User's Manual

for HCA4 series Programmable controller

1. Product overview

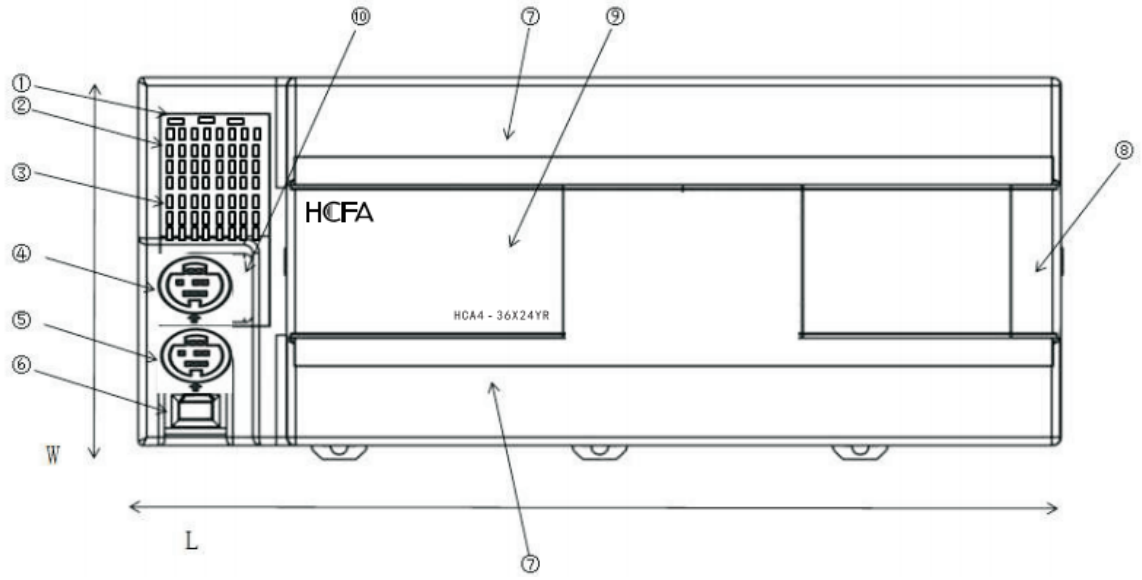
1.1 Product naming rules

HC A4-36X 24Y R(T)- A(D)
① ② ③ ④ ⑤ ⑥

Code	Contents
①	HC indicates the Chinese Characters Pinyin Initials 'Hechuan'
②	A4 indicates series number of PLC. HC PLC Types: A1~A8
③	36X indicates 36 input points; Input points of A4 series: 8X, 14X, 20X, 24X, 28X, 36X
④	24Y indicates 24 output points; Output points of A4 series: 8Y,12Y, 14Y, 16Y, 20Y, 24Y Total number of input& output points: 16 points, 26 points, 34 points, 40 points, 48 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: 85V~264V AC input D: 20.4V~26.4V DC input

1.2 Part names

Example: HCA4-36X24YR-A



①Status indicator

POWER LED: Lit when power is ON.

RUN LED: Lit when executing a program in either RUN or MONITOR mode

Not lit when Operation is stopped in PROGRAM mode or due to a fatal error

ERROR LED: Flash when a non-fatal error has occurred (including battery alarm). HCA4

operation will continue.

Lit when a fatal error or a hardware error has occurred. HCA4 operation will stop and all outputs will be turned OFF.

②Input indicator: HCA4 input is duodecimal. One channel for 12 points.

③Output indicator: HCA4 output is octal. One channel for 8 output points

④RS422 &485 Communication port: Operating according to arrow directions

⑤RS422 Communication port: Operating according to arrow directions

⑥USB port: Used to connect to a personal computer for programming and monitoring by the Programmer for HCA4

(Installation procedure: Start Windows and insert the Programmer for HCA4 Master Disk in the CD-ROM drive.

The installation program will be started by the computer's auto-run function. Complete the installation process following the instructions provided on-screen.)

