

Hardware Instruction for HCA1P, HCA2P Series Programmable Controller

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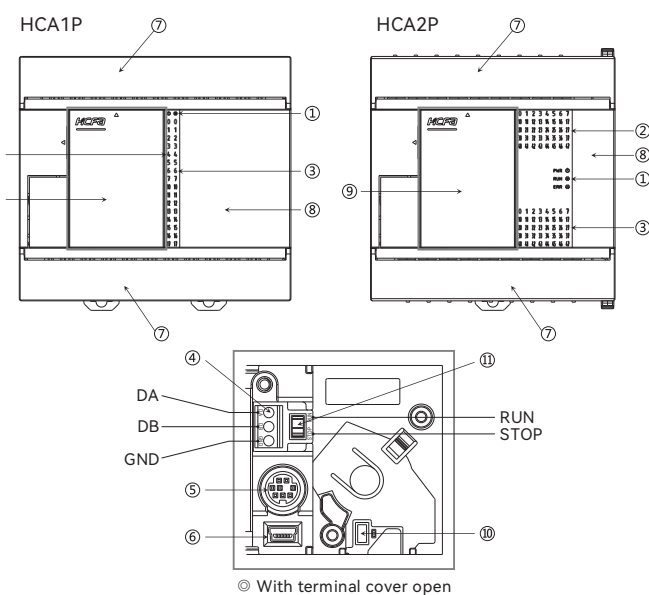
1. Product overview

1.1 Product naming rules

HC A2P - 36X 24Y R(T) - A (D)
 ① ② ③ ④ ⑤ ⑥

Code	Contents
①	HC indicates the Chinese Character Pinyin Initials 'HeChuan'
②	A2P indicates series number of PLC.
③	36X indicates 36 input points; Input points of A1P series: 8X, 12X, 16X Input points of A2P series: 14X, 24X, 36X
④	24Y indicates 24 output points; Output points of A1P series: 6Y, 8Y, 14Y Output points of A2P series: 10Y, 16Y, 24Y Total number of input& output points: A1P: 14 points, 20 points, 30 points A2P: 14 points, 24 points, 40 points, 60 points
⑤	R(T) indicates output type of PLC R: relay output T: transistor output
⑥	A(D) indicates power supply type of PLC A: AC 100V~240V input D: DC 20.4V~26.4V input

1.2 Part names



- ① Status indicator POWER LED: Lit when power is ON.
RUN LED: Lit when executing a program
ERROR LED: When program error, indicating lampflashes
When CPU error, indicating lamp lit
- ② Input indicator: From X0 to X7 in the first row, from X10 to X17 in the second row.
- ③ Output indicator: From Y0 to Y7 in the first row, from Y10 to Y17 in the second row.
- ④ RS485 communication port: Operating according to arrow directions
- ⑤ RS422 communication port: Operating according to arrow directions
- ⑥ Reserved
- ⑦ Terminal cover
- ⑧ Right expansion cover
- ⑨ Front cover
- ⑩ Battery interface
- ⑪ Run/Stop switch

1.3 External dimension

Points	L(mm)	W(mm)	H(mm)
HCA1P-8X6Y(14 points)	60.5	90	75
HCA1P-14X10Y(20 points)	75.5	90	75
HCA1P-20X14Y(30 points)	100	90	75
HCA2P-14X10Y(24 points)	90	90	82
HCA2P-24X16Y(40 points)	130	90	82
HCA2P-36X24Y(60 points)	175	90	82

