Unit (high-resolution) | CS1W-PTS11 | 4 inputs | B, E, J, K, L, N, R, S, T, U, WRe5-26, PLII, ±100 mV | Standard accuracy: ±0.05% of F.S.<br>Temperature coefficient: ±0.01%/°C<br>Resolution: 1/64,000<br>Conversion period: 20 ms/4 pts, 10 ms/2 pts | Output scaling (±32,000)<br>Process value alarms (HH, H, L, LL)<br>Rate-of-change calculation and alarm<br>Input disconnection alarm<br>Top/bottom/valley hold<br>Zero/span adjustment for any specified range |
| Isolated-type Resistance Thermometer Input Unit (high-resolution) | CS1W-PTS12 | 4 inputs | Pt100 Ω (JIS, IEC), JPt100 Ω, Pt50 Ω, Ni508.4 Ω | Standard accuracy: ±0.05% of F.S. or ±0.1°C, whichever is larger<br>Temperature coefficient: ±0.009%/°C<br>Resolution: 1/64,000<br>Conversion period: 20 ms/4 pts, 10 ms/2 pts | Output scaling (±32,000)<br>Process value alarms (HH, H, L, LL)<br>Rate-of-change calculation and alarm<br>Input disconnection alarm<br>Top/bottom/valley hold<br>Zero/span adjustment for any specified range |
| Isolated-type DC Input Unit (high-resolution) | CS1W-PDC11 | 4 inputs | 4 to 20 mA, 0 to 20 mA, 0 to 10 V, ±10 V, 0 to 5 V, ±5 V, 1 to 5 V, 0 to 1.25 V, ±1.25 V | Standard accuracy: ±0.05% of F.S.<br>Temperature coefficient: ±0.008%/°C<br>Resolution: 1/64,000<br>Conversion period: 20 ms/4 pts, 10 ms/2 pts | Output scaling (±32,000)<br>Process value alarms (HH, H, L, LL)<br>Rate-of-change calculation and alarm<br>Input disconnection alarm<br>Top/bottom/valley hold<br>Zero/span adjustment for any specified range |
| Isolated-type Thermocouple Input Unit (economical type) | CS1W-PTS51 | 4 inputs | R, S, K, J, T, L, B | Centigrade Selected<br>Total accuracy: ±0.3% of PV or ±1°C whichever is larger, ±1 digit max.<br>Conversion period: 250 ms/Unit | Process value alarms (H, L)<br>Input disconnection detection |
| | CS1W-PTS55 | 8 inputs | | | |
| Isolated-type Resistance Thermometer Input Unit (economical type) | CS1W-PTS52 | 4 inputs | Pt100(JIS, IEC), JPt100 | Centigrade Selected<br>Total accuracy: ±0.3% of PV or ±0.8°C, whichever larger, ±1 digit max.<br>Conversion period: 250 ms/Unit | Process value alarms (H, L)<br>Input disconnection detection |
| | CS1W-PTS56 | 8 inputs | | | |
| Isolated-type DC Input Unit (economical type) | CS1W-PDC55 | 8 inputs | 4 to 20 mA, 0 to 10 V, 0 to 5 V, 1 to 5 V | Standard accuracy: ±0.3% of F.S.<br>Resolution: 1/16,000<br>Conversion period: 250 ms/8 inputs | Process value alarms (H, L)<br>Input disconnection alarm |
| Isolated-type Thermocouple Input Unit | CS1W-PTS01-V1 | 4 inputs | B, E, J, K, N, R, S, T<br>Variable range: ±80 mV DC | Standard accuracy: ±0.1%<br>Temp. coefficient: ±0.015%/°C<br>Resolution: 1/4,096<br>Conversion cycle: 150 ms/4 pts | Variable range setting<br>Scaling (±32,000)<br>Process value alarms (HH, H, L, LL)<br>Rate-of-change calculation and alarm<br>Input disconnection detection |
| Isolated-type Resistance Thermometer Input Unit | CS1W-PTS02 | 4 inputs | Pt100 (JIS, IEC), JPt100 | Standard accuracy: ±0.1% or ±0.1°C, whichever is larger<br>Temperature coefficient: ±0.015%/°C<br>Resolution: 1/4,096<br>Conversion period: 100 ms/4 pts | Variable range setting<br>Output scaling (±32,000)<br>Process value alarms (HH, H, L, LL)<br>Rate-of-change calculation and alarm<br>Input disconnection alarm |
| Isolated-type Resistance Thermometer Input Unit (Ni508.4 Ω) | CS1W-PTS03 | 4 inputs | Ni508.4 Ω | Standard accuracy: ±0.2% or ±0.2°C, whichever is larger<br>Temperature coefficient: ±0.015%/°C<br>Resolution: 1/4,096<br>Conversion period: 100 ms/4 pts | Variable range setting<br>Output scaling (±32,000)<br>Process value alarms (HH, H, L, LL)<br>Rate-of-change calculation and alarm<br>Input disconnection detection |