⑦Terminal cover

⑧The right extension cover

⑨ The front cover, built-in battery interface

⑩ Two analog potentiometer opening

1.3 External dimension

Points	L(mm)	W(mm)	H(mm)
HCA4-8X8Y(16 points)	100.2	90	81
HCA4—14X12Y (28 points)	130.2	90	81
HCA4—20X14Y (34 points)	150.2	90	83
HCA4—24X16Y (40 points)	182.2	90	83
HCA4—28X20Y (48 points)	182.2	90	83
HCA4—36X24Y (60 points)	220.2	90	83

1.4 Performance specification

Items	Performance
Program capacity	8K steps
DM Area capacity	8K words, of these 7K words can be written to the built-in EEPROM.
Mounting expansion units and expansion I/O units	Available (Not yet introduced)
Models with transistor outputs	Available
High-speed counter	●Increment: 100 kHz ×2 counters, 10 kHz × 4 counters ●Up/ down: 100 kHz × 1 counter, 10 kHz ×1 counter ●Pulse plus direction: 100 kHz ×2 counters ●Differential phases (4×): 50 kHz × 1 counter, 5kHz ×1 counter
Pulse output	Supported (Models with transistor outputs only)
Built-in RS422 communication port	Provided(Online function of the port can be used only by the programming software ver. 9.2 or higher)
Built-in RS422& 485	Provided(Online function of the port can be used only by the programming

communication port	software ver. 9.2 or higher)
Connection port for programming device	USB port
Clock	Provided
Using a battery	Can be used(Sold separately)
Back-up time of built-in capacitor	Max. 10 days at 25°C (Normal starting for more than 15 minutes)
Battery-free operation	Battery-free operation if no battery is attached. In this case, only data in the built-in EEPROM will be retained if the power is interrupted for longer than 8 or 10 days.

★Precaution for correct use

For HCA4 CPU units, the following I/O area will be unstable after a power interruption.

•DM area (D) (Excluding the words backed up to the EEPROM using the DM function)

•Holding area (H)

•Counter present values and completion flags(C)

•Auxiliary area related to clock function (A)

Mount the battery (sold separately) to a CPU unit if the data in above area need to be retained after a power interruption.

2 Power specification

2.1 AC Power module specification

Items	**16 points**	**26 points**	**34 points**	**40 points**	**48 points**	**60 points**
Supply voltage	100 - 240V AC, +10% -15%					
Operating voltage range	85 to 264 VAC					
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	250 V, 1 A					
Inrush current	100 V AC –Max.15 A for 5ms 200 V AC –Max.25 A for 5ms					
Power consumption(W)	21 W			30 W		
24V DC External power supply	24V DC 400mA					

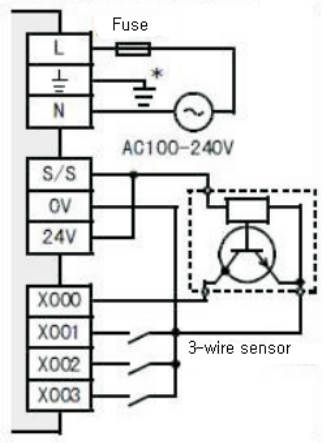
2.2 DC Power module specification

Items	16 points	26 points	34 points	40 points	48 points	60 points
Supply voltage	24V DC, +10% -15%					
Operating voltage range	20.4 to 26.4 V					
Allowable momentary power failure period	5ms, If less than 5 ms, the PLC will continue operation. If 5 ms or more, the PLC will be shut down					
Inrush current	15 A for 0.1ms					
Power consumption(W)	8 W			15 W		

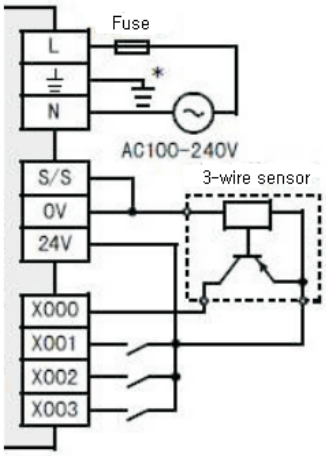
3 Input/ output wiring diagram

3.1 Input wiring diagram

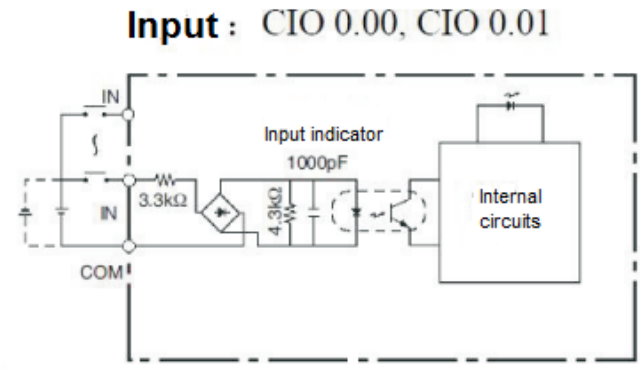
Programmable controller (Sinking)



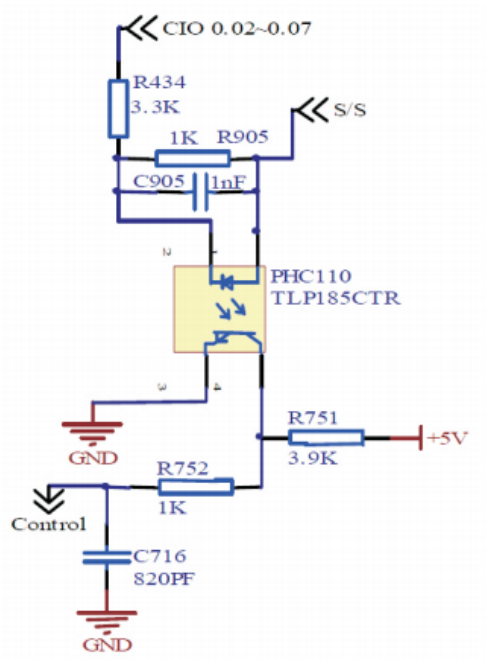
Programmable controller (Sourcing)



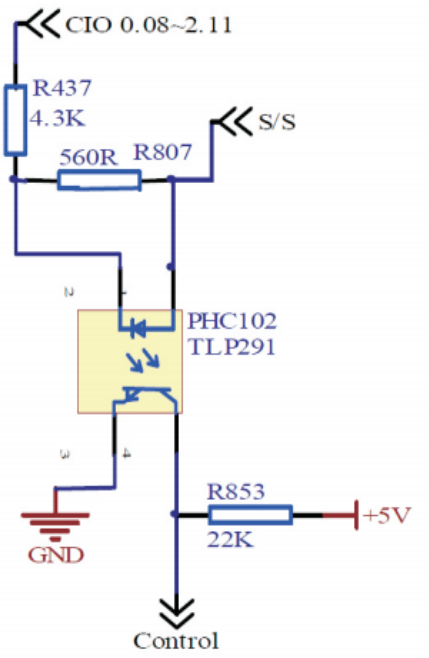
Wiring diagram of input terminal (Sinking/ sourcing)



a) 2*100 KHZ Internal circuit of high-speed input



b) CIO0.02-0.07 internal circuit



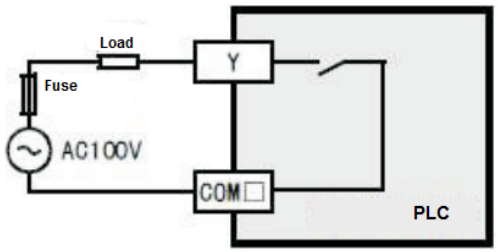
c) CIO0.08-2.11 internal circuit of normal input

★Precaution for correct use:

Unidirectional coupling was used in photocoupler input for all HCA4 series, and all inputs can only be sinking input.

3.2 Output wiring diagram

3.2.1 Relay output specification and wiring



Output type		Relay	
External power supply		≤30V DC ≤240V AC ("250V AC or less" if not a CE, UL, cUL compliant item)	
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 8point common collector: 8A

	Inductive load	80 VA	
Minimum load		5 VDC 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.	

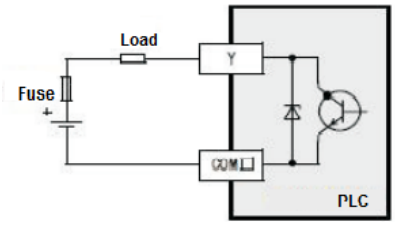
★Precaution for correct use:

The load short-circuit protection circuit: When the output terminal load short-circuited, printed circuit board may be burned. Please insert the fuse in the output.

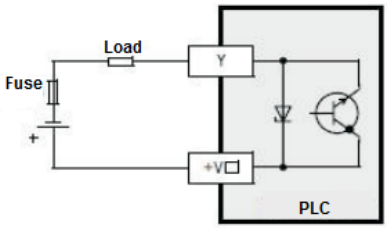
Contact protection circuit of inductive load: An internal protection circuit for the relays is not provided in the relay output circuit for this product. It is recommended to use inductive loads with built-in protection circuits. When using loads without built-in protection circuits, insert an external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

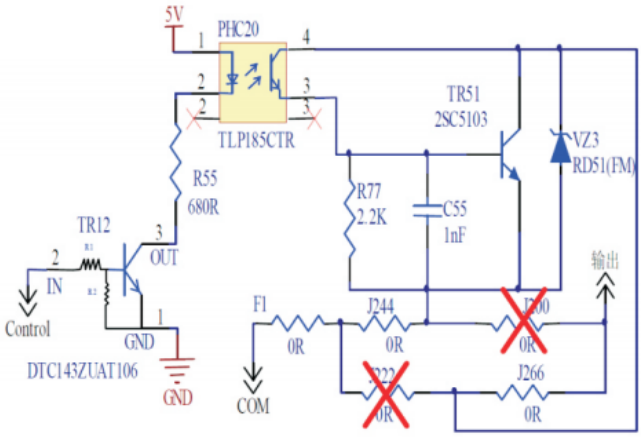
3.2.2 Transistor output specification and wiring

1. Sinking output wiring



2. Sourcing output wiring





External power supply		5~30 V DC
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 8point common collector: 1.6A
	Inductive load	12 W/ 24V DC
Minimum load		--
Open-circuit leakage current		≤0.1 mA / DC30V
ON voltage		≤1.5V