1.4 Performance Specification

Items	Performance
Memory capacity	<ul style="list-style-type: none"> ● Built-in 2K/8K EEPROM(A1P:2K,A2P:8K) ● 2K, including comments, file register ● Rewrite: 20,000 times
Install expansion unit/IO	Optional f or A2P
Transistor output modules	Optional
High-speed counter	<ul style="list-style-type: none"> ● Increment: 60 kHz*2 counter, 10 kHz*4 counter ● Up/down: 60 kHz*1 counter, 10 kHz*1 counter ● Pulse plus direction: 100 kHz * 2 counter ● Differential phases (4×): 50 kHz*1 counter, 5 kHz*1 counter
Pulse output	Support(Only with transistor output modules)
Rs422 communication port	Provided
Rs485 communication port	Provided
Corresponding links	<ul style="list-style-type: none"> ● Simple PC links (8 base units(max.) can be connected) ● PC links(can be used as a sub-station connection) ● Parallel links(2 main unit can be linked)
Clock	Provided
Battery	Can be used(Sold separately)
Backup time of capacitor	7 days (at most), at 25 °C(More than 30 minutes after start-up)
Battery-free operation	If there are no batteries, we have to do no battery operation. If power outage more than 7 days, only EEPROM data can be kept.

2. Power specification

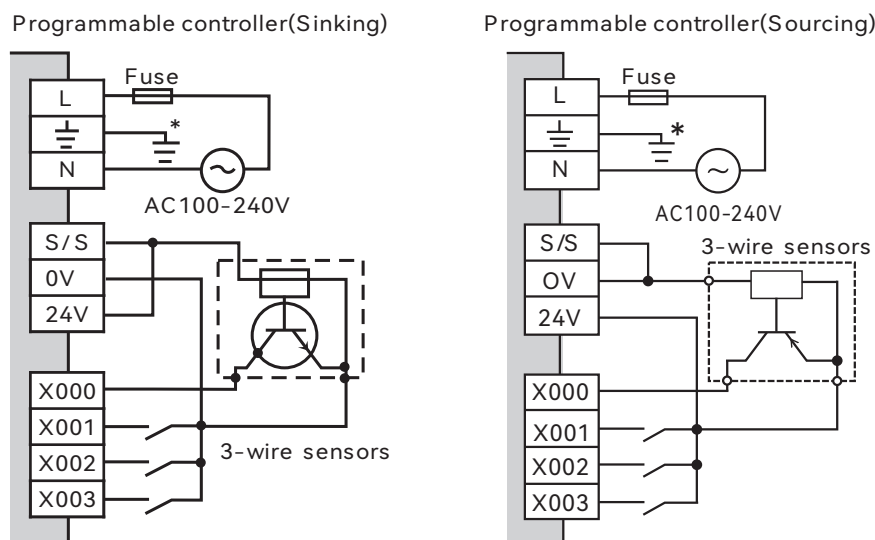
2.1 AC power module Specification

Items	HCA1P			HCA2P		
	14 points	20 points	30 points	24 points	40 points	60 points
Rated voltage	AC 100 - 240V					
Rated frequency	50/60 Hz					
Allowable momentary power failure period	10ms, If less than 10 ms, the PLC will continue operation. If 10 ms or more, the PLC will be shut down					
Power fuse	3.15A			5A		
In-rush current	100V AC - Max. 15A for 5ms 200V AC - Max. 25A for 5ms			100V AC - Max. 30A for 5ms 200V AC - Max. 50A for 5ms		
Power consumption	19W	20W	21W	30W	32W	35W
24V DC External power	24V DC 500mA (Not relevant to the connection of expansion module)					

Attention: Includes Input current (7mA or 5mA perpoint)

3. Input /Output wiring diagram

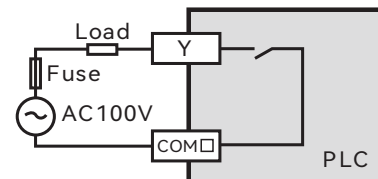
3.1 Input wiring diagram



3.2 Output wiring diagram

3.2.1 Relay output specification and wiring

Output type	Relay	
External power supply	≤ DC30V ≤ 240V(It should be lower than AC 250V if not consistent with CE/UL/CUL)	
Maximum load	Resistive load	2A/1 point The total load current should not exceed following values of common collector: Output 1 point common collector: 2A Output 4 point common collector: 8A Output 8 point common collector: 8A
	Inductive load	80VA
Minimum load	DC5V 2mA (Reference value)	
Open circuit leakage current	-	
Response Time	OFF→ON	About 10 ms
	ON→OFF	About 10 ms
Circuit isolation	Mechanical isolation	
Operation indication	When relay coil is energized, LED is lit	