| Name | Model | Number of I/O | I/O type | Main specifications (See note.) | Main functions |
|---|---|---|---|---|---|
| Isolated-type 2-Wire Transmitter Input Unit | CS1W-PTW01 | 4 inputs | 4 to 20 mA,<br>1 to 5 V | Standard accuracy: ±0.2%<br>Temp. coefficient: ±0.015%/°C<br>Resolution: 1/4,096<br>Conversion period: 100 ms/4 pts | Built-in power supply for 2-wire transmitter<br>Output scaling (±32,000)<br>Process value alarms (HH, H, L, LL)<br>Rate-of-change calculation and alarm<br>Square root<br>Input error detection |
| Isolated-type Analog Input Unit | CS1W-PDC01 | 4 inputs | –10 to 10 V, 0 to 10 V, –5 to 5 V, 0 to 5 V, 1 to 5 V, ±10 V DC variable range,<br>4 to 20 mA,<br>0 to 20 mA | Standard accuracy: ±0.1%<br>Temp. coefficient: ±0.015%/°C<br>Resolution: 1/4,096<br>Conversion cycle: 100 ms/4 pts | Process value alarms (HH, H, L, LL)<br>Output scaling (±32,000)<br>Square root<br>Rate-of-change calculation and alarm<br>Input error detection |
| Isolated-type Pulse Input Unit | CS1W-PPS01 | 4 inputs | Max. counting speed:<br>20 k pulses/s (voltage input or no-voltage semiconductor input)<br>20 pulses/s<br>(contact input) | --- | Built-in sensor power supply<br>Contact bounce filter<br>Unit pulse conversion<br>Accumulated value output<br>Instantaneous value output and 4 instantaneous value alarms |
| Isolated-type Analog Output Unit | CS1W-PMV01 | 4 outputs | 4 to 20 mA,<br>1 to 5 V | Standard accuracy:<br>±0.1% (4 to 20 mA)<br>Standard accuracy:<br>±0.2% (1 to 5 V)<br>Temperature coefficient: ±0.015%/°C<br>4,000 (outputs)<br>Conversion period: 100 ms/4 pts | Output disconnection alarm<br>Control output answer input<br>Output rate-of-change limit<br>Output high/low limits |
| | CS1W-PMV02 | 4 outputs | 0 to 10 V,<br>±10 V, 0 to 5 V,<br>±5 V, 0 to 1 V, ±1 V | Standard accuracy: ±0.1%<br>Temp. coefficient: ±0.015%/°C<br>Resolution (full scale):<br>±10 V, ±1 V: 1/16,000<br>0 to 10 V, 0 to 1 V, and ±5 V: 1/8,000<br>0 to 5 V: 1/4,000<br>Conversion period: 40 ms/4 pts | Output rate-of-change limit<br>Output high/low limits<br>Output scaling (±32,000) |
| Power Transducer Input Unit | CS1W-PTR01 | 8 inputs | ±1 mA,<br>0 to 1 mA | Standard accuracy: ±0.2%<br>Temp. coefficient: ±0.015%/°C<br>Resolution: 1/4,096<br>Conversion cycle: 200 ms/8 pts | Anti-overshooting at motor startup<br>Process value alarms (H, L)<br>Output scaling (±32,000) |
| Analog Input Unit (100 mV) | CS1W-PTR02 | 8 inputs | ±100 mV,<br>0 to 100 mV | Standard accuracy: ±0.2%<br>Temp. coefficient: ±0.015%/°C<br>Resolution: 1/4,096<br>Conversion period: 200 ms/8 pts | Process value alarms (H, L)<br>Output scaling (±32,000) |

**Note:** Varies depending on usage conditions. Refer to the *Analog I/O Units User's Manual* (W368) for details.

# Overview of Analog I/O Units

| Name | Model | Number of I/O | I/O signal ranges | Overall accuracy |
|---|---|---|---|---|
| Analog Input Unit | CS1W-AD041-V1 | 4 inputs | 1 to 5 V, 0 to 5 V,<br>0 to 10 V, –10 to 10 V,<br>4 to 20 mA | Voltage input: ±0.2% of F.S.: current input ±0.4% of F.S. (23±2°C)<br>Voltage input: ±0.4% of F.S.: current input ±0.6% of F.S. (0 to 55°C)<br>Resolution: 1/8,000 (See note 1.)<br>Conversion speed: 250 μs/point max. (See note 1.)<br>(Can be used with a resolution of 1/4,000 and conversion speed of 1 ms.) |
| | CS1W-AD081-V1 | 8 inputs | 1 to 5 V, 0 to 5 V,<br>0 to 10 V, –10 to 10 V,<br>4 to 20 mA | Voltage input: ±0.2% of F.S.: current input ±0.4% of F.S. (23±2°C)<br>Voltage input: ±0.4% of F.S.: current input ±0.6% of F.S. (0 to 55°C)<br>Resolution: 1/8,000 (See note 1.)<br>Conversion speed: 250 μs/point max. (See note 1.)<br>(Can be used with a resolution of 1/4,000 and conversion speed of 1 ms.) |
| | CS1W-AD161<br>(See note 2.) | 16 inputs | 1 to 5 V, 0 to 5 V,<br>0 to 10 V, –10 to 10 V,<br>4 to 20 mA | Voltage input: ±0.2% of F.S.: current input ±0.2% of F.S. (23±2°C)<br>Voltage input: ±0.4% of F.S.: current input ±0.4% of F.S. (0 to 55°C)<br>Resolution: 1/8,000 (See note 1.)<br>Conversion speed: 250 μs/point max. (See note 1.)<br>(Can be used with a resolution of 1/4,000 and conversion speed of 1 ms.) |
| Analog Output Unit | CS1W-DA041 | 4 outputs | 1 to 5 V, 0 to 5 V,<br>0 to 10 V, –10 to 10 V,<br>4 to 20 mA | Voltage output: ±0.3% of F.S.: current output ±0.5% of F.S. (23±2°C)<br>Voltage output: ±0.5% of F.S.: current output ±0.8% of F.S. (0 to 55°C)<br>Resolution: 1/4,000<br>Conversion speed: 1 ms/point max. |
| | CS1W-DA08V | 8 outputs | 1 to 5 V, 0 to 5 V,<br>0 to 10 V, –10 to 10 V | ±0.3% of F.S. (23±2°C)<br>±0.5% of F.S. (0 to 55°C)<br>Resolution: 1/4,000<br>Conversion speed: 1 ms/point max. |
| | CS1W-DA08C | 8 outputs | 4 to 20 mA | ±0.5% of F.S. (23±2°C)<br>±0.8% of F.S. (0 to 55°C)<br>Resolution: 1/4,000<br>Conversion speed: 1 ms/point max. |
| Analog I/O Unit | CS1W-MAD44 | 4 inputs<br>4 outputs | Input:<br>1 to 5 V, 0 to 5 V,<br>0 to 10 V, –10 to 10 V,<br>4 to 20 mA<br>Output:<br>1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V | Voltage input: ±0.2% of F.S.: current input ±0.4% of F.S. (23±2°C)<br>Voltage input: ±0.4% of F.S.: current input ±0.6% of F.S. (0 to 55°C)<br>Output: ±0.3% of F.S. (23±2°C)<br>Output: ±0.5% of F.S. (0 to 55°C)<br>I/O resolution: 1/4,000<br>Conversion speed: 1 ms/point max. |

**Note: 1.** The resolution and conversion speed can be switched with a DM setting.
If it isn't necessary to change the setting, the Unit can be used with the earlier model's mode (resolution of 1/4,000 and conversion speed of 1 ms) just like the conventional model.

**2.** Use the OMRON XW2D-34G6 Connector-Terminal Block Conversion Unit and XW2Z-200C Connecting Cable to wire inputs.