CP series CP1H CPU Unit
CP1H-X□□D□-□/CP1H-Y□□D□-□
CP1H-XA□□D□-□

4 Axis Position Control and Comprehensive Programmable Controller

- The CP1H-X with pulse outputs for 4 axes.
- The CP1H-Y with 1-MHz pulse I/O.
- The CP1H-XA with pulse outputs for 4 axes and built-in analog I/O.

Features

- Pulse output for 4 axes. Advanced power for high-precision positioning control.
- High-speed counters. Differential phases for 4 axes.
  Easily handles multi-axis control with a single unit.
- Eight interrupt inputs are built in. Faster processing of approximately 500 instructions speeds up the entire system.
- Serial communications. Two ports. Select Option Boards for either RS-232C or RS-485 communications.
- Ethernet Communications. Enabled by using an Option Board. Two ports can be used as an Ethernet port to perform. Ethernet communications between the CP1H and a host computer.
- Built-in Analog I/O. XA CPU Units provide 4 input words and 2 output words.
- USB Peripheral Port. Another standard feature.
- The structured text (ST) language. Makes math operations even easier.
- Can be used for the CP1W series and CJ series Unit. The extendibility of it is preeminently good.
- LCD displays and settings. Enabled using Option Board.

Category	Name	Specifications		Model
CJ1 CPU Bus Units	Controller Link Units	Wired (shielded twisted-pair cable)		CJ1W-CLK23
	Serial Communications Units	1 RS-232C port and 1 RS-422A/485 port		CJ1W-SCU42
		2 RS-232C ports		CJ1W-SCU22
		2 RS-422A/485 ports		CJ1W-SCU32
		1 RS-232C port and 1 RS-422A/485 port		CJ1W-SCU41-V1
		2 RS-232C ports		CJ1W-SCU21-V1
		2 RS-422A/485 ports		CJ1W-SCU31-V1
	EtherNet/IP Unit	Shielded twisted-pair cable (STP), category 5 or 5e or higher Tag data links and message communications supported		CJ1W-EIP21
	Ethernet Unit	100Base-TX		CJ1W-ETN21
	DeviceNet™ Unit	Functions as master and/or slave; allows control of 32,000 points max. per master		CJ1W-DRM21
	MECHATROLINK-II Position Control Unit	Control commands sent using MECHATROLINK-II synchronized communications 16 axes max., direct operation from ladder diagram, control modes: position/ speed/torque	2 axes	CJ1W-NC271
			4 axes	CJ1W-NC471
			16 axes	CJ1W-NCF71
			16 axes	CJ1W-NCF71-MA
	FI-net Unit	100Base-TX		CJ1W-FLN22
	SPU	High-speed Data Storage Unit		CJ1W-SPU01-V2

Note: Refer to the *CJ1 catalog* (Cat. No. P052) for information on the CJ1 CPU Bus Units.

■ Industrial Switching Hubs

Product name	Appearance	Specifications			Accesories	Current consumption (A)	Model
		Functions	No. of ports	Failure detection			
Industrial Switching Hubs		Quality of Service (QoS): EtherNet/IP™ control data priority Failure detection: Broadcast storm and LSI error detection 10/100BASE-TX, Auto-Negotiation	3	No	• Power supply connector	0.22	W4S1-03B
			5	No		0.22	W4S1-05B
			5	Yes	• Power supply connector • Connector for informing error	0.22	W4S1-05C

General Specifications

Type / Item / Model	AC power supply models	DC power supply models
	CP1H-□□□-A	CP1H-□□□-D
Power supply	100 to 240 VAC 50/60 Hz	24 VDC
Operating voltage range	85 264 VAC	20.4 to 26.4 VDC (with 4 or more Expansion Units and Expansion I/O Units: 21.6 to 26.4 VDC)
Power consumption	100 VA max. (CP1H-□□□-A)(page 28)	50 W max. (CP1H-□□□-D)(page 28)
Inrush current (See note.)	100 to 120 VAC inputs: 20 A max. (for cold start at room temperature) 8 ms max. 200 to 240 VAC inputs: 40 A max. (for cold start at room temperature), 8 ms max.	30 A max. (for cold start at room temperature) 20 ms max.
External power supply	300 mA at 24 VDC	None
Insulation resistance	20 MΩ min. (at 500 VDC) between the external AC terminals and GR terminals	No insulation between primary and secondary for DC power supply
Dielectric strength	2,300 VAC at 50/60 Hz for 1 min between the external AC and GR terminals, leakage current: 5 mA max.	No insulation between primary and secondary for DC power supply
Noise immunity	Conforms to IEC 61000-4-4. 2 kV (power supply line)	
Vibration resistance	Conforms to JIS C60068-2-6. 10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s² in X, Y, and Z directions for 80 minutes each. Sweep time: 8 minutes × 10 sweeps = total time of 80 minutes)	
Shock resistance	Conforms to JIS C60068-2-27. 147 m/s² three times each in X, Y, and Z directions	
Ambient operating temperature	0 to 55°C	
Ambient humidity	10% to 90% (with no condensation)	
Ambient operating environment	No corrosive gas	
Ambient storage temperature	–20 to 75°C (Excluding battery.)	
Power holding time	10 ms min.	2 ms min.

Note: The above values are for a cold start at room temperature for an AC power supply, and for a cold start for a DC power supply.

- A thermistor (with low-temperature current suppression characteristics) is used in the inrush current control circuitry for the AC power supply. The thermistor will not be sufficiently cooled if the ambient temperature is high or if a hot start is performed when the power supply has been OFF for only a short time. In those cases the inrush current values may be higher (as much as two times higher) than those shown above. Always allow for this when selecting fuses and breakers for external circuits.
- A capacitor charge-type delay circuit is used in the inrush current control circuitry for the DC power supply. The capacitor will not be charged if a hot start is performed when the power supply has been OFF for only a short time, so in those cases the inrush current values may be higher (as much as two times higher) than those shown above.

Performance Specifications

Item \ Type		CP1H-XA CPU Units	CP1H-X CPU Units	CP1H-Y CPU Units
Item \ Models		CP1H-XA□□□-□	CP1H-X□□□-□	CP1H-Y□□□-□
Control method		Stored program method		
I/O control method		Cyclic scan with immediate refreshing		
Program language		Ladder diagram		
Function blocks		Maximum number of function block definitions: 128 Maximum number of instances: 256 Languages usable in function block definitions: Ladder diagrams, structured text (ST)		
Instruction length		1 to 7 steps per instruction		
Instructions		Approx. 500 (function codes: 3 digits)		
Instruction execution time		Basic instructions: 0.10 μs min. Special instructions: 0.15 μs min.		
Common processing time		0.7 ms		
Program capacity		20K steps		
Number of tasks		288 (32 cyclic tasks and 256 interrupt tasks)		
	Scheduled interrupt tasks	1 (interrupt task No. 2, fixed)		
	Input interrupt tasks	8 (interrupt task No. 140 to 147, fixed)		6 (interrupt task No. 140 to 145, fixed)
		(Interrupt tasks can also be specified and executed for high-speed counter interrupts.)		
Maximum subroutine number		256		
Maximum jump number		256		
I/O areas (See note.)	Input bits	272bits (17 words) : CIO 0.00 to 16.15		
	Output bits	272bits (17 words) : CIO 100.00 to 116.16		
	Built-in Analog Inputs	CIO 200 to CIO 203	---	
	Built-in Analog Outputs	CIO 210 to CIO 211	---	
	Serial PLC Link Area	1,440 bits (90 words): CIO 3100.00 to CIO 3189.15 (CIO 3100 to CIO 3189)		
Work bits		8,192 bits (512 words): W0.00 to W511.15 (W0 to W511) CIO Area: 37,504 bits (2,344 words): CIO 3800.00 to CIO 6143.15 (CIO 3800 to CIO 6143)		
TR Area		16 bits: TR0 to TR15		
Holding Area		8,192 bits (512 words): H0.00 to H511.15 (H0 to H511)		
AR Area		Read-only (Write-prohibited): 7168 bits (448 words): A0.00 to A447.15 (A0 to A447) Read/Write: 8192 bits (512 words): A448.00 to A959.15 (A448 to A959)		
Timers		4,096 bits: T0 to T4095		
Counters		4,096 bits: C0 to C4095		
DM Area		32 Kwords: D0 to D32767		
Data Register Area		16 registers (16 bits): DR0 to DR15		
Index Register Area		16 registers (32 bits): IR0 to IR15		
Task Flag Area		32 flags (32 bits): TK0000 to TK0031		
Trace Memory		4,000 words (500 samples for the trace data maximum of 31 bits and 6 words.)		
Memory Cassette		A special Memory Cassette (CP1W-ME05M) can be mounted. Note: Can be used for program backups and auto-booting.		
Clock function		Supported. Accuracy (monthly deviation): –4.5 min to –0.5 min (ambient temperature: 55°C), –2.0 min to +2.0 min (ambient temperature: 25°C), –2.5 min to +1.5 min (ambient temperature: 0°C)		
Communications functions		One built-in peripheral port (USB 1.1): For connecting Support Software only.		
		A maximum of two Serial Communications Option Boards can be mounted.		
		A maximum of two Ethernet Option Boards can be mounted. When using CP1W-CIF41 Ver.1.0, one Ethernet Option Board can be mounted.		
Memory backup		Flash memory: User programs, parameters (such as the PLC Setup), comment data, and the entire DM Area can be saved to flash memory as initial values. Battery backup: The Holding Area, DM Area, and counter values (flags, PV) are backed up by a battery.		
Battery service life		5 years at 25°C. (Use the replacement battery within two years of manufacture.)		
Built-in input terminals		40 (24 inputs, 16 outputs)		20 (12 inputs, 8 outputs) Line-driver inputs: Two axes for phases A, B, and Z Line-driver outputs: Two axes for CW and CCW
Number of connectable Expansion (I/O) Units		CP Expansion I/O Units: 7 max.; CJ-series Special I/O Units or CPU Bus Units: 2 max.		
Max. number of I/O points		320 (40 built in + 40 per Expansion (I/O) Unit × 7 Units)		300 (20 built in + 40 per Expansion (I/O) Unit × 7 Units)
Interrupt inputs		8 inputs (Shared by the external interrupt inputs (counter mode) and the quick-response inputs.)		6 inputs (Shared by the external interrupt inputs (counter mode) and the quick-response inputs.)
Interrupt input counter mode		8 inputs (Response frequency: 5 kHz max. for all interrupt inputs), 16 bits Up or down counters		6 inputs (Response frequency: 5 kHz max. for all interrupt inputs), 16 bits Up or down counters
Quick-response inputs		8 points (Min. input pulse width: 50 μs max.)		6 points (Min. input pulse width: 50 μs max.)
Scheduled interrupts		1		

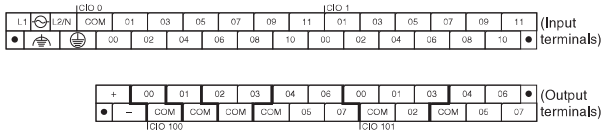
Item \ Type		CP1H-XA CPU Units	CP1H-X CPU Units	CP1H-Y CPU Units
Item \ Models		CP1H-XA□□□-□	CP1H-X□□□-□	CP1H-Y□□□-□
High-speed counters		4 inputs: Differential phases (4x), 50 kHz or Single-phase (pulse plus direction, up/down, increment), 100 kHz Value range: 32 bits, Linear mode or ring mode Interrupts: Target value comparison or range comparison		2 inputs: Differential phases (4x), 500 kHz or Single-phase, 1 MHz and 2 inputs: Differential phases (4x), 50 kHz or Single-phase (pulse plus direction, up/down, increment), 100 kHz Value range: 32 bits, Linear mode or ring mode Interrupts: Target value comparison or range comparison
Pulse outputs (models with transistor outputs only)	Pulse outputs	Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fixed) 4 outputs, 1 Hz to 100 kHz (CCW/CW or pulse plus direction)		Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fixed) 2 outputs, 1 Hz to 1 MHz (CCW/CW or pulse plus direction) 2 outputs, 1 Hz to 100 kHz (CCW/CW or pulse plus direction)
	PWM outputs	Duty ratio: 0.0% to 100.0% (Unit: 0.1%) 2 outputs, 0.1 to 6553.5 Hz (Accuracy: ±5% at 1 kHz)		
Built-in analog I/O terminals		4 analog inputs and 2 analog outputs	None	
Analog control		1 (Setting range: 0 to 255)		
External analog input		1 input (Resolution: 1/256, Input range: 0 to 10 V), not isolated		

Note: The memory areas for CJ-series Special I/O Units and CPU Bus Units are allocated at the same as for the CJ-series. For details, refer to the CJ Series catalog (Cat. No. P052).

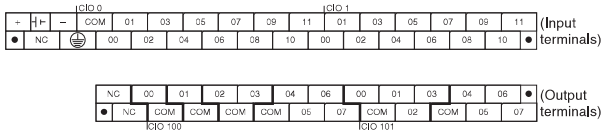
Built-in Inputs / Built-in Outputs

■ Terminal Block Arrangement

● CP1H-XA and X CPU Units with AC Power Supply



● CP1H-XA and X CPU Units with DC Power supply



■ Built-in Input Area

● CP1H-XA and X CPU Units

PLC Setup		Input operation			High-speed counter operation	Pulse output origin search function set to be used.
		Normal inputs	Interrupt inputs	Quick-response inputs	High-speed counters	Origin search
CIO 0	00	Normal input 0	Interrupt input 0	Quick-response input 0		Pulse 0: Origin input signal
	01	Normal input 1	Interrupt input 1	Quick-response input 1	High-speed counter 2 (phase-Z/reset)	Pulse 0: Origin proximity input signal
	02	Normal input 2	Interrupt input 2	Quick-response input 2	High-speed counter 1 (phase-Z/reset)	Pulse output 1: Origin input signal
	03	Normal input 3	Interrupt input 3	Quick-response input 3	High-speed counter 0 (phase-Z/reset)	Pulse output 1: Origin proximity input signal
	04	Normal input 4			High-speed counter 2 (phase-A, increment, or count input)	
	05	Normal input 5			High-speed counter 2 (phase-B, decrement, or direction input)	
	06	Normal input 6			High-speed counter 1 (phase-A, increment, or count input)	
	07	Normal input 7			High-speed counter 1 (phase-B, decrement, or direction input)	
	08	Normal input 8			High-speed counter 0 (phase-A, increment, or count input)	
	09	Normal input 9			High-speed counter 0 (phase-B, decrement, or direction input)	
	10	Normal input 10			High-speed counter 3 (phase-A, increment, or count input)	
	11	Normal input 11			High-speed counter 3 (phase-B, decrement, or direction input)	
CIO 1	00	Normal input 12	Interrupt input 4	Quick-response input 4	High-speed counter 3 (phase-Z/reset)	Pulse output 2: Origin input signal
	01	Normal input 13	Interrupt input 5	Quick-response input 5		Pulse output 2: Origin proximity input signal
	02	Normal input 14	Interrupt input 6	Quick-response input 6		Pulse output 3: Origin input signal
	03	Normal input 15	Interrupt input 7	Quick-response input 7		Pulse output 3: Origin proximity input signal
	04	Normal input 16				
	05	Normal input 17				
	06	Normal input 18				
	07	Normal input 19				
	08	Normal input 20				
	09	Normal input 21				
	10	Normal input 22				
	11	Normal input 23				

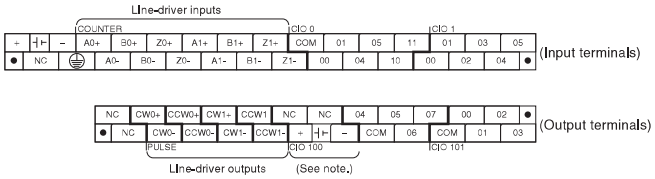
■ Built-in Output Area

● CP1H-XA and CP1H-X CPU Units

Instructions		When the instructions to the right are not executed	When a pulse output instruction (SPED, ACC, PLS2, or ORG) is executed		When the origin search function is set to be used in the PLC Setup, and an origin search is executed by the ORG instruction	When the PWM instruction is executed
PLC Setup		Normal outputs	Fixed duty ratio pulse outputs			Variable duty ratio pulse output
			CW/CCW	Pulse plus direction	When the origin search function is used	PWM output
CIO 100	00	Normal output 0	Pulse output 0 (CW)	Pulse output 0 (pulse)		
	01	Normal output 1	Pulse output 0 (CCW)	Pulse output 1 (pulse)		
	02	Normal output 2	Pulse output 1 (CW)	Pulse output 0 (direction)		
	03	Normal output 3	Pulse output 1 (CCW)	Pulse output 1 (direction)		
	04	Normal output 4	Pulse output 2 (CW)	Pulse output 2 (pulse)		
	05	Normal output 5	Pulse output 2 (CCW)	Pulse output 2 (direction)		
	06	Normal output 6	Pulse output 3 (CW)	Pulse output 3 (pulse)		
	07	Normal output 7	Pulse output 3 (CCW)	Pulse output 3 (direction)		
CIO 101	00	Normal output 8				PWM output 0
	01	Normal output 9				PWM output 1
	02	Normal output 10			Origin search 0 (Error counter reset output)	
	03	Normal output 11			Origin search 1 (Error counter reset output)	
	04	Normal output 12			Origin search 2 (Error counter reset output)	
	05	Normal output 13			Origin search 3 (Error counter reset output)	
CIO 101	06	Normal output 14				
	07	Normal output 15				

■ Terminal Block Arrangement

● CP1H-Y CPU Units



Note: Supply 24 VDC to the bottom 24 VDC input terminals when using bits 04 to 07 of output word CIO 100.

■ Built-in Input Area

● CP1H-Y CPU Units

PLC Setup		Input operation setting			High-speed counter operation setting	Pulse output origin search function set to be used.
		Normal inputs	Interrupt inputs	Quick-response inputs	High-speed counters	Origin search
A0					High-speed counter 0 (phase-A, increment, or count input) fixed	
B0					High-speed counter 0 (phase-B, decrement, or direction input) fixed	
Z0					High-speed counter 0 (phase-Z/reset) fixed	Pulse 0: Origin input signal (line driver)
A1					High-speed counter 1 (phase-A, increment, or count input) fixed	
B1					High-speed counter 1 (phase-B, decrement, or direction input) fixed	
Z1					High-speed counter 1 (phase-Z/reset) fixed	Pulse 1: Origin input signal (line driver)
CIO 0	Bit 00	Normal input 0	Interrupt 0	Quick-response input 0		Pulse 2: Origin proximity input signal
	Bit 01	Normal input 1	Interrupt 1	Quick-response input 1	High-speed counter 2 (phase-Z/reset)	
	Bit 04	Normal input 2			High-speed counter 2 (phase-A, increment, or count input)	
	Bit 05	Normal input 3			High-speed counter 2 (phase-B, decrement, or direction input)	
	Bit 10	Normal input 4			High-speed counter 3 (phase-A, increment, or count input)	
	Bit 11	Normal input 5			High-speed counter 2 (phase-B, decrement, or direction input)	Pulse 3: Origin proximity input signal
CIO 1	Bit 00	Normal input 6	Interrupt 2	Quick-response input 2	High-speed counter 2 (phase-Z/reset)	Pulse 3: Origin input signal
	Bit 01	Normal input 7	Interrupt 3	Quick-response input 3		Pulse 2: Origin input signal
	Bit 02	Normal input 8	Interrupt 4	Quick-response input 4		Pulse 1: Origin input signal (open collector)
	Bit 03	Normal input 9	Interrupt 5	Quick-response input 5		Pulse 0: Origin input signal (open collector)
	Bit 04	Normal input 10				Pulse 1: Origin proximity input signal
	Bit 05	Normal input 11				Pulse 0: Origin proximity input signal

These areas are for line-driver inputs, so they can be used only for high-speed counters (1 MHz) and not for other purposes, such as normal inputs.

■ Built-in Output Area

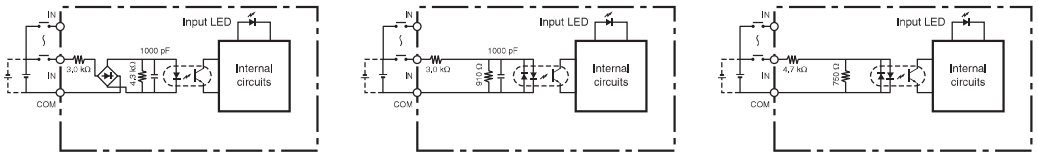
● CP1H-Y CPU Units

Instructions		When the instructions to the right are not executed	When a pulse output instruction (SPED, ACC, PLS2, or ORG) is executed		When the origin search function is set to be used in the PLC Setup, and an origin search is executed by the ORG instruction	When the PWM instruction is executed
PLC Setup		Normal output	Fixed duty ratio pulse output			Variable duty ratio pulse output
			CW/CCW	Pulse plus direction	When the origin search function is used	PWM output
CW0		Not supported.	Pulse output 0 (CW) fixed	Pulse output 0 (pulse) fixed		
CCW0		Not supported.	Pulse output 0 (CCW) fixed	Pulse output 1 (pulse) fixed		
CW1		Not supported.	Pulse output 1 (CW) fixed	Pulse output 0 (direction) fixed		
CCW1		Not supported.	Pulse output 1 (CCW) fixed	Pulse output 1 (direction) fixed		
CIO 100	Bit 04	100.04	Pulse output 2 (CW)	Pulse output 2 (pulse)		
	Bit 05	100.05	Pulse output 2 (CCW)	Pulse output 2 (direction)		
	Bit 06	100.06	Pulse output 3 (CW)	Pulse output 3 (pulse)		
	Bit 07	100.07	Pulse output 3 (CCW)	Pulse output 3 (direction)		
CIO 101	Bit 00	101.00			Origin search 2 (Error counter reset output)	PWM output 0
	Bit 01	101.01			Origin search 3 (Error counter reset output)	PWM output 1
	Bit 02	101.02			Origin search 0 (Error counter reset output)	
	Bit 03	101.03			Origin search 1 (Error counter reset output)	

These areas are for line-driver inputs, so they can be used only for high-speed counters (1 MHz) and not for other purposes, such as normal inputs.

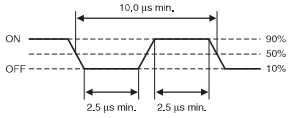
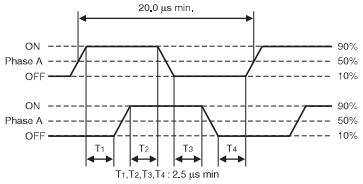
I/O Specifications for CPU Units

■ Input Specifications

ITEM	Specifications		
	High-speed counter inputs (phases A and B)	Interrupt inputs and quick-response inputs	Normal inputs
CP1H-XA/X CPU Units	CIO 0.04 to CIO 0.11	CIO 0.00 to CIO 0.03 and CIO 1.00 to CIO 1.03	CIO 1.04 to CIO 1.11
CP1H-Y CPU Units	CIO 0.04, CIO 0.05, CIO 0.10, CIO 0.11	CIO 0.00, CIO 0.01 and CIO 1.00 to CIO 1.03	CIO 1.04, CIO 1.05
Input voltage	24 VDC +10%/–15%		
Applicable sensors	2-wire sensors or 3-wire sensors		
Input impedance	3.0 kΩ		4.7 kΩ
Input current	7.5 mA typical		5 mA typical
ON voltage	17.0 VDC min.		14.4 VDC min.
OFF voltage/current	1 mA max. at 5.0 VDC		
ON delay	2.5 μs max.	50 μs max.	1 ms max.
OFF delay	2.5 μs max.	50 μs max.	1 ms max.
Circuit configuration			

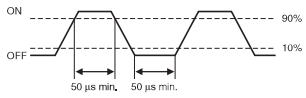
● High-speed Counter Function Input Specifications

CP1H-XA/X CPU Units (Input bits: CIO 0.04 to CIO 0.11)
CP1H-Y CPU Units (Input bits: CIO 0.04, CIO 0.05, CIO 0.10, CIO 0.11)

Item	Specifications
ON/OFF delay	• Pulse plus direction input mode • Increment mode • Up/down input mode  • Differential phase input mode 

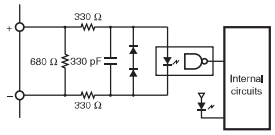
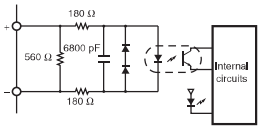
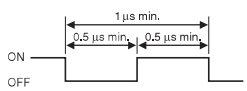
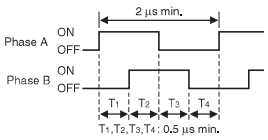
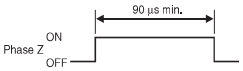
● Interrupt Input Counter Mode

CP1H-XA/X CPU Units (Input bits: CIO 0.00 to CIO 0.03, CIO 1.00 to CIO 1.03)
CP1H-Y CPU Units (Input bits: CIO 0.00, CIO 0.11, CIO 1.00 to CIO 1.03)

Item	Specifications
ON/OFF delay	

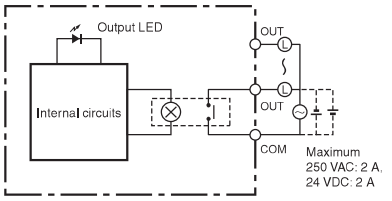
● High-speed Counter Inputs (Line-driver Inputs)

CP1H-Y CPU Units

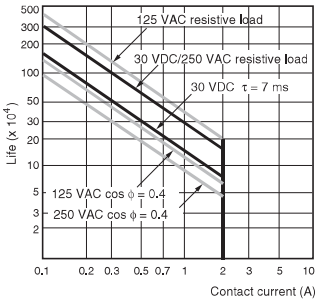
Item	Specifications	
High-speed counter inputs	Phases A and B	Phase Z
Input voltage	RS-422A line-driver, AM26LS31 or equivalent Note: The power supply voltage on the line-driver must be 5 V±5% max.	
Input type	Line-driver input	
Input current	10 mA typical	13 mA typical
Circuit configuration		
ON/OFF delay	• Pulse plus direction input mode • Increment mode • Up/down input mode  • Differential phase input mode 	

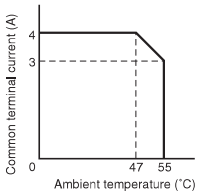
■ Output Specifications

● CPU Units with Relay Outputs

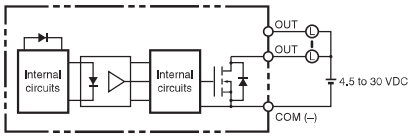
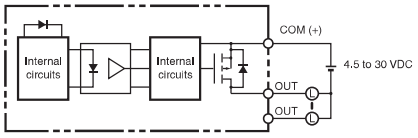
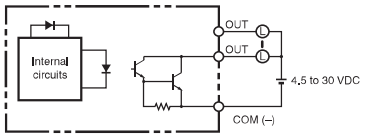
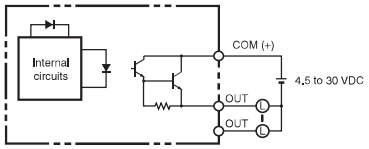
Item			Specifications
Max. switching capacity			2 A, 250 VAC (cosϕ = 1), 2 A, 24 VDC 4 A/common)
Min. switching capacity			5 VDC, 10 mA
Service life of relay	Electrical	Resistive load	100,000 operations (24 VDC)
		Inductive load	48,000 operations (250 VAC, cosϕ = 0.4)
	Mechanical		20,000,000 operations
ON delay			15 ms max.
OFF delay			15 ms max.
Circuit configuration			

Note: Under the worst conditions, the service life of output contacts is as shown on the left.
The service life of relays is as shown in the following diagram as a guideline.



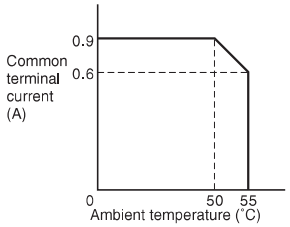


● CPU Units with Transistor Outputs (Sinking/Sourcing)

Item		Specifications		
	CP1H-XA/X CPU Units	CIO 100.00 to CIO 100.07	CIO 101.00, CIO 101.01	CIO 101.02 to CIO 101.07
	CP1H-Y CPU Units	CIO 100.04 to CIO 100.07	CIO 101.00, CIO 101.01	CIO 101.02, CIO 101.03
Max. switching capacity		4.5 to 30 VDC: 300 mA/point, 0.9 A/common, 3.6 A/Unit *1*2		
Min. switching capacity		4.5 to 30 VDC, 1 mA		
Leakage current		0.1 mA max.		
Residual voltage		0.6 V max.	1.5 V max.	
ON delay		0.1 ms max.		
OFF delay		0.1 ms max.		1 ms max.
Fuse		1/common *3		
Circuit configuration		Sinking Outputs  Sourcing Outputs 	Sinking Outputs  Sourcing Outputs 	

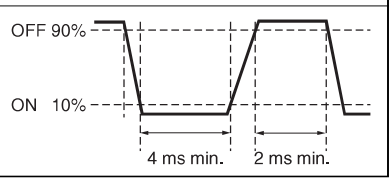
Note: 1. Do not apply a voltage or connect a load to an output terminal exceeding the maximum switching capacity.

***1** Also do not exceed 0.9 A for the total for CIO 100.00 to CIO 100.03. (CIO 100.00 to CIO 100.03 is different common.)
***2** A maximum of 0.9 A per common can be switched at an ambient temperature of 50 °C.
***3** Fuses cannot be replaced by the user.



● Pulse outputs

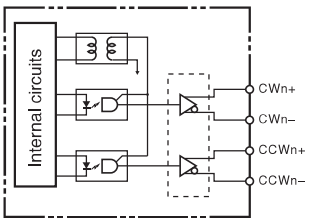
CP1H-XA/X CPU Units: Output bits CIO 100.00 to CIO 100.07
CP1H-Y CPU Units: Output bits CIO100.04 to CIO 100.07

Item	Specifications
Max. switching capacity	30 mA at 4.75 to 26.4 VDC
Min. switching capacity	7 mA at 4.75 to 26.4 VDC
Max. output frequency	100 kHz
Output waveform	

Note: 1. The above values assume a resistive load and do not consider the impedance of the cable connecting the load.
2. The pulse widths during actual use may be smaller than the ones shown above due to pulse distortion caused by connecting cable impedance.
3. The OFF and ON refer to the output transistor. The output transistor is ON at level "L".

● Pulse Outputs (Line-driver Outputs)

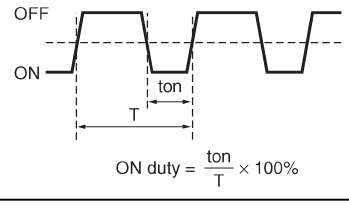
CP1H-Y CPU Units

Item	Specifications
Pulse outputs	Line-driver outputs, Am26LS31 or equivalent
Max. output current	20 mA
Max. output frequency	1 MHz
Circuit configuration	

Note: Connect a load of 20 mA or less to the output. The Unit may be damaged if a current of more than 20 mA is output.

● Pulse outputs

CP1H-XA/X/Y CPU Units: Output bits CIO101.00, CIO 101.01

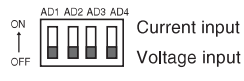
Item	Specifications
Max. switching capacity	30 mA at 4.75 to 26.4 VDC
Max. output frequency	1 kHz
PWM output precision	ON duty +5%, –0% at output frequency of 1 kHz
Output waveform	

Note: 1. The above values assume a resistive load and do not consider the impedance of the cable connecting the load.
2. The pulse widths during actual use may be smaller than the ones shown above due to pulse distortion caused by connecting cable impedance.
3. The OFF and ON refer to the output transistor. The output transistor is ON at level "L".

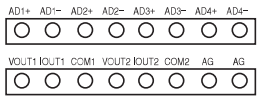
■ Analog I/O Specifications (CP1H-XA CPU Units Only)

Item		Voltage I/O	Current I/O
Analog Input Section	Number of analog inputs	4	
	Input signal range	0 to 5 V, 1 to 5 V, 0 to 10 V, or –10 to 10 V	0 to 20 mA or 4 to 20 mA
	Max. rated input	±15 V	±30 mA
	External input impedance	1 MΩ min.	Approx. 250 Ω
	Resolution	1/6,000 or 1/12,000 (full scale)	
	Overall accuracy	25°C: ±0.3% full scale/0 to 55°C: ±0.6% full scale	25°C: ±0.4% full scale/0 to 55°C: ±0.8% full scale
	A/D conversion data	Full scale for –10 to 10 V: F448 (E890) to 0BB8 (1770) hex Full scale for other ranges: 0000 to 1770 (2EE0) hex	
	Averaging	Supported (Set for individual inputs in the PLC Setup.)	
	Open-circuit detection	Supported (Value when disconnected: 8000 Hex)	
Analog Output Section	Number of outputs	2	
	Output signal range	0 to 5 V, 1 to 5 V, 0 to 10 V, –10 to 10 V	0 to 20 mA or 4 to 20 mA
	Allowable external output load resistance	1 kΩ min.	600 Ω max.
	External output impedance	0.5 Ω max.	---
	Resolution	1/6000 or 1/12000 (full scale)	
	Overall accuracy	25°C±0.4% of full scale, 0 to 55°C±0.8% of full scale	
	D/A conversion data	Full scale for –10 to 10 V: F448 (E890) to 0BB8 (1770) hex Full scale for other ranges: 0000 to 1770 (2EE0) hex	
Conversion time		1 ms/point	
Isolation method		Photocoupler isolation between analog I/O terminals and internal circuits. No isolation between analog I/O signals.	

Built-in Analog Input Switch (Factory Settings)



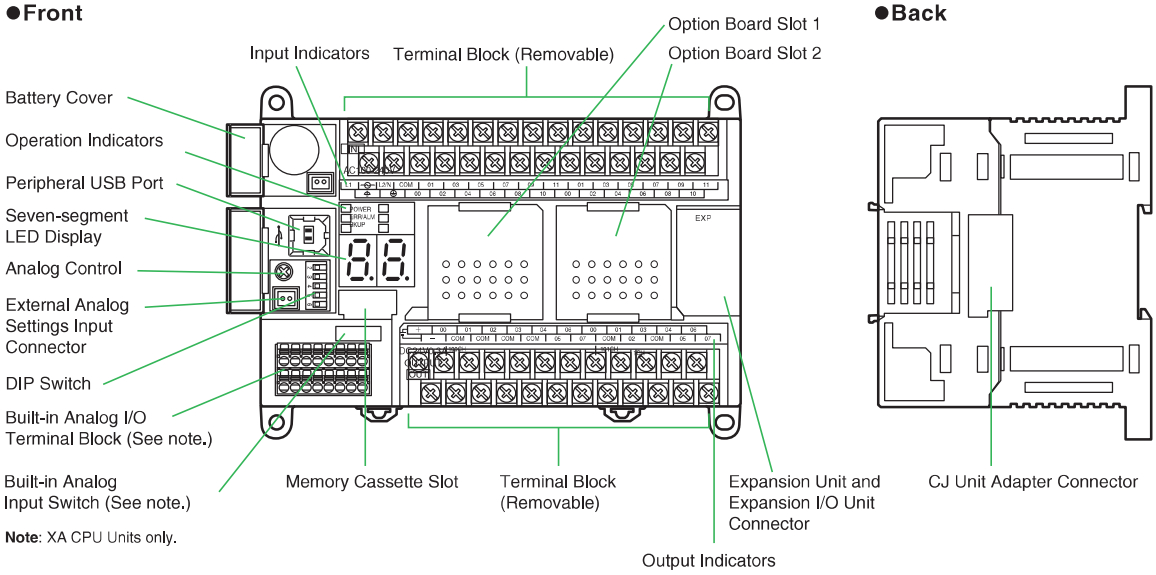
Built-in Analog I/O Terminal Block Arrangement



External Interfaces

■ CPU Unit Nomenclature

●Front



●Back

Note: XA CPU Units only.