★Precaution:

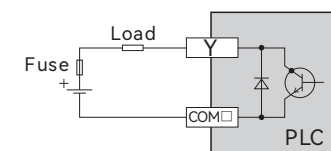
Protection circuit for load short-circuit: A short-circuit at a load connected to an output terminal could cause burnout at the output element or the PCB. To prevent this, a protection fuse should be inserted at the output.

Contact protection circuit of inductive load: An internal protection circuit for the relays is not provided in the relay output circuit for this product. It is recommended to use inductive loads with built-in protection circuits. When using loads without built-in protection circuits, insert an external contact protection circuit composed of surge absorber to reduce electromagnetic interference and extend the product life

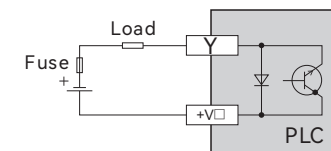
3.2.2 Transistor output specification and wiring

External Power supply	DC5~30V	
Maximum load	Resistive load	The total load current should not exceed the following values of common collector resistance load. Output 1 point common collector: 0.5A Output 4 point common collector: 0.8A Output 8 point common collector: 1.6A
	Inductive load	12W/DC 24V
Minimum load	-	
Open circuit leakage current	≤ 0.1 mA / DC30V	
ON Voltage	≤ 1.5V	

1.Sinking output wiring



2.Sourcing output wiring



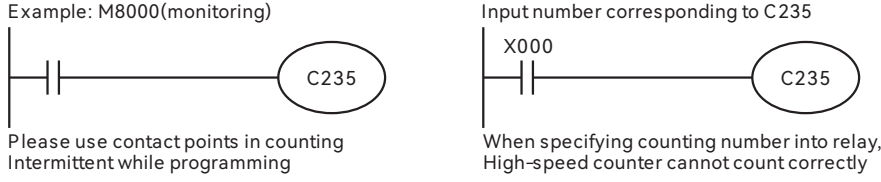
● Attention: All outputs are set as sinking output modes in all HCA1P/HCA2P series with transistor output.

► 4. High-speed counter input/pulse output instruction

[Input] high-speed counter function
 1 phase: 60kHz * 2 points, 10kHz * 4 points 2 phase: 30kHz * 1 points, 5kHz X1 points
 [Input] Pulse latch function
 To capture signal of 10μs(X0,X1) or 50μs(X2~X5)
 [Input] external interrupt function
 By external signals of 10μs(X000,X001) or 50μs(X002~X005), it can process interrupt program first.
 [Output] pulse output function
 2 pulse train outputs 100kHz (max.) at the same time(transistor output base units only). With special positioning instruction of ZRN, DRVI, DRVA.

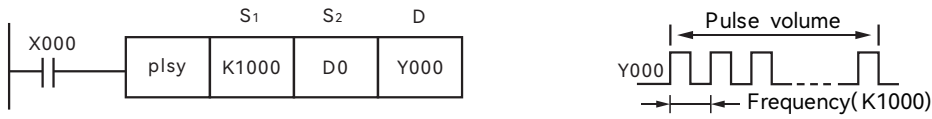
●4.1 High-speed counter input example

High-speed counter coil drive depends on Contact points. In high-speed counting, please use energized contact points.



- Please note that if we use contact device of analog switch to count, switch vibration may cause counting error.
- If high-speed counter coil programmed, the corresponding input filter in input relay will automatically be 20μs (X000, X001) or 50μs (X002~X005) (initial value: 10 ms)
- Serial number of input relay cannot be used with same input instructions at the same time, e.g: Input interrupt processing(pointer), pulse output density instruction SPD
- Output contact points of high-speed counters will not execute instructions even with current value, unless counting input pulse set.
- When output coil of high-speed counter(OUT C***) on/off, it can start/ stop execution counting. Output coil should be programmed in the main program. If programmed in step ladder circuit, subroutine, interrupt handlers, Counting and Counting Stop Function can work until step ladder circuit and subroutine perform.