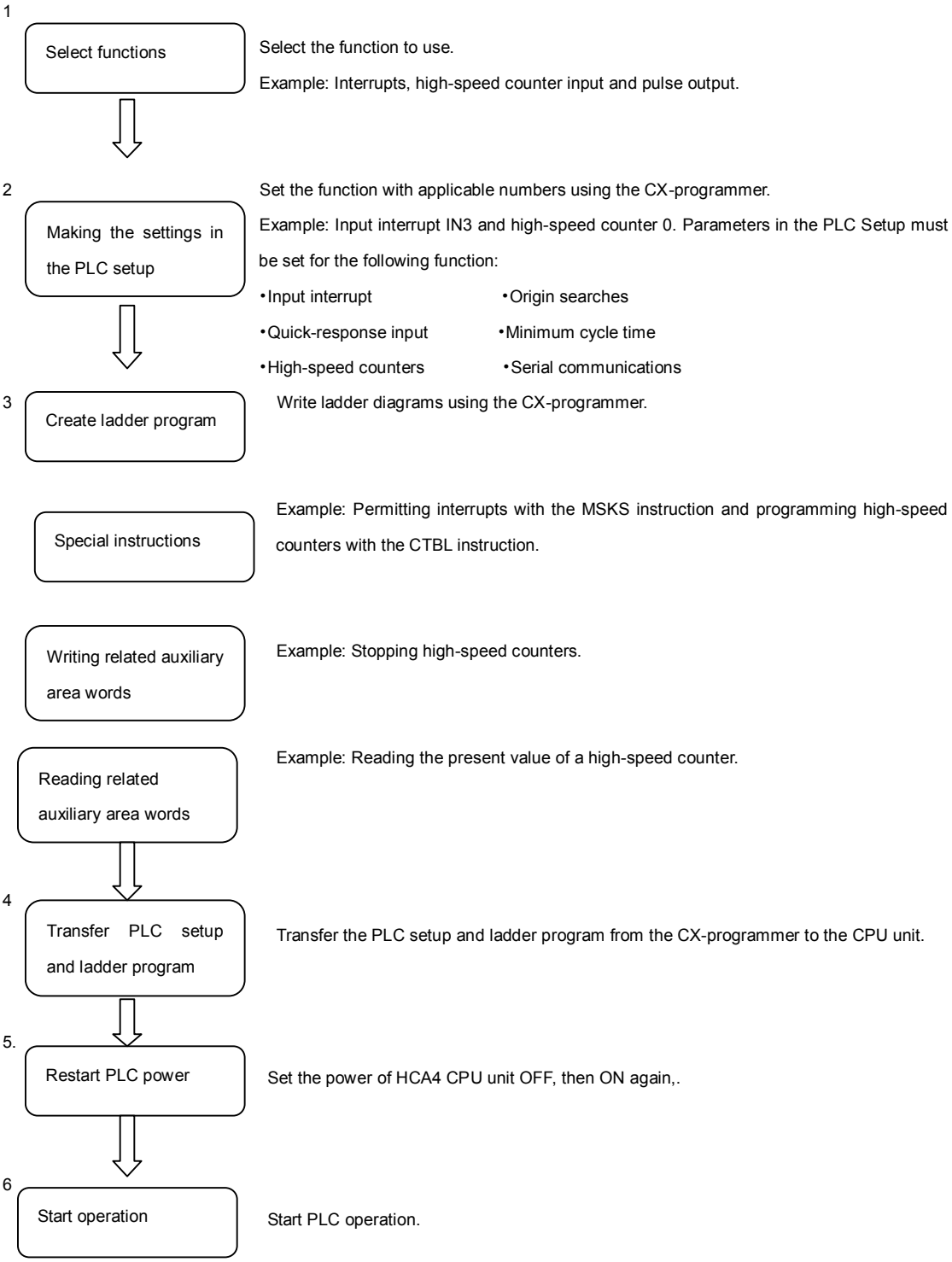
★Precaution for correct use

All outputs are set as sinking output modes in all HCA4 series with transistor output.

4 Guidelines for high-speed counter input and pulse output

●4.1 Example of using high-speed counter input

The overall procedure for using built-in HCA4 functions is described below.

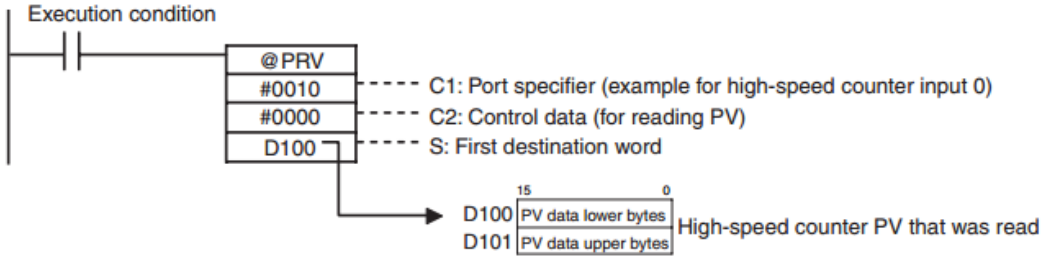


★Precaution for correct use:

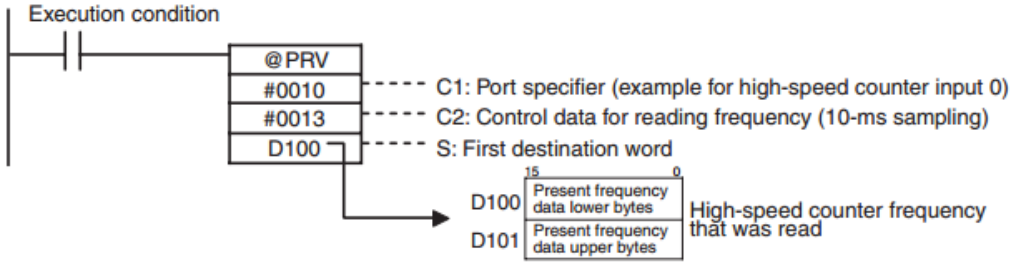
The power supply must be restarted after the PLC Setup is modified and transferred in order to enable the settings.

Click the '***Built-in Input'*** Tab and select the '***Use high-speed counter***' Check Box for high-speed counters 0 to 5, and then set the counting mode, reset method, and input setting.

●Reading the High-speed Counter present value(PV) with a PRV Instruction



●Reading the High-speed Counter Frequency with a PRV Instruction



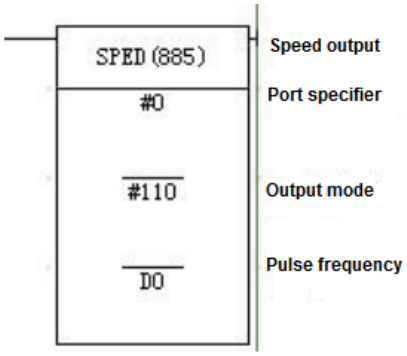
Items		Specification
Number of frequency measurement inputs		1 input (high-speed counter 0 only)
Frequency measurement range		High-speed counter 0: Differential phase inputs: 0 to 50 kHz All other input modes: 0 to 100 kHz Note: If the frequency exceeds the maximum value, the maximum value will be stored.
Measurement method		Execution of the PRV instruction
Stored data	Unit	Hz
	Output data range	Differential phase input: 0000 0000 to 0003 0D40 hex All other input modes: 0000 0000 to 0001 86A0 hex

★Restrictions

- The frequency measurement function can be used with high-speed counter 0 only.

●4.2 Example of using pulse output(Only for transistor output models)

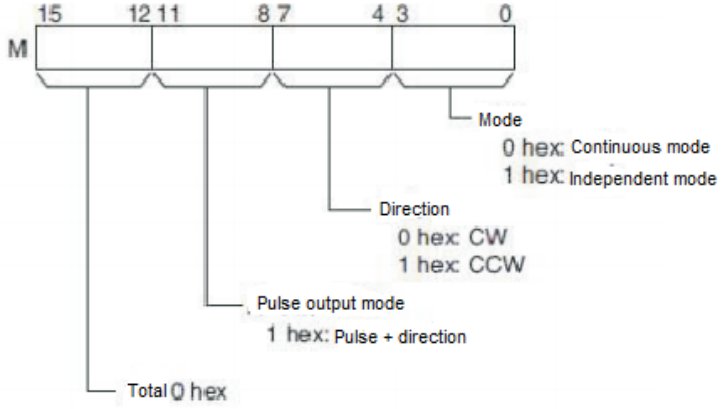
SPED Instruction pulse output is used to specify the frequency and perform pulse output without acceleration or deceleration.



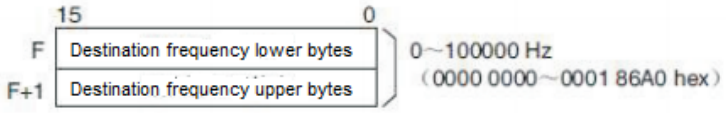
P: Port specifier

0000 hex	Pulse output 0
0001 hex	Pulse output 1

M: Output mode



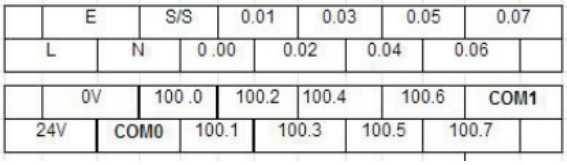
F: First pulse frequency word



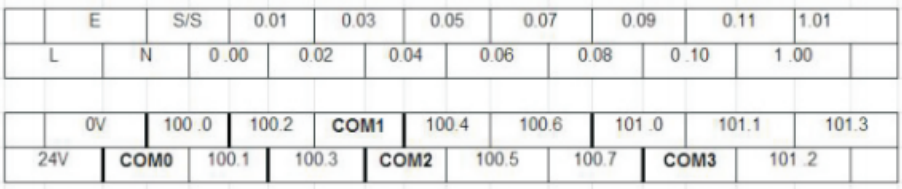
The unit of pulse frequency value is Hz.

5 Terminal arrangements for HCA4 series

HCA4-8X8Y□-A



HCA4-14X12Y□-A



HCA4-20X14Y□-A

	E	S/S	0.01	0.03	0.05	0.07	0.09	0.11	1.01	1.03	1.05	1.07	
L	N	0.00	0.02	0.04	0.06	0.08	0.10	1.00	1.02	1.04	1.06		

	0V	100.0	100.2	COM1	100.4	100.6	•	101.0	101.2	101.4	•	COM4	
24V	COM0	100.1	100.3	COM2	100.5	100.7	COM3	101.1	101.3	101.5	•		

HCA4-24X16Y□-A

	E	S/S	0.00	0.02	0.04	0.06	0.08	0.10	1.00	1.02	1.04	1.06	1.08	1.10	•	•		
L	N	•	0.01	0.03	0.05	0.07	0.09	0.11	1.01	1.03	1.05	1.07	1.09	1.11	•			

	0V	100.0	100.2	COM1	100.4	100.6	•	101.0	101.2	101.4	101.6	•	•	•	•	•		
24V	COM0	100.1	100.3	COM2	100.5	100.7	COM3	101.1	101.3	101.5	101.7	•	•	•	•			

HCA4-28X20Y□-A

	E	S/S	0.01	0.03	0.05	0.07	0.09	0.11	1.01	1.03	1.05	1.07	1.09	1.11	2.01	2.03		
L	N	0.00	0.02	0.04	0.06	0.08	0.10	1.00	1.02	1.04	1.06	1.08	1.10	2.00	2.02			

	0V	100.0	100.2	COM1	100.4	100.6	●	101.0	101.2	●	101.4	101.6	●	102.0	102.2	●		
24V	COM0	100.1	100.3	COM2	100.5	100.7	COM3	101.1	101.3	COM4	101.5	101.7	COM5	102.1	102.3			

HCA4-36X24Y□-A

	E	S/S	0.00	0.02	0.04	0.06	0.08	0.10	1.00	1.02	1.04	1.06	1.08	1.10	2.00	2.02	2.04	2.06	2.08	2.10	•
L	N	•	0.01	0.03	0.05	0.07	0.09	0.11	1.01	1.03	1.05	1.07	1.09	1.11	2.01	2.03	2.05	2.07	2.09	2.11	

	0V	100.0	100.2	COM1	100.4	100.6	•	101.0	101.2	101.4	101.6	•	102.0	102.2	102.4	102.6	•	•	•	•	•
24V	COM0	100.1	100.3	COM2	100.5	100.7	COM3	101.1	101.3	101.5	101.7	COM4	102.1	102.3	102.5	102.7	•	•	•	•	

Difference between DC power terminal and AC power terminal:

AC power supply

	E	S/S
L	N	

DC power supply

	E	S/S
⊕	⊖	

Manual NO. : HCFA-HC-HCA4-001

Date: Nov.15th, 2013.