

Special I/O Selection

This section describes the CS1 modules that are specially designed to handle analog, multiple-loop temperature control, Heat/Cool control, PID control, Fuzzy Logic control, single- and multiple-axis position control, multiple-axis motion control, high-speed counting, ID sensor control and voice notification module right on the PLC. All of these modules have independent co-processors to handle the specialized functions to reduce the load on the CPU and keep cycle times extremely fast.

Analog I/O Modules

Classification	Model	I/O Capacity	I/O Isolation*	I/O Ranges/types	Conversion Time	Remarks	See page
Analog input units	CS1W-AD041-V1	8 inputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, ± 10 V, 4 to 20 mA	1 ms/pt	–	C-76
	CS1W-AD081-V1	8 inputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, ± 10 V, 4 to 20 mA	1 ms/pt	–	C-76
	CS1W-PTW01	4 inputs	Yes	1 to 5 V, 4 to 20 mA	100 ms/4 pts	Built-in power supply for 2-wire transmission device, measured value alarms (HH, H, L, LL), other features	C-83
	CS1W-PDC01	4 inputs	Yes	1 to 5 V, 0 to 5 V, 0 to 10 V, ± 10 V, 4 to 20 mA, 0 to 20 mA	100 ms/4 pts	Measured value alarms (HH, H, L, LL), other features	C-84
	CS1W-PPS01	4 inputs	Yes	No-voltage semiconductor input: 0 to 20,000 pulses/s, Voltage input: 0 to 20,000 pulses/s, Contact input: 0 to 20 pulses/s	100 ms/4 pts	Built-in power supply, contact bounce filter, 4 instantaneous value alarms	C-84
	CS1W-PTR01	8 inputs	No	-1 mA to 1 mA, 0 to 1 mA	200 ms/8 pts	Motor overdrive prevention, measured value alarms (H, L), other features	C-84
	CS1W-PTR02	8 inputs	No	-100 mA to 100 mA, 0 to 100 mV	200 ms/8 pts	Measured value alarms (H, L), other features	C-82
Analog output units	CS1W-DA041	4 outputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, ± 10 V, 4 to 20 mA	1 ms/pt	–	C-78
	CS1W-DA08V	4 outputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, ± 10 V	1 ms/pt	–	C-78
	CS1W-DA08C	4 outputs	No	4 to 20 mA	1 ms/pt	–	C-78
	CS1W-PMV01	4 outputs	Yes	1 to 5 V, 4 to 20 mA	100 ms/4 pts	Output disconnection alarm, control output answerback input, other features	C-84
Analog I/O unit	CS1W-PMV02	4 outputs	Yes	0 to 10 V, ± 10 V, 0 to 5 V, ± 5 V, 0 to 1 V, ± 1 V	100 ms/4 pts	–	C-84
	CS1W-MAD44	4 inputs and 4 outputs	No	Inputs: 1 to 5 V, 0 to 5 V, to 10 V, ± 10 V, 4 to 20 mA Outputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, ± 10 V	1 ms/pt	–	C-80
Temperature sensor input units	CS1W-PTS01-V1	4 inputs	Yes	B, E, J, K, N, R, S, T, ± 80 mVDC auto range	150 ms/4 pts	Automatic range setting, measured value alarms (HH, H, L, LL), other features	C-83
	CS1W-PTS02	4 inputs	Yes	Pt100 (JIS, DIN, ISO) JPt100	100 ms/4 pts		
	CS1W-PTS03	4 inputs	Yes	Ni508 Ω	100 ms/4 pts		
	C200H-TS001	4 inputs	No	K, J	4.8 s max.	–	C-85
	C200H-TS002	4 inputs	No	K, L	4.8 s max.	–	C-85
	C200H-TS101	4 inputs	No	JPt100	4.8 s max.	–	C-85
C200H-TS102	4 inputs	No	Pt100	4.8 s max.	–	C-85	

High-resolution Analog I/O Modules

Classification	Model	I/O Capacity	I/O Isolation*	I/O Ranges/types	Conversion Time	Remarks	See page
Analog input units	CS1W-PTS11	4 inputs	Yes	B, E, J, K, L, N, R, S, T, U, WRe5-26, PLII, ± 100 mV	2 ms/4 pts, 10 ms/2 pts	Scaling ($\pm 32,000$), process value alarms (HH, H, L, LL), other features	C-83
	CS1W-PTS12	4 inputs	Yes	Pt100 Ω (JIS, IEC), JPt100 Ω , Pt50 Ω , Ni508.4 Ω	2 ms/4 pts, 10 ms/2 pts	Scaling ($\pm 32,000$), process value alarms (HH, H, L, LL), other features	C-83
	CS1W-PDC11	4 inputs	Yes	4 to 20 mA, 0 to 20 mA, 0 to 10 V, ± 10 V, 0 to 5 V, ± 5 , 1 to 5 V, 0 to 1.25 V, ± 1.25 V	2 ms/4 pts, 10 ms/2 pts	Scaling ($\pm 32,000$), process value alarms (HH, H, L, LL), other features	C-83

*Note: Inputs are isolated from PLC signals for all units.

Multiple-loop Temperature Control Modules

The temperature control modules are designed for various temperature control applications. The C200H-TC modules have one actuator (heating) and the C200H-TV modules have two actuators (heating/cooling).

Performs complete temperature control and reports results right from the CS1.

- 2-loop control offers independent settings for each loop.
- Ideal for zone control in extrusion and heat-treating applications as well as reliable temperature control for multiple processes.
- Heater burnout detection function for effective diagnostics in critical processes.

Temperature Control Application	Module	Temperature Sensor Input	Control Output Type	See page
Heating control	C200H-TC001	Thermocouples (R, S, K, J, T, E, B, N, L or U)	Open-collector (pulse)	C-87
	C200H-TC002		Voltage (pulse)	C-87
	C200H-TC003		Current (linear)	C-87
	C200H-TC101	Platinum resistance thermometer (JPt100 and Pt100)	Open-collector (pulse)	C-87
	C200H-TC102		Voltage (pulse)	C-87
	C200H-TC103		Current (linear)	C-87
Heating/cooling control	C200H-TV001	Thermocouples (R, S, K, J, T, E, B, N, L or U)	Open-collector (pulse)	C-89
	C200H-TV002		Voltage (pulse)	C-89
	C200H-TV003		Current (linear)	C-89
	C200H-TV101	Platinum resistance thermometer (JPt100 and Pt100)	Open-collector (pulse)	C-89
	C200H-TV102		Voltage (pulse)	C-89
	C200H-TV103		Current (linear)	C-89

PID Control Modules

The PID Control Modules can read analog input variables such as pressure or speed and control them via a 2-channel process controller with a PID (self-tuning) or two-point (ON/OFF) control response.

The Modules have multiple-range inputs (Voltage or Current) and are available with three different types of output.

Scaling and extensive monitoring functions (10 alarm modes) are integrated.

Module	Analog Input Type	Control Output Type	See page
C200H-PID01	4 to 20 mA, 1 to 5 V, 0 to 5 V or 0 to 10 V	Open-collector (pulse)	C-91
C200H-PID02		Voltage (pulse)	C-91
C200H-PID03		Current (linear)	C-91

Single- and Multiple-axis Position Control Modules

The position control modules for the CS1 series have been developed for precise positioning on pick and place machines and for the use of cutting equipment and positioning systems.

Servo or stepper systems that accept pulse-train inputs can be controlled with these modules.

Configure a complete system by combining these parts:


- Position control module (CS1W-NC□□□)
- Omron SMARTSTEP or W-Series servo drive or any manufacturer's servo/stepper drive.

Module	Output	Controlled Axes	See page
CS1W-NC113	Open collector	1 Axis	C-97
CS1W-NC213		2 Axis	C-97
CS1W-NC413		4 Axis	C-97
CS1W-NC133	Line driver	1 Axis	C-97
CS1W-NC233		2 Axis	C-97
CS1W-NC433		4 Axis	C-97

Motion Control Modules

The motion control modules for the CS1 series have been developed for precise positioning, as is necessary in pick and place machines and positioning systems. Up to four axes can be controlled dependently or independently of one another.

The new high-performance motion controller CS1W-MCH71 can also handle up to 30 axes over an electronic high-speed 10 Mbps bus and also perform electronic gear functions.

Module	Controlled Axes	Electronic Gear Functions	See page
CS1W-MC221	2 max.	No	C-99
CS1W-MC421	4 max.	No	C-99
CS1W-MCH71	30 max.	Yes	 Go to www.omron.com/oei , type CS1W-MCH71 in "Site Search" for more information.

High-Speed Counter Modules

The high-speed counter modules count pulse signal inputs that are too fast to be detected by normal input units.

Module	Max. Input Frequency	Input Voltage	Number of Counters	Remarks
CS1W-CT021	50 kHz - 500 kHz with line driver input	5, 12, 24 VDC and RS-422 line driver	2	–
CS1W-CT041	50 kHz - 500 kHz with line driver input	5, 12, 24 VDC and RS-422 line driver	4	–
CS1W-HCP22	50 kHz - 200 kHz with line driver input	5, 12, 24 VDC and RS-422 line driver	2	Programmable unit with PLC functionality and 2 pulse outputs
CS1W-HCA22	50 kHz - 200 kHz with line driver input	5, 12, 24 VDC and RS-422 line driver	2	Programmable unit with PLC functionality and 2 analog outputs
CS1W-CTS21	1.5 MHz	RS-422/485	2	SSI (Synchronous Serial Interface) encoder inputs

Cam Positioner Module

The cam positioner module is an electronic high-speed drum counter operating like 48 mechanical cams. Angles are detected with an externally connected resolver.

Module	Number of Cam Outputs	Resolver Response Speed	See page
C200H-CP114	48	800 r/min max.	C-95

ID Sensor Modules

The ID sensor modules interface with the V600-series RFID (Radio Frequency Identification) system for high-speed communications between the CPU unit and data carriers (Radio Frequency Tags).

Module	Number of R/W Heads	See page
CS1W-V600C11	1	C-107
CS1W-V600C12	2	C-107

Voice Module

The voice module provides audible message notification of system condition or alarms.

Module	Message Capacity	See page
C200H-OV001	60 messages	C-110

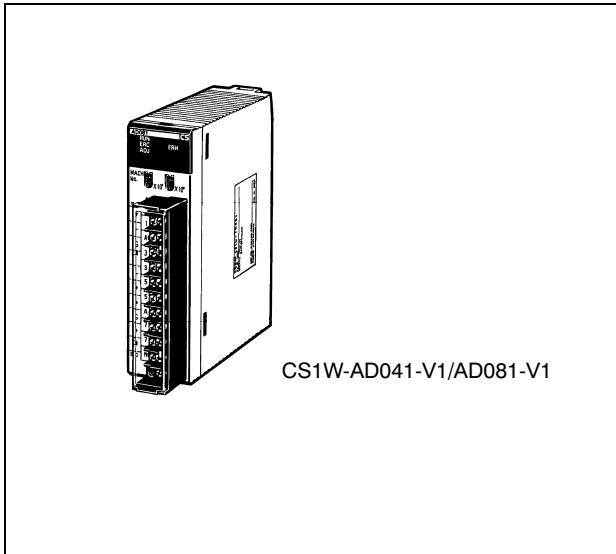
Configuration Guidelines

Remember to add all the current consumptions of basic I/O, special I/O modules, and CPU bus units to determine which power supply is appropriate.

Please refer to the *System Configuration* section for current consumption of individual modules.

For more I/O options, see the *Industrial Networks and Communication* section for DeviceNet I/O on page C-123 and CompoBus/S I/O on page C-138.

Analog Input Modules



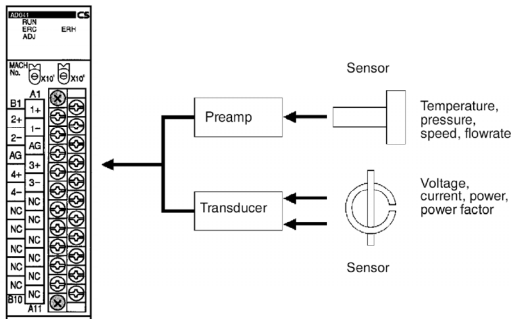
Convert input signals such as 1 to 5 V or 4 to 20 mA to binary values between 0000 and 0FA0 Hex and store the results in the allocated words each cycle. The ladder diagram can be used to transfer the data to the DM Area or the Scaling instructions (e.g, SCL(194)) can be used to scale the data to the desired range.

■ Features

- Wire burnout detection.
- Peak-hold function.
- Mean function.
- Offset gain setting.

Note: Analog Input Terminals are also available as DeviceNet Slaves and for Multiple I/O Terminals. Find more information in the Industrial Networking and Communications section of this catalog.

■ System Configuration



■ Terminal Arrangement

CS1W-AD041-V1
CS1W-AD041

Input 2 (+)	B1	A1	Input 1 (+)
Input 2 (-)	B2	A2	Input 1 (-)
AG	B3	A3	AG
Input 4 (+)	B4	A4	Input 3 (+)
Input 4 (-)	B5	A5	Input 3 (-)
N.C.	B6	A6	N.C.
N.C.	B7	A7	N.C.
N.C.	B8	A8	N.C.
N.C.	B9	A9	N.C.
N.C.	B10	A10	N.C.
		A11	N.C.

CS1W-AD081-V1
CS1W-AD081

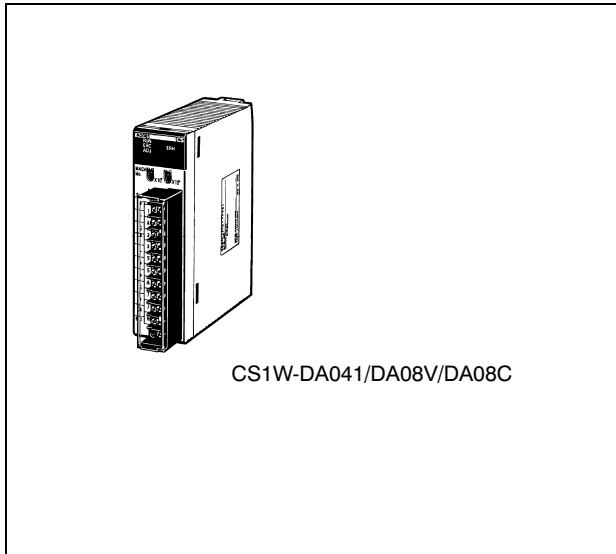
Input 2 (+)	B1	A1	Input 1 (+)
Input 2 (-)	B2	A2	Input 1 (-)
AG	B3	A3	AG
Input 4 (+)	B4	A4	Input 3 (+)
Input 4 (-)	B5	A5	Input 3 (-)
Input 6 (+)	B6	A6	Input 5 (+)
Input 6 (-)	B7	A7	Input 5 (-)
AG	B8	A8	AG
Input 8 (+)	B9	A9	Input 7 (+)
Input 8 (-)	B10	A10	Input 7 (-)
		A11	N.C.

■ Specifications

Model		CS1W-AD041-V1	CS1W-AD081-V1
Classification		CS1 Special Modules	
Module number		0 to 95	
Inputs		4 pts	8 pts
Signal range	Voltages	1 to 5 V	Yes
		0 to 10 V	Yes
		0 to 5 V	Yes
		-10 to 10 V	Yes
	Currents	4 to 20 mA	Yes
		0 to 20 mA	---
Signal range settings		4 settings (one for each point)	8 settings (one for each point)
Resolution		1/4000 (1/8000)	
Conversion speed		1 ms/pt max. (0.25 ms/pt max.)	
Overall accuracy (at 25°C)		Voltage: ±0.2% Current: ±0.4%	
Connections		Terminal block	
Features	Wire burnout detection	Yes	
	Peak-hold function	Yes	
	Mean function	Yes	

- Note:** 1. The C200H-AD001/AD002/AD003 can also be used with the CS1.
 2. Process I/O Modules are also available for analog I/O.
 3. For more details and information refer to manual no. W345.

Analog Output Modules



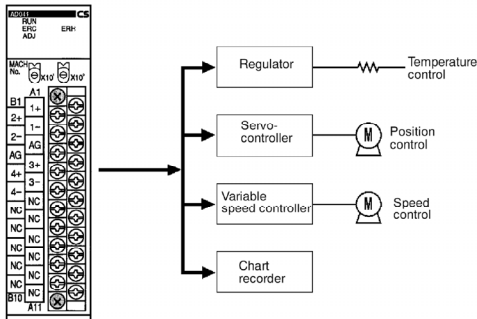
Binary data between 0000 to 0FA0 Hex in the allocated words can be converted to Analog signals such as 1 to 5 V or 4 to 20 mA for output. All that is required in the ladder diagram is to place the data in the allocated words.

■ Features

- Output limit.
- Upper/lower limit alarms.
- Offset gain adjustment.

Note: 1. The functions provided depend on the model used.
 2. Analog Output Terminals are also available as DeviceNet Slaves and for Multiple I/O Terminals. You can find more information in the Industrial Networking and Communication section of this catalog.

■ System Configuration



■ Terminal Arrangement

CS1W-DA08V/08C

N.C.	B1	A1	N.C.
Output 2 (+)	B2	A2	Output 1 (+)
Output 2 (-)	B3	A3	Output 1 (-)
Output 4 (+)	B4	A4	Output 3 (+)
Output 4 (-)	B5	A5	Output 3 (-)
Output 6 (+)	B6	A6	Output 5 (+)
Output 6 (-)	B7	A7	Output 5 (-)
Output 8 (+)	B8	A8	Output 7 (+)
Output 8 (-)	B9	A9	Output 7 (-)
N.C.	B10	A10	N.C.
		A11	N.C.

CS1W-DA041

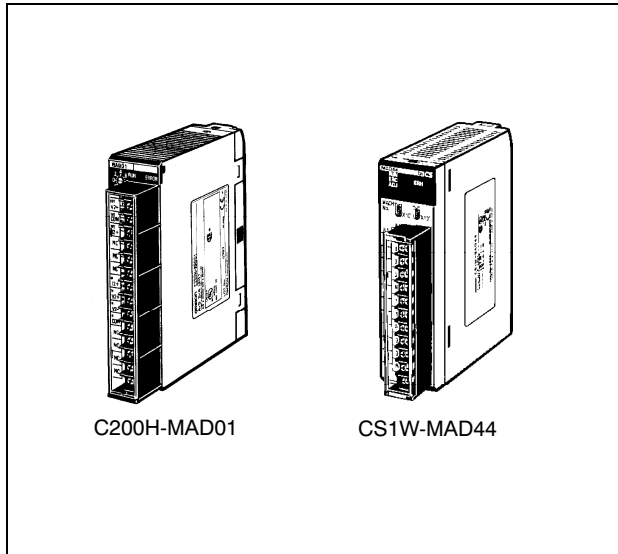
N.C.	B1	A1	N.C.
Output voltage 2 (+)	B2	A2	Output voltage 1 (+)
Output 2 (-)	B3	A3	Output 1 (-)
Output current 2 (+)	B4	A4	Output current 1 (+)
N.C.	B5	A5	N.C.
N.C.	B6	A6	N.C.
Output voltage 4 (-)	B7	A7	Output voltage 3 (+)
Output 4 (-)	B8	A8	Output 3 (-)
Output current 4 (+)	B9	A9	Output current 3 (+)
N.C.	B10	A10	N.C.
		A11	N.C.

■ Specifications

Model		CS1W-DA041	CS1W-DA08V	CS1W-DA08C	
Classification		CS1 Special I/O Modules			
Module numbers		0 to 95			
Outputs		4 pts	8 pts		
Signal range	Voltages	1 to 5 V	Yes		---
		0 to 10 V	Yes		---
		0 to 5 V	Yes		---
		-10 to 10 V	Yes		---
	Currents	4 to 20 mA	Yes	---	Yes
		0 to 20 mA	---		
Signal range settings		4 settings (one for each point)	8 settings (one for each point)		
Resolution		1/4000			
Conversion speed		1.0 ms/pt max.			
Overall accuracy (at 25°C)		Voltage: ±0.3% FS Current: ±0.5% FS	±0.3% FS	±0.5% FS	
Connections		Terminal block			
Features	Output hold function	---	Yes	Yes	

- Note:** 1. The C200H-DA001/DA002/DA003/DA004 can also be used with the CS1.
 2. Process I/O Modules are also available for analog I/O.

Analog I/O Modules

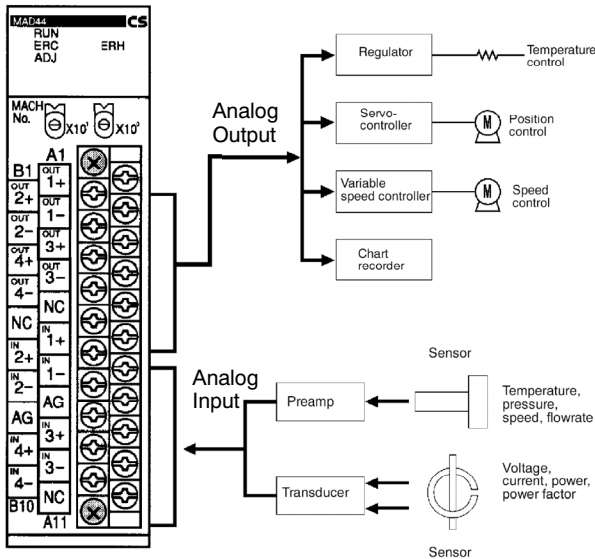


One Module performs both analog input and analog output operations. The Module can also be used for ratio and bias processing, which can be performed on analog inputs to output the results as analog outputs.

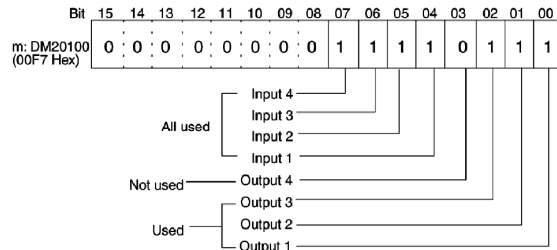
■ Features

- Mean Function.
- Peak hold function.
- Wire burnout detection.
- Output hold function.
- Ratio conversions.

■ System Configuration



■ Terminal Arrangement

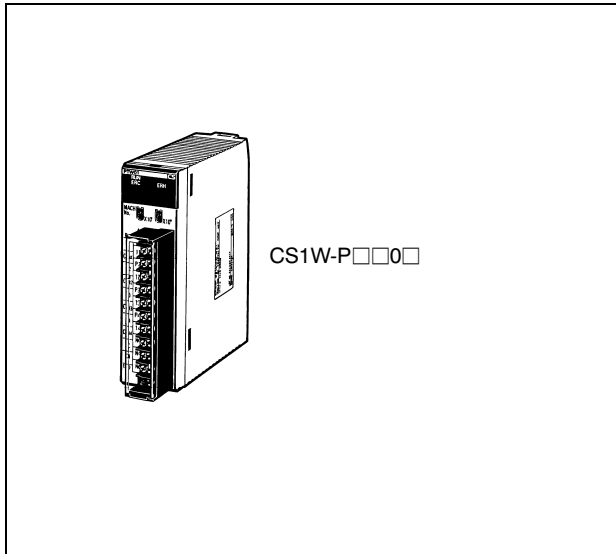


Note: For Terminal arrangement of C200H-MAD01 refer to manual W325.

■ Specifications

Model		C200H-MAD01	CS1W-MAD44	
Classification		C200H Special I/O Modules	CS1 Special I/O Modules	
Module numbers		0 to F	0 to 95	
Inputs		2 pts	4 pts	
Outputs		2 pts	4 pts	
Input signal range	Voltages	1 to 5 V	Yes	
		0 to 5 V	---	Yes
		0 to 10 V	Yes	
		-10 to 10 V	Yes	
		4 to 20 mA	Yes	
Output signal range	Currents	1 to 5 V	Yes	
		0 to 5 V	---	Yes
		0 to 10 V	Yes	
		-10 to 10 V	Yes	
		4 to 20 mA	Yes	---
Resolution		1/4000 (inputs/outputs)		
Conversion speed		1.0 ms/pt max. (Inputs/ouputs)		
Overall accuracy	Inputs	Voltage: $\pm 0.2\%$ Current: $\pm 0.4\%$		
	Outputs	Voltage: $\pm 0.3\%$ Current: $\pm 0.5\%$		
Connections		Terminal block		
Features	Mean function	Yes		
	Peak hold	Yes		
	Wire burnout detection	Yes		
	Output hold	Yes		
	Ratio conversion	Yes		

Process I/O Modules



Choose from a total of 13 models, including 11 isolated-type models, to handle essentially all normal processing applications. Meet a wide variety of monitoring needs with variable range setting, output scaling, rate-of-change operation and alarm, and many other features.

■ Features

Process Modules

- External converters and transducers not required: greatly reduces costs, space requirements, and labor.
- Input temperatures and use measured value alarms and disconnection alarms.
- Input analog currents and voltages and output square root and input error detection.
- Input pulse signals from capacitive flow sensors and output either accumulated or instantaneous values.
- For control outputs, use output disconnected detection, output rate-of-change limits, and high/low output limits.

Temperature Sensor Modules

- Input directly from up to four temperature sensors with one Module. The types of temperature sensor and temperature ranges can be set separately for each input.
- Models available with isolated inputs to prevent unwanted current flow between temperature sensor inputs.
- Provided with measured value alarms (4 points each).
- Line disconnection detection provided.

■ Specifications

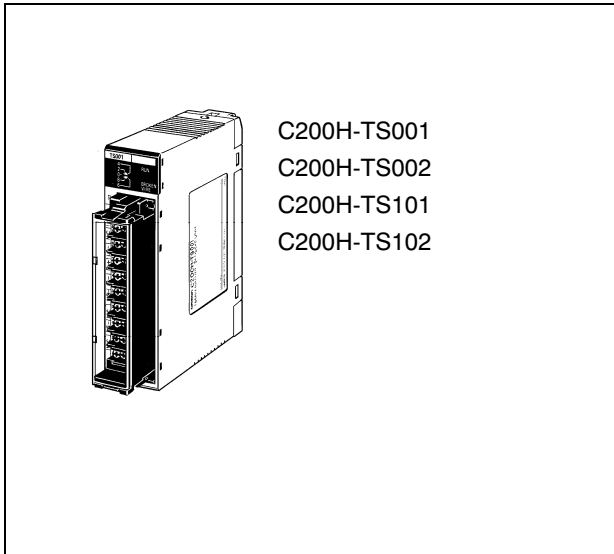
Module name	Model	I/O capacity	Field I/O isolation	I/O range/type	Accuracy/effective resolution	Main features
Isolated-type Thermocouple Input Module (high-resolution)	CS1W-PTS11	4 inputs	All inputs isolated.	B, E, J, K, L, N, R, S, T, U, WRe5-26, PLII, ± 100 mV	Standard accuracy: $\pm 0.05\%$ full scale Temp coefficient: $\pm 0.005\%/^{\circ}\text{C}$ Resolution: 1/64,000 Conversion cycle: 20 ms/4 pts, 10 ms/2 pts	Scaling ($\pm 32,000$), Process value alarms (HH, H, L, LL), rate-of-change calculation and alarms, input disconnection alarms, top, bottom, valley hold, variable range zero-span adjustment
Isolated-type Temperature Resistance Thermometer Input Module (high-resolution)	CS1W-PTS12	4 inputs	All inputs isolated.	Pt100 Ω (JIS, IEC), JPt100 Ω , Pt50 Ω , Ni508.4 Ω	Standard accuracy: The larger of $\pm 0.05\%$ full scale or $\pm 0.01\% ^{\circ}\text{C}$ Temp coefficient: $\pm 0.001\%/^{\circ}\text{C}$ Resolution: 1/64,000 Conversion cycle: 20 ms/4 pts, 10 ms/2 pts	Scaling ($\pm 32,000$), Process value alarms (HH, H, L, LL), rate-of-change calculation and alarms, input disconnection alarms, top, bottom, valley hold, Variable range zero-span adjustment
Isolated-type Analog Input Module (high-resolution)	CS1W-PDC11	4 inputs	All inputs isolated.	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: $\pm 0.05\%$ full scale Temp coefficient: $\pm 0.005\%/^{\circ}\text{C}$ Resolution: 1/64,000 Conversion cycle: 20 ms/4 pts, 10 ms/2 pts	Scaling ($\pm 32,000$), Process value alarms (HH, H, L, LL), rate-of-change calculation and alarms, input disconnection alarms, top, bottom, valley hold, accumulated value output variable range zero-span adjustment
Isolated-type Thermocouple Input Module	CS1W-PTS01-V1	4 inputs	All inputs isolated.	B, E, J, K, N, R, S, T, ± 80 mVDC variable range	Standard accuracy: $\pm 0.1\%$ full scale Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ Resolution: 1/4,096	Variable range setting, output scaling ($\pm 32,000$), measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, input disconnection alarms
Isolated-type Temperature-resistance Thermometer Input Module (Pt100)	CS1W-PTS02	4 inputs	All inputs isolated.	Pt100 (JIS, IEC) JPt100	Standard accuracy: Larger of $\pm 0.1\%$ or $\pm 0.1^{\circ}\text{C}$ full scale Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ Resolution: 1/4,096	Variable range setting, output scaling ($\pm 32,000$), measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, input disconnection alarms
Isolated-type Temperature-resistance Thermometer Input Module (Ni508.4 Ω)	CS1W-PTS03	4 inputs	All inputs isolated.	Ni508.4 Ω	Standard accuracy: Larger of $\pm 0.2\%$ or $\pm 0.2^{\circ}\text{C}$ full scale Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ Resolution: 1/4,096	
Isolated-type Two-wire Transmission Device Input Module	CS1W-PTW01	4 inputs	All inputs isolated.	4 to 20 mA, 1 to 5 V	Standard accuracy: $\pm 0.2\%$ full scale Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ Resolution: 1/4,096	Built-in power supply for 2-wire transmission device output scaling ($\pm 32,000$), measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, input disconnection alarms

(This table continues on the next page.)

Process I/O Modules

Specifications (continued)

Module name	Model	I/O capacity	Field I/O isolation	I/O range/type	Accuracy/effective resolution	Main features
Isolated-type Analog Input Module	CS1W-PDC01	4 inputs	All inputs isolated.	± 10 V, 0 to 10 V, ± 5 V, 0 to 5 V, 1 to 5 V, ± 10 VDC variable range, 4 to 20 mA, 0 to 20 mA	Standard accuracy: $\pm 0.1\%$ full scale Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ Resolution: 1/4,096	Output scaling ($\pm 32,000$), measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, square root, input error alarms
Isolated-type Pulse Input Module	CS1W-PPS01	4 inputs	All inputs isolated.	Max. counting speed: 20 K pulses/s (voltage input or no-voltage semi-conductor input) or 20 pulses/s (contact input)	---	Built-in sensor power supply, contact bounce filter, Module pulse conversion, accumulative and instantaneous value output, 4 instantaneous value alarms.
Isolated-type Control Output Module	CS1W-PMV01	4 outputs	All outputs isolated.	4 to 20 mA, 1 to 5 V	Standard accuracy: 4 to 20 mA: $\pm 0.1\%$ full scale 1 to 5 V: $\pm 0.2\%$ full scale Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ 4,000 (outputs)	Output disconnection alarms, control output answerback input, output rate-of-change limit, output high/low limits
Isolated-type Power Voltage Output Module	CS1W-PMV02	4 outputs	All outputs isolated	0 to 10 V, ± 10 V, 0 to 5 V, ± 5 V, 0 to 1 V, ± 1 V	---	---
Power Transducer Input Module	CS1W-PTR01	8 inputs	No isolation between inputs.	± 1 mA, 0 to 1 mA	Standard accuracy: $\pm 0.2\%$ full scale Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ Resolution: 1/4,096	Motor overdrive prevention at startup, output scaling ($\pm 32,000$), measured value alarms (H, L)
Analog Input Module	CS1W-PTR02	8 inputs	No isolation between inputs.	± 100 mV, 0 to 100 mV	Standard accuracy: $\pm 0.2\%$ full scale Temp coefficient: $\pm 0.015\%/^{\circ}\text{C}$ Resolution: 1/4,096	Output scaling ($\pm 32,000$), measured value alarms (H, L)



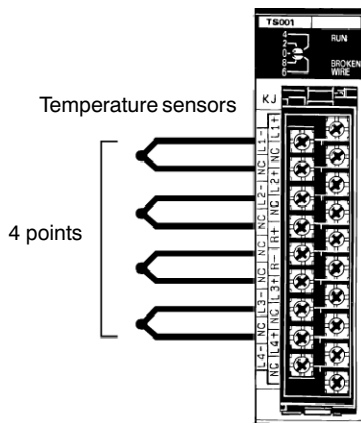
Using Input from thermocouples or resistance thermometers (up to 4 inputs) the Module converts the measured temperatures into BCD or binary data and stores them in the allocated relay area every cycle. The data can be transferred to the DM area or other memory locations using the ladder program.

■ Features

- Input directly from up to four temperature sensors of the same kind with one range setting.
- Analog-digital conversion speed ideal for slower processes: 4.8 seconds max. for 4 points.
- Line disconnection detection provided.

Note: Temperature sensor terminals are also available on DeviceNet slave. Further information is available on these in the CS1 Industrial Networking and communications section of this catalog.

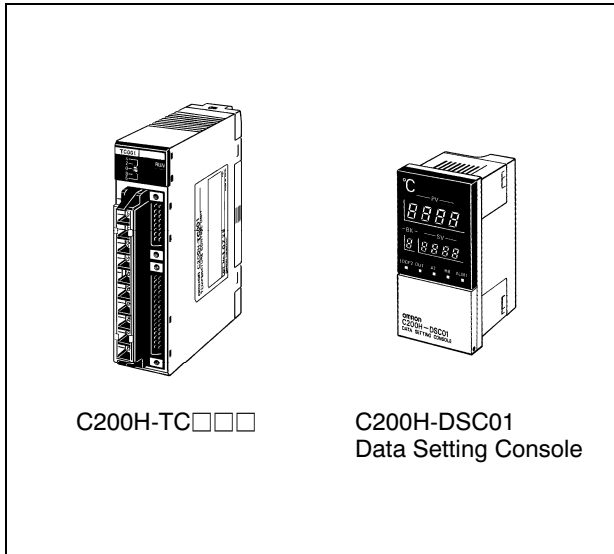
■ System Configuration



Temperature Sensor Modules

■ Specifications

Model		C200H-TS001	C200H-TS002	C200H-TS101	C200H-TS102	
Classification		C200H Special I/O Modules				
Module numbers		0 to 9	0 to 9	0 to 9	0 to 9	
Inputs		4 pts				
Input signals	Thermocouples	K	Yes	Yes	---	---
		J	Yes	---	---	---
		L	---	Yes	---	---
		R	---	---	---	---
		S	---	---	---	---
		T	---	---	---	---
		E	---	---	---	---
		B	---	---	---	---
		N	---	---	---	---
		W	---	---	---	---
		U	---	---	---	---
		PLII	---	---	---	---
		±80 mV	---	---	---	---
	Resistance thermometers	JPt100	---	---	Yes	---
PT100		---	---	---	Yes	
Ni508.4Ω		---	---	---	---	
Input signal range settings		One setting for all 4 pts				
A/D conversion output data		4-digit BCD				
Conversion speed		4.8 s max. (when 4 pts are set for Module)				
Overall accuracy		±1% + 1°C				
Connections		Terminal block				

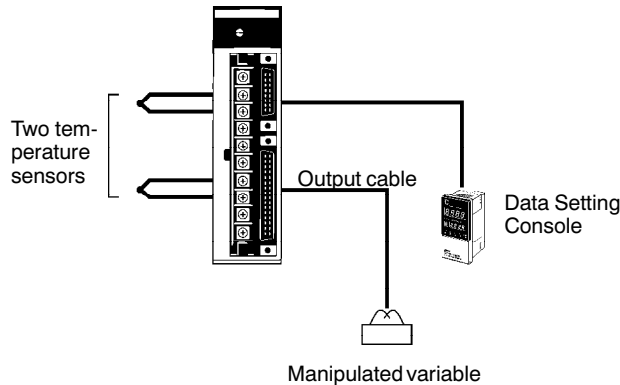


Perform 2-loop PID control (two degrees of freedom) based on inputs from thermocouples or platinum resistance thermometers to control a transistor, voltage or current output. Words allocated to the Module in memory can be manipulated from the ladder diagram to start/stop operation, set the target value, read the process value, or perform other operations.

■ Features

- Supports 2-loop PID control (two degrees of freedom) or ON/OFF control.
- Input directly from two temperature sensors (thermocouples: R, S, K, J, T, E, B, N, L, or U) or platinum resistance thermometers (JPt00, Pt100).
- Open-collector, voltage, or current outputs .
- Sampling period: 500 ms.
- Run/start control.
- Two internal alarms per loop.
- Detects heater burnout through current detectors for both loops.
- Record up to eight sets of target values, alarm values and PID parameters.
- Connects to Data Setting Console.

■ System Configuration



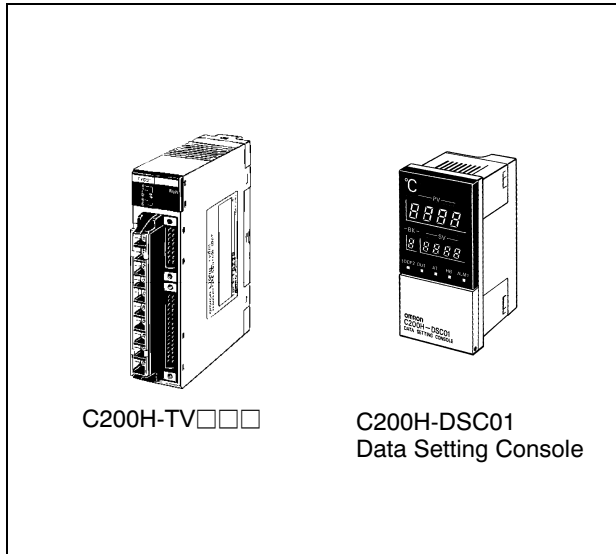
Temperature Control Modules

■ Specifications

Classification	Temperature sensor inputs	Control outputs	Module numbers	Model
C200H Special I/O Module	Thermocouples (R, S, K, J, T, E, B, N, L, or U)	Open-collector (pulse)	0 to 9	C200H-TC001
		Voltage (pulse)		C200H-TC002
		Current (linear)		C200H-TC003
	Platinum resistance thermometers (JPt100, Pt100)	Open-collector (pulse)		C200H-TC101
		Voltage (pulse)		C200H-TC102
		Current (linear)		C200H-TC103

Data Setting Console

Specifications	Model
Monitoring, setting, and changing present values, set points, alarm values, PID parameters, bank numbers, etc.	C200H-DSC01

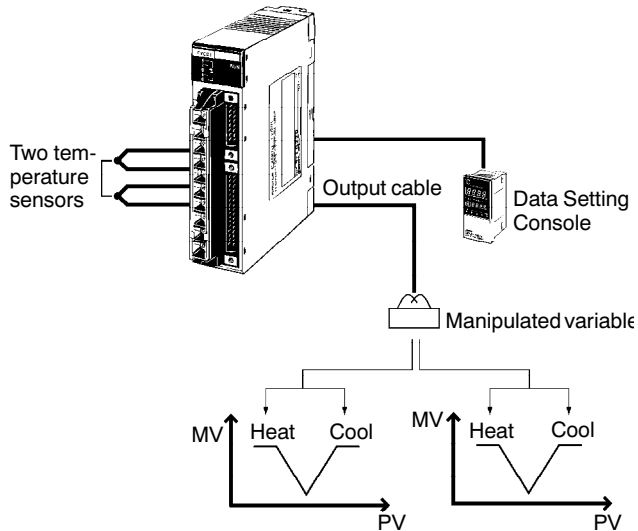


Perform 2-loop PID control (two degrees of freedom) based on inputs from thermocouples or platinum resistance thermometers to control a transistor, voltage or current output. Words allocated to the Module in memory can be manipulated from the ladder diagram to start/stop operation, set the target value, read the process value, or perform other operations.

■ Features

- Supports 2-loop PID control (two degrees of freedom) or ON/OFF control.
- Input directly from two temperature sensors (thermocouples: R, S, K, J, T, E, B, N, L, or U) or platinum resistance thermometers (JPt00, Pt100).
- Open-collector, voltage, or current outputs.
- Sampling period: 500 ms.
- Run/start control.
- Two internal alarms per loop.
- Detects heater burnout through current detectors for both loops.
- Record up to eight sets of set points, alarm values and PID parameters.
- Connects to Data Setting Console.

■ System Configuration



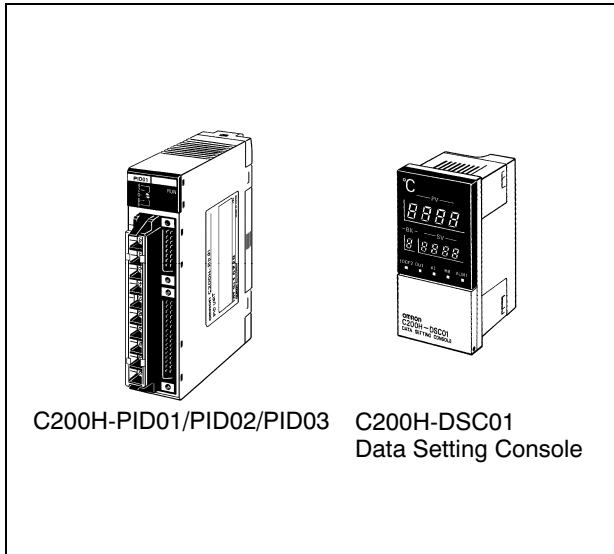
Heat/Cool Control Module

■ Specifications

Classification	Temperature sensor inputs	Heating control output	Cooling control output	Module numbers	Model
C200H Special I/O Module	Thermocouples (R, S, K, J, T, E, B, N, L, or U)	Open-collector (pulse)	Open-collector (pulse)	0 to 9	C200H-TV001
		Voltage (pulse)			C200H-TV002
		Current (linear)			C200H-TV003
	Platinum resistance thermometers (JPt100, Pt100)	Open-collector (pulse)			C200H-TV101
		Voltage (pulse)			C200H-TV102
		Current (linear)			C200H-TV103

Data Setting Console

Specifications	Model
Monitoring, setting, and changing present values, set points, alarm values, PID parameters, bank numbers, etc.	C200H-DSC01

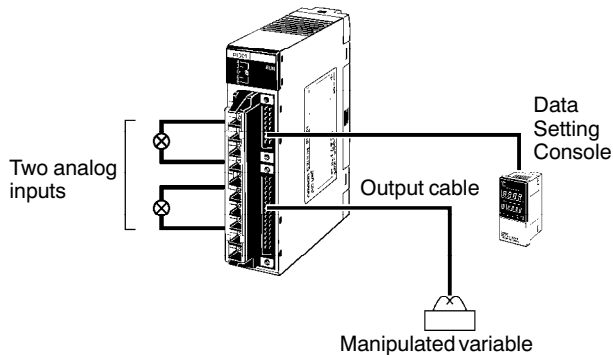


Perform 2-loop PID control (two degrees of freedom) based on input ranges such as 4 to 20 mA or 1 to 5 V to control transistor, voltage, or current outputs. Words allocated to the Module in memory can be manipulated from the ladder diagram to start/stop operation, set the set point, read the process value, or perform other operations.

■ Features

- Supports 2-loop PID control (two degrees of freedom) or ON/OFF control.
- Directly input analog signal.
- Open-collector, voltage, or current outputs.
- Sampling period: 100 ms.
- Run/start control.
- Manual outputs supported.
- Set two internal alarms per loop.
- Record up to eight sets of target values, alarm values and PID parameters.
- Digital filters can be set to dampen rapid changes in inputs.
- Connects to Data Setting Console.

■ System Configuration



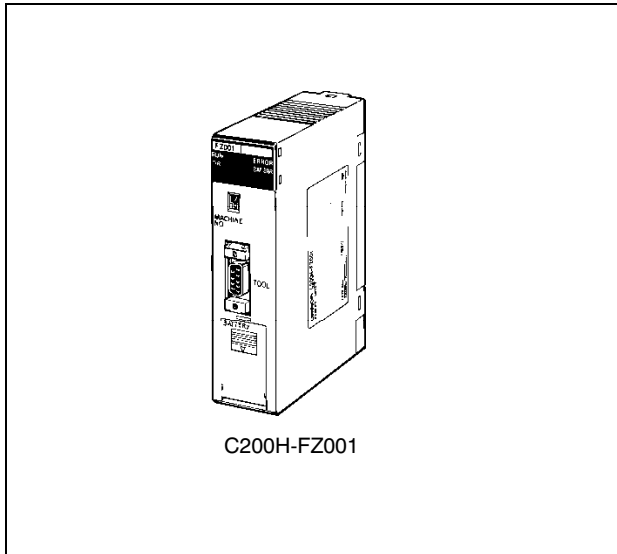
PID Control Modules

■ Specifications

Classifications	Temperature sensor input	Control output	Module numbers	Model
C200H Special I/O Module	4 to 20 mA, 1 to 5 V, 0 to 5 V or 0 to 10 V	Open-collector (pulse)	0 to 9	C200H-PID01
		Voltage (pulse)		C200H-PID02
		Current (linear)		C200H-PID03

Data Setting Console

Specifications	Model
Monitoring, setting, and changing present values, set points, alarm values, PID parameters, bank numbers, etc.	C200H-DSC01

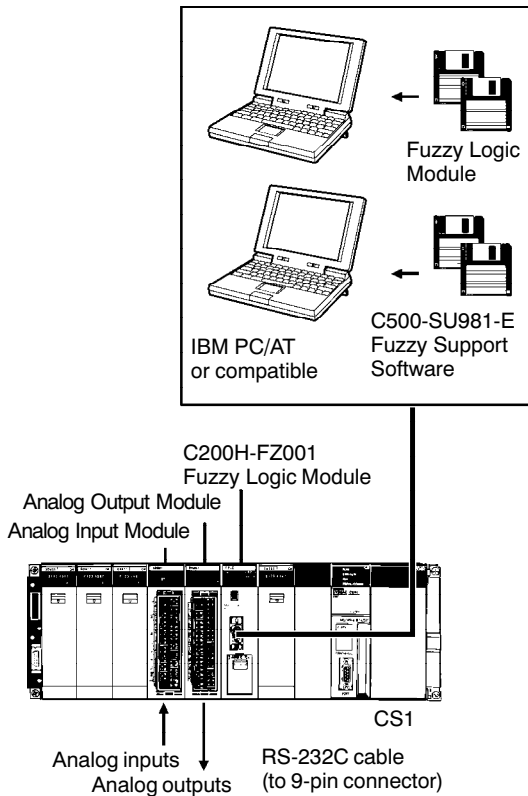


Use the Fuzzy Support software to create rules, membership functions, and other fuzzy data and transfer them to the Module after checking the knowledge. The ladder program in the CPU can be used to set fuzzy inputs for processing by the Fuzzy Logic Module and then the results can be read using the ladder program.

■ Features

- Contains a high-performance fuzzy logic processor for high-speed fuzzy processing.
- Handles jobs that used to be performed by using the experience of skilled operators.
- Eight inputs and 4 outputs .
- 8 conditions and 2 conclusions per rule, 128 rules total.

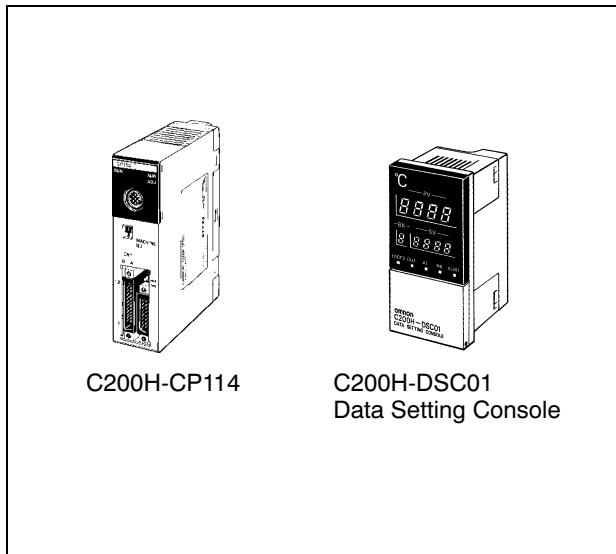
■ System Configuration



Fuzzy Logic Module

■ Specifications

Classification	Model	Fuzzy logic		Inputs		Outputs		Module numbers	Processing time
		Rule form	Rules	Data	FS range	Data	FS range		
C200H Special I/O Module	C200H-FZ001	8 conditions and 2 conclusions	128	8 words max.	0 to 4095	4 words max.	0 to 4095	0 to 9	6 ms max. for Module, 3 to 4 times the cycle time for system

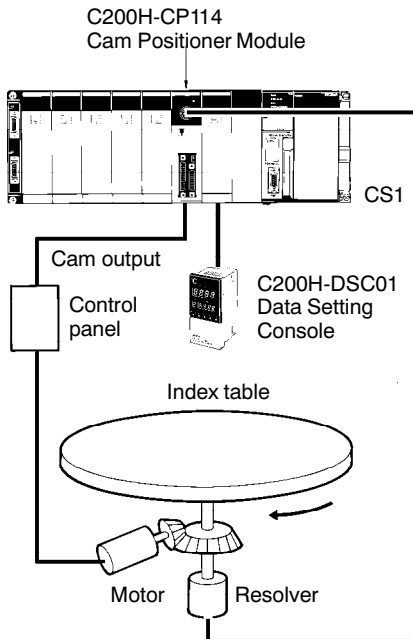


Simulate the control functions of 48 mechanical cams to increase machine reliability and simplify setup. Angles are detected through an externally connected resolver (3F88L-RS□□ angle detector) and cam outputs are produced for preset ON/OFF angle data.

■ Features

- Supports 16 external outputs and 32 internal outputs for a total of 48 cam outputs.
- Set up to seven ON/OFF data points for each cam.
- The data setting console allows easy monitoring of cam data settings, preset cam angles, or etc.
- An adjustment operation function enables setting cam outputs while actually operating the controlled machine.

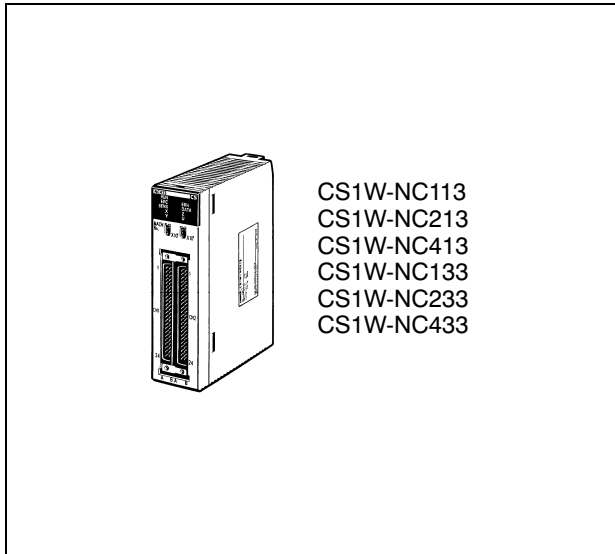
■ System Configuration



Cam Positioner Module

■ Specifications

Classification	Model	No. of cam outputs	Control Module	Resolver response speed	Module numbers	Resolver response time
C200H Special I/O Module	C200H-CP114	48 (16 external outputs, 32 internal outputs)	1°	800 r/min max.	0 to 9	200 μ s (sampling frequency: 5 kHz)

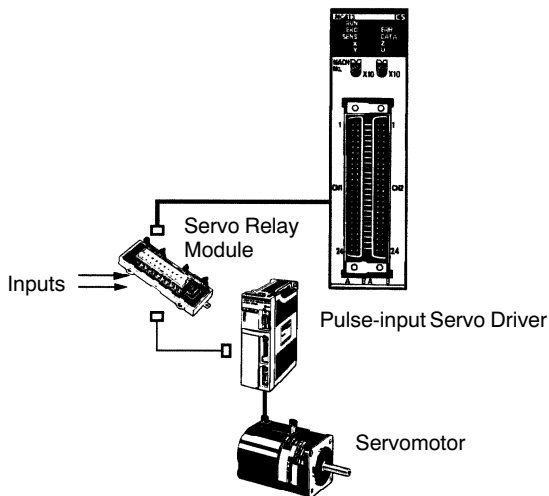


These position control Modules support open-loop control with pulse-train outputs. Position using automatic trapezoid or S-curve acceleration and deceleration. Models available with 1, 2, or 4 axes. Use in combination with servomotors or stepping motors that accept pulse-train inputs.

■ Features

- Simple positioning systems can be created by directly specifying operation from the CPU when required.
- Positioning data is saved in internal flash memory, eliminating the need to maintain a back up battery.
- Use CX-Position Windows-based support software to easily create positioning data and store data and parameters in files.
- Interrupt feeding, forced starting, and other features also supported.

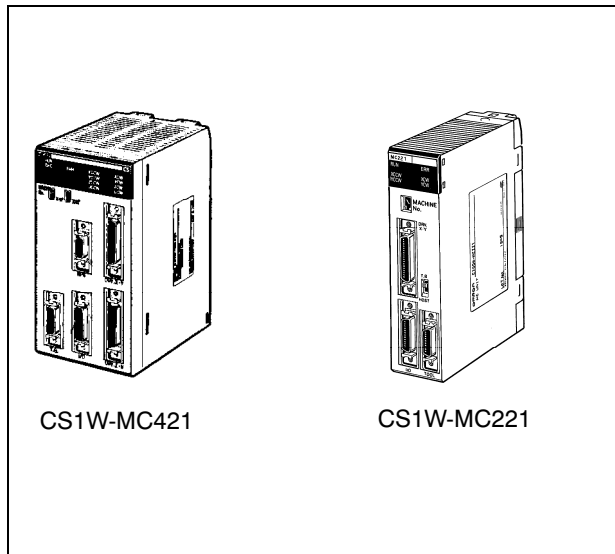
■ System Configuration



Position Control Modules

■ Specifications

Model	CS1W-NC113 CS1W-NC133	CS1W-NC213 CS1W-NC233	CS1W-NC413 CS1W-NC433
Module name	Position Control Module		
Classification	CS1 Special I/O Modules		
Module numbers	0 to 95		
Control method	Open-loop, automatic trapezoid acceleration/deceleration		
Control output signals	CS1W-NC□13: Open-collector outputs CS1W-NC□33: Line-driver outputs		
Controlled axes	1	2	4
Operating modes	Direct operation or memory operation		
Data format	Binary (hexadecimal)		
Affect on scan time for end refresh	0.29 to 0.41 ms max./Module		
Affect on scan time for IOWR/IORD	0.6 to 0.7 ms max./instructions		
Startup time	2 ms min. (Refer to operation manual for conditions.)		
Position data	-1,073,741,823 to +1,073,741,823 pulses		
No. of positions	100 per axis		
Speed data	1 to 500 kpps (in 1-pps Modules)		
No. of speeds	100 per axis		
Acceleration/ deceleration times	0 to 250 s (time to max. speed)		
Acceleration/ deceleration curves	Trapezoidal or S-curve		
Saving data in CPU	Flash memory		
Windows-based Support Software	CX-Position		



CS1W-MC421

CS1W-MC221

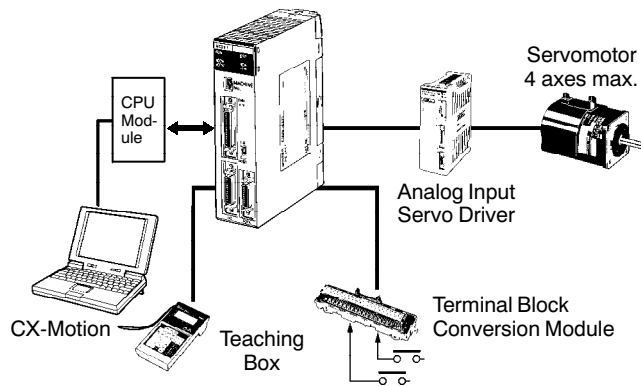
The motion controller provides semiclosed-loop control with analog outputs for up to 4 axes, and supports the G language for advanced, high-speed, high precision position control, such as traverse operations. Multi-tasking allows you to run the two axes independently for a wider range of applications.

■ Features

- High-speed control of up to 4 axes with one Module and up to 76 axes with one PLC (19 Modules x 4 axes. Assumes that power supply Module capacity is not exceeded.).
- Winding operations easily controlled at high-speed using traverse positioning control.
- High-speed response to commands from CPU (8 ms for 2 axes, 13 ms for 4 axes).
- Encoder response of 2 Mpps possible with 4x frequency multiplication for applications with high-speed, high-precision servomotors.
- D interrupt code outputs to CPU at end of positioning or at specified positions (D code output time: 3.3 ms max.)
- CX-Motion Windows-based support software: Define user mnemonics to use in place of G codes to simplify motion control program development and analysis.
- Servo trace function from CX-Motion to trace error counter changes or motor speeds.
- Automatic loading function: Motion control programs and positioning data can be automatically downloaded from computer memory when required by the MC Module.

Motion Control Module

■ System Configuration

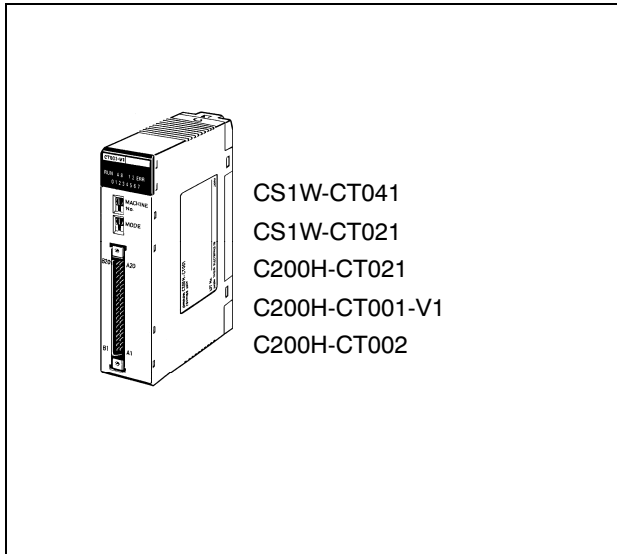


■ Specifications

Model		CS1W-MC421	CS1W-MC221
Classification		CS1 Special I/O Module	
Control method		Semiclosed loop with automatic trapezoid or S-curve acceleration/deceleration	
Control output signals		Analog	
Internal programming language		G language (Program started by command sent from CPU Module's ladder program.)	
Controlled axes		4 axes max.	2 axes max.
Maximum position value		-39,999,999 to 39,999,999 (for minimum setting Module of 1)	
Synchronous axis control		4 axes max.	2 axes max.
Positioning	Linear interpolation	4 axes max.	2 axes max.
	Arc interpolation	2 axes max. in a plane	
	Helical interpolation	2-axis arc interpolation in a plane + feed axis	---
	Traverse	2-axis traverse feeding	
	Infinite feed	Infinite feeding of one or more axes	
	Interrupt feed	Interrupt feeding for specified axes (Positioning can be specified for when there is no interrupt.)	
Task programming capacity	Number of tasks	4 tasks max.	2 tasks max.
	Number of programs	25 programs when using 4 tasks	50 programs when using 2 tasks
	Program capacity	500 blocks per task when using 4 tasks	1,000 blocks per task when using 2 tasks

CX-Motion: Windows-based Support Software

Model	WS02-MCTC1-EV2
Supported MC Modules	CS1W-MC221/421, C200H-MC221, and CV500-MC221/421
Applicable computer	DOS, OS: Windows 95/98 or Windows NT Version 4.0
Functions	Functions required for MC Module control: Creating/editing/saving/printingsystem parameters, positioning data, and MC programs; monitoring MC Module operation

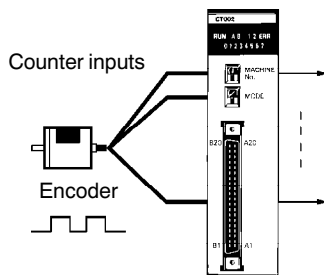


The high-speed counter modules count pulse signal inputs that are too fast to be detected by normal input Modules. The Modules can be programmed to produce outputs according to counter values for specified conditions, and many other functions are supported.

■ Features

- Max. input frequency = 500 kHz (see note 1). Output turns ON less than 0.5 ms after set value is reached (see note 2).
- 32 bit counting range.
- 2 and 4 axis operation available.
- 5, 12, and 24 V line driver inputs available (5 and 12 V line driver input is only available for 1 axis with the CS1W-CT021 and 2 axes with the CS1W-CT041).
- Supports simple, ring, and linear counting modes.
- Supports offset phase input, up and down pulse input, and pulse + direction input.
- Supports 4 external control outputs and a total of 16 functions can be set including open gate, close gate, preset, reset, capture, stop/capture/reset combinations, and reset enable.
- One Module supports 4 external outputs and 28 internal outputs with counter value zone comparisons, target comparisons, delays, holds, programable outputs, and hysteresis settings.
- Pulse rate measurement function and data logging.
- Counter outputs and external control inputs can be used to trigger interrupt tasks in the CPU.
- Settings can be changed during Module operation.

■ System Configuration

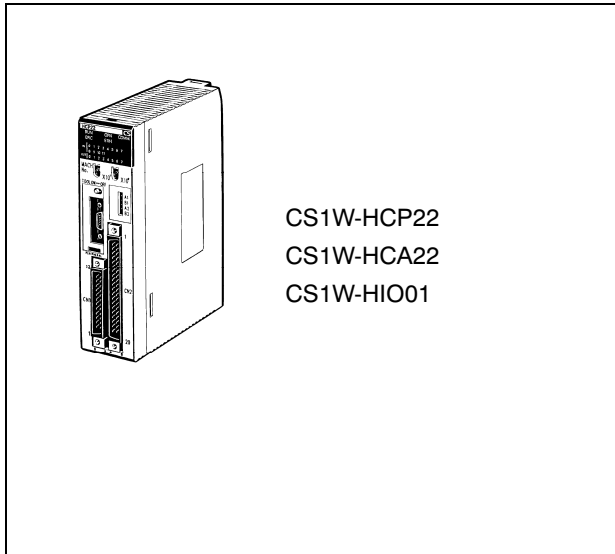


High-speed Counter Modules

■ Specifications

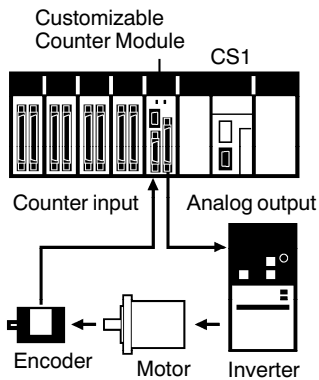
Classification	Number of counters	Encoder A and B input, pulse input, Z signal	Maximum counting speed	Module numbers	Model
C200H Special I/O Module	1	Open-collector Input voltage: 5 VDC, 12 VDC, or 24 VDC	50 kcps	0 to 9	C200H-CT001-V1
		RS-422 line driver	75 kcps		C200H-CT002
	2	Open-collector Input voltage: 12 VDC or 24 VDC	50 kcps	0 to F	C200H-CT021
		RS-422 line driver	75 kcps		
CS1 Special I/O Module	2	Open-collector Input voltage: 5 VDC, 12 VDC, or 24 VDC (5- and 12-VDC input only possible for 1 axis.)	50 kcps	0 to 92 (4 Module numbers per Module)	CS1W-CT021
		RS-422 line driver	500 kcps		
	4	Open-collector Input voltage: 5 VDC, 12 VDC, or 24 VDC (5- and 12-VDC input only possible up to 2 axes.)	50 kcps		CS1W-CT041
		RS-422 line driver	500 kcps		

- Note:**
1. This figure is for when line driver input is used.
 2. The time may exceed 0.5 ms in some cases, such as during execution of IORD/IOWR instructions.



In addition to counter input, pulse input and analog output which are indispensable for mechanical control (inputs and outputs vary with the model) PLC functionality and 20 points of basic I/O are available with just 1 Module. There are also models that just have PLC functionality. High-speed PLC functionality, with an overhead of 0.1 ms, allows the Modules to be used as “sub PLCs” that contribute to greater responsiveness and system performance, as well as function distribution and modularization.

■ System Configuration



■ Available Models

Model number	Program capacity	I/O points (built-in)		Special I/O			Built-in peripheral port
		Contact input	Contact output	Pulse input (high-speed counters)	Pulse outputs	Analog outputs	
CS1W-HIO01	4 Kwords	12 inputs (24 VDC) (4 inputs can be used as interrupt inputs)	8 transistor outputs (sinking)	None	None	None	For Programming Console or CX-Programmer
CS1W-HCP22				2 pts	2 pts	None	
CS1W-HCA22				2 pts	None	2 pts	

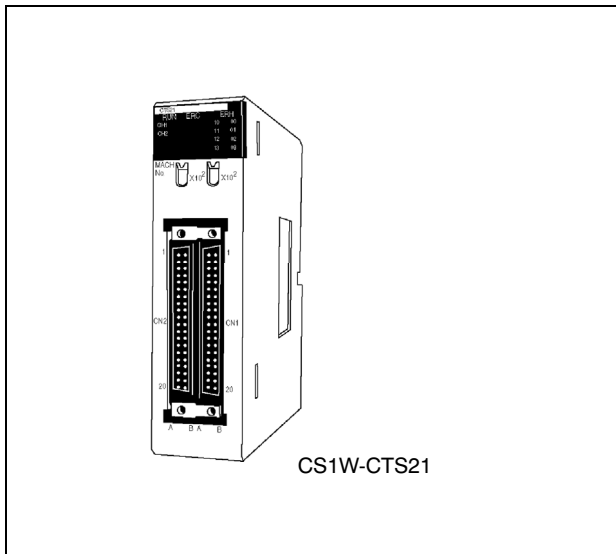
■ Specifications

Model	I/O	Contents
All Modules: CS1W-HIO01, CS1W-HCP22, and CS1W-HCA22	Contact inputs	12 inputs (24-VDC; bits IR 00000 to IR 00011) Details: <ul style="list-style-type: none"> • 4 interrupt inputs in Input Interrupt Mode or Counter Mode. Can also be used as normal inputs (bits IR 00000 to IR 00003) • 8 normal inputs (bits IR 00004 to IR 00011) Note It is possible to specify ON, OFF, or both for the timing of interrupts in Input Interrupt Mode.
	Contact outputs	8 outputs (transistor NPN outputs; bits IR 00100 to IR 00107)
CS1W-HCP22 (pulse I/O)	Pulse inputs (high-speed counters)	2 inputs Each input can be set to either single-phase or differential-phase (multiplication factor of 1, 2, or 4) at 50 or 200 kHz (switchable). Note Target value interrupts or range comparison bit pattern outputs for high-speed counter present values can be programmed. Measurement of the rate of change in high-speed counter present values and measurement of the frequency from the high-speed counter present values is also possible.
	Pulse outputs	2 outputs Each output can be set to any one of the following: <ol style="list-style-type: none"> 1. Pulse output: 6 Hz to 200 kHz 2. One-shot pulse output: Output can be set to turn ON for a time specified by the user. (Set in range 0.01 to 9,999 ms in 0.01-ms Modules.) 3. Pulse output counter timer (time measurement): High-precision timer measurement in 0.01-ms Modules is possible using one-shot pulse output. (In this case, external pulse output is not possible.)
CS1W-HCA22 (pulse inputs and analog outputs)	Pulse inputs (high-speed counters)	2 inputs Each input can be set to either single-phase or differential-phase (multiplication factor of 1, 2, or 4) at 50 or 200 kHz (switchable). Note Target value interrupts or range comparison bit pattern outputs for high-speed counter present values can be programmed. Measurement of the rate of change in high-speed counter present values and measurement of the frequency from the high-speed counter present values is also possible.
	Analog outputs	2 outputs Each output can be set to any one of the following: 1 to 5 V, 0 to 5 V, 0 to 10 V, or -10 to 10 V Accuracy: $\pm 0.3\%$; Resolution: 4,000 (1 to 5 V, 0 to 5 V, 0 to 10 V) or 10,000 (-10 to 10 V), D/A conversion time: 0.5 ms max. Outputs the output values set in the AR Area. Also, for each point, using the SPED instruction and ACC instruction (combined use possible), output at a fixed analog value, or output at values rising or falling at a fixed rate, is possible. <ul style="list-style-type: none"> • It is possible to select either immediate refreshing when instructions are executed or refreshing of output values in the AR Area after execution of the END instruction as the refreshing method for analog output. • Analog output values can be held. (Analog values can be output at their peak, held, or cleared values when the Conversion Enable Flag is OFF, a fatal error occurs, or an analog output error occurs.) Note It is also possible to produce trapezoidal output of analog values according to the time elapsed by combining the SPED instruction, the ACC instruction, timer instructions, and scheduled interrupts.

■ Specifications

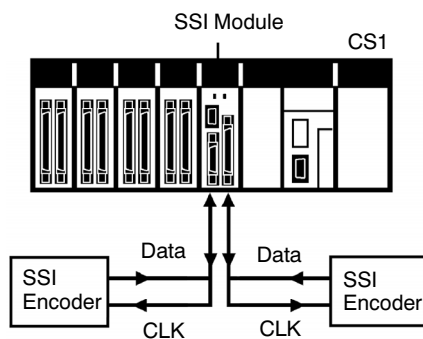
Item	Specifications
Contact inputs	<p>Number of inputs</p> <p>12 inputs</p> <ul style="list-style-type: none"> 4 inputs (input bits IR 00000 to IR 00003) can be used either as interrupt inputs or normal inputs. <p>Note Each of these 4 inputs can be set to be used as either interrupt inputs or normal inputs in the Module Setup Area (DM 6620). It is also possible to specify the ON, OFF, or both for the interrupt timing for each point (Input Interrupt Mode or Counter Mode) in the Module Setup Area (DM 6620).</p> <ul style="list-style-type: none"> 8 inputs (input bits IR 00004 to IR 00011) can be used as normal inputs only.
Input voltage/current	24 V ^{+10%} / _{-15%} , 5 mA typical
Min. ON voltage	15.2 V
Max. OFF voltage	4.8 V
Input response	<p>Inputs for interrupt input or normal input (4 points with one common):</p> <p>ON delay time: 50 μs OFF delay time: 200 μs max.</p> <p>Inputs for normal input (8 points with one common):</p> <p>ON delay time: 100 μs OFF delay time: 1 ms max.</p>
Circuit configuration	

Programmable Synchronous Serial Interface (SSI) Counter Module



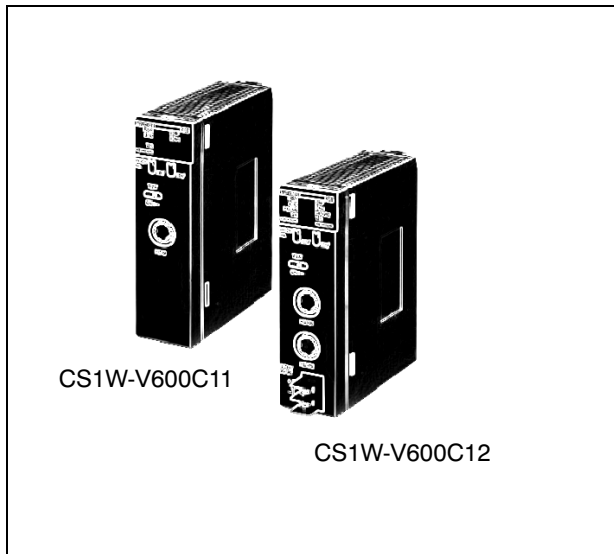
In addition to 2 SSI inputs with flexible SSI settings, 4 digital inputs with interrupts to the PLC and 4 digital outputs both NPN and PNP are available in the same Module. Encoder count values and status bits are stored in the PLC's memory (CIO). Default switch for "plug and play".

System Configuration



Specifications

Classification	CS1 special I/O Module
SSI connection	RS-422/485, galvanically isolated
SSI data format	- Gray/binary/tannenbaum/raw - Parity check - Status bit freely configurable
Number of encoder data bits	Phase difference (×1, ×2, or ×4), up/down, or pulse with direction
Clock frequency	100, 200, 300, 400 & 500 kHz 1.0 and 1.5 MHz
One-shot setting range	10 μs to 99 ms
Digital inputs	4 DC inputs, 24 VDC with interrupt function, individually isolated, 10 kHz noise filter
Digital outputs	4 transistor, NPN/PNP selectable, 2 circuits 24 VDC, 0.1 A
Status display	LED



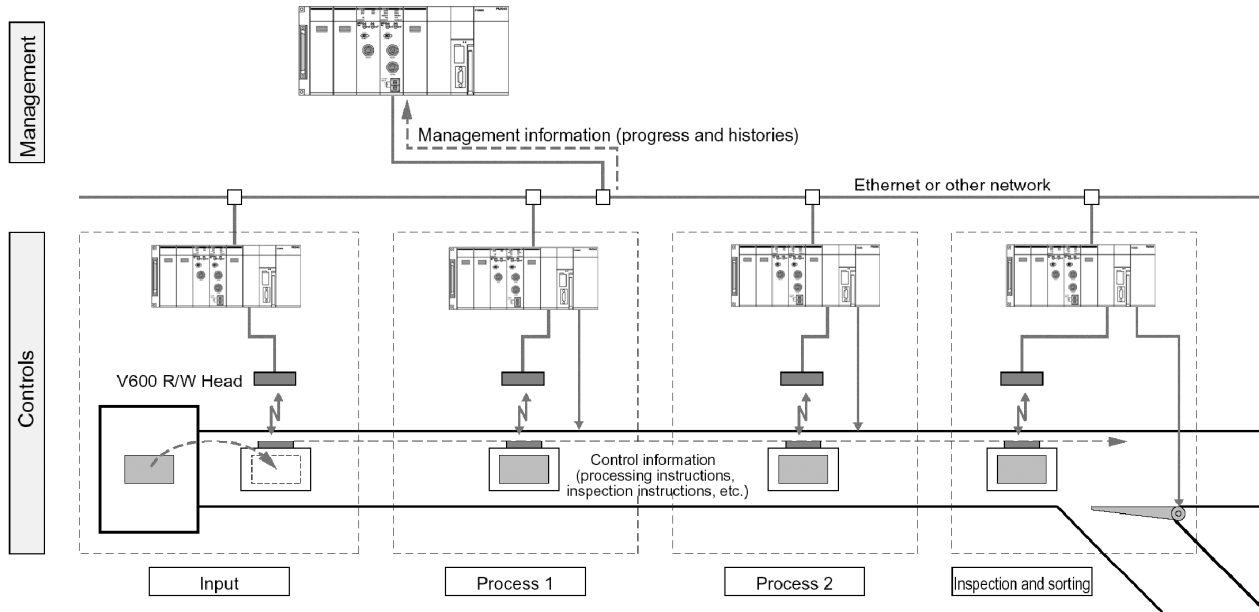
Control RFID-based data tracking directly from the CS1 PLC. An ID sensor module interfaces with a V600-series ID system (an electronic magnetic-coupling RFID system) and is used together with Read/Write (R/W) heads and data carriers.

■ Feature

- Models available to connect to either one or two R/W heads.
- High-data communications with the CPU (160 bytes/scan) greatly reduce processing time from communications with Data carriers to results.
- Efficient programming with control bits and data located in different interface areas.
- Common operating methods for both single-head and double head Modules to effectively apply programming resources through modularization.
- Status confirmation function without CPU program for faster system setup.
- Power supply error flags and processing results monitor data (communications TAT and error codes) for easier maintenance.

ID Sensor Modules

System Configuration



ID Sensor Units	Read/Write Heads	Data Carriers
CS1-series Special I/O Unit CS1W-V600C11 CS1W-V600C12	With Built-in Amplifier (Example: V600-H11) Head (Example: V600-HS51) + Amplifier (Example: V600-HA51)	Battery-free Data Carriers V600-D□□P□□ (Example: V600-D23P66N) (Features of Battery-free DCs) • Internal EEPROM (256 bytes); battery free. • Thin, compact DCs are available. • Low cost. • Applicable up to 150 • Write life of 400,000 at room temperature. Unlimited read life. Data Carriers with Built-in Batteries V600-D□□KR□□ (Example: V600-D8KR12) (Features of DCs with Built-in Batteries) • SRAM memory. • Battery life detection. • Large memory capacity (8 KB). • All models mountable to metal. • Models available with replaceable batteries (battery life: 2 years).

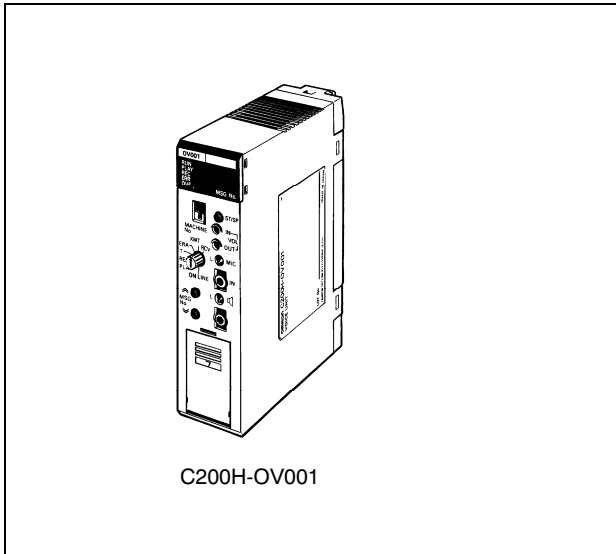
Note: Refer to the *Auto-Identification Components Group Catalog* (Cat. No. Q132) for details on the V600 Series.

■ Specifications

Item	CS1W-V600C11	CS1W-V600C12												
Data transfer speed	160 bytes/scan (between CPU and ID sensor Module)													
Applicable RFID system	V600 series													
Number of connectable R/W heads	1	2												
Commands (The number of bytes that can be specified is given in brackets)	Read/write [1 to 2,048] Data fill (clear) [1 to 2,048 or through end address] Copy (for double-head Modules only) [1 to 2,048] Calculation write [1 to 4] Bit set/bit clear [1 to 4] Masked bit write [2] Memory check [2] Number of writes control [2]													
Communications processing time (See note.)	<table border="1"> <thead> <tr> <th>Command</th> <th>Data carriers with built-in batteries</th> <th>Battery free data carriers in time priority mode</th> </tr> </thead> <tbody> <tr> <td>Read</td> <td>1.8 x N + 48.4 ms</td> <td>1.8 x N + 79.0 ms</td> </tr> <tr> <td>Write with verify</td> <td>4.2 x N + 86.5 ms</td> <td>7.1 x N + 180.4 ms</td> </tr> <tr> <td>Write without verify</td> <td>2.2 x N + 72.8 ms</td> <td>4.3 x N + 132 ms</td> </tr> </tbody> </table> <p>N = the number of bytes being read or written.</p>		Command	Data carriers with built-in batteries	Battery free data carriers in time priority mode	Read	1.8 x N + 48.4 ms	1.8 x N + 79.0 ms	Write with verify	4.2 x N + 86.5 ms	7.1 x N + 180.4 ms	Write without verify	2.2 x N + 72.8 ms	4.3 x N + 132 ms
Command	Data carriers with built-in batteries	Battery free data carriers in time priority mode												
Read	1.8 x N + 48.4 ms	1.8 x N + 79.0 ms												
Write with verify	4.2 x N + 86.5 ms	7.1 x N + 180.4 ms												
Write without verify	2.2 x N + 72.8 ms	4.3 x N + 132 ms												
Maintenance features	Communications test, processing results monitor data (communications TAT and error codes)													
Error detection	CPU errors, communications errors with Data carriers, R/W head power supply check.													

Note: Add the data transfer time to the communications processing time for the command processing time.

Voice Module



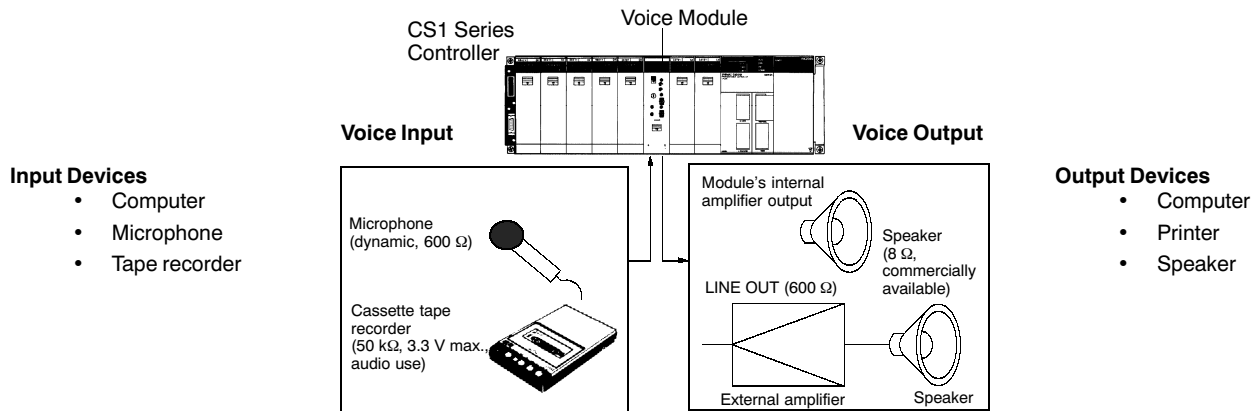
Alert machine operators with audible notification of system conditions or alarms. Use the Voice Module for operator interface messages. Record up to 60 voice messages on site, or use a tape recorder and transfer the message to the module.

Messages can also be uploaded or downloaded through the RS-232C port on the front panel. The built-in speaker enables immediate message verification. Message length and sound quality are selectable.

■ Feature

- Microphone jack enables live message broadcast.
- Flexible message length.
- Messages can be interrupted to start another message.
- Messages can be recorded in phrase and word combination formats.
- Status confirmation function without CPU program for faster system setup.
- Upload or download messages through the RS-232C port on the front panel.

■ System Configuration



■ Specifications

Classification		C200H Special I/O Module
Model		C200H-OV001
Voice synthesis method		Adaptive differential pulse-coded modulation (ADPCM)
Message	Recording time	32, 48, or 64 s (switch-selectable)
	Capacity (sentences and phrases)	60 max.
Message input (switch-selectable)	MIC IN	Microphone input: Unbalanced dynamic microphone (600 Ω)
	LINE IN	Tape input: Input impedance: 50 k Ω , unbalanced; Maximum input voltage: 3.3 V
Message output (switch-selectable)	SPEAKER OUT	Built-in amplifier output: 0.14 W (8 Ω speaker)
	LINE OUT	External amplifier output: 600 Ω unbalanced transformer output Maximum output voltage: 0.5 V rms (effective value) Balanced and unbalanced external amplifiers are connectable
Built-in monitor speaker		Diameter 27 mm, 0.1 W (8 Ω)
Input frequency		32-second recordings: 8 kHz 48-second recordings: 5.3 kHz 64-second recordings: 4 kHz
Output frequency characteristics		32-second recordings: 100 Hz to 3.2 kHz 48/64-second recordings: 100 Hz to 2.2 kHz
Low-pass filter (LPF) selector function (see note)		Cutoff frequency: 3.2 kHz for 32-second recordings, 2.2 kHz for 48/64-second recordings
Message memory		128K bytes RAM (battery powered)
External communication function (save recorded messages)		RS-232C (Baud rate: 19,200/9,600/4,800/2,400bps. XON/XOFF: yes/no, CTS/RTS: yes/no)
Self-diagnosis function		CPU watchdog timer, LOW battery voltage detection
Battery life		5 years at 25°C (battery life is shorter for higher temperatures)
I/O words required		10 (Special I/O area)
Internal current consumption		5 VDC, 0.3 A max.
Weight		400 g max.

Note: The recording time of the Voice Module is varied by changing the module's input frequency. For improved sound quality, the cutoff frequency of the low-pass filter is automatically changed to a lower frequency when the recording time is increased from 32 to either 48 or 64 seconds. (The output frequency is set to 100 Hz to 2.2 kHz when the recording time is set to 48 or 64 seconds.)