●4.2 High-speed counter output example (only applicable to transistor output)



- PLSY instruction: produces quantitative pulse with assigned frequency
 S1: assigned frequency
 HC1AP, HC2AP: 16-bit instruction→1~32, 767(HZ), 32-bit instruction→1~100, 000(HZ)
 When S1 specified word device changes during instruction execution, output frequency changes accordingly.
- S2: assigned pulse volume
 ●Allowable setting range: 16-bit instruction→1~32, 767(PLS), 32-bit instruction→1~2, 147, 483, 647 (PLS)
 Setting value is zero, the generated pulse do no limit.
 In DPLSY instruction, (D1, D0) can be set as pulse value.
 During instruction execution, when S2 specified word device changes, it starts executing change instruction in next instruction drive.
 D specifies Y serial number of output pulse, only valid with Y000 or Y001(Please use transistor output mode)

- X000 is OFF, output interrupts. Reset NO, it starts from initial state. Continuous pulse occurs, X000 will be OFF, Y000 will be OFF, too.
- Duty ratio of pulse is 50%ON, 50%OFF. Output control is not affected by scan cycle, then interrupt processing.
- Pulse completing, marking the end of M8029 action

●5.Terminal arrangements for HCA1P &HCA2P series

HCA1P-8X6Y□

E	S/S	X1	X3	X5	X7
L	N	X0	X2	X4	X6
0V	Y0	Y1	Y2	Y4	●
24V	COM0	COM1	COM2	Y3	Y5

HCA1P-12X8Y□

E	S/S	X1	X3	X5	X7	X11	X13
L	N	X0	X2	X4	X6	X10	X12
0V	Y0	Y1	Y2	Y3	Y4	Y6	●
24V	COM0	COM1	COM2	COM3	COM4	Y5	Y7

HCA1P-16X14Y□

E	S/S	S/S	X1	X3	X5	X7	X11	X13	X15	X17
L	N	S/S	X0	X2	X4	X6	X10	X12	X14	X16
0V	Y0	Y1	Y2	Y4	COM3	Y7	Y11	Y12	Y14	●
24V	COM0	COM1	COM2	Y3	Y5	Y6	Y10	COM4	Y13	Y15

HCA2P-14X10Y□

E	S/S	X1	X3	X5	X7	X11	X13	X15
L	N	X0	X2	X4	X6	X10	X12	X14
0V	Y0	Y1	Y2	Y3	Y5	Y6	Y10	●
24V	COM0	COM1	COM2	COM3	Y4	COM4	Y7	Y11

HCA2P-24X16Y□

E	S/S	X1	X3	X5	X7	X11	X13	X15	X17	X21	X23	X25	X27
L	N	X0	X2	X4	X6	X10	X12	X14	X16	X20	X22	X24	X26
0V	Y0	Y1	Y2	●	Y4	Y6	●	Y10	Y12	●	Y14	Y16	●
24V	COM0	COM1	COM2	Y3	COM3	Y5	Y7	COM4	Y11	Y13	COM5	Y15	Y17

HCA2P-36X24Y□

E	S/S	X1	X3	X5	X7	X11	X13	X15	X17	X21	X23	X25	X27	X31	X33	X35	X37	X41	X43
L	N	X0	X2	X4	X6	X10	X12	X14	X16	X20	X22	X24	X26	X30	X32	X34	X36	X40	X42
0V	Y0	Y1	Y2	●	Y4	Y6	●	Y10	Y12	●	Y14	Y16	●	Y20	Y22	●	Y24	Y26	●
24V	COM0	COM1	COM2	Y3	COM3	Y5	Y7	COM4	Y11	Y13	COM5	Y15	Y17	COM6	Y21	Y23	COM7	Y25	Y27

Difference between DC power terminal type and AC power terminal type:

