



— 禾川股份 —

User's Manual
for HCA8P Series Programmable Controller

Manual No	160800022A
Manual version	1.1
Date	July, 2017

http://www.hcfa.cn

► Startup and maintenance precautions

◆ DANGER

- Do not touch any terminals while the PLC's power is ON. Doing so may cause electric shock or malfunction.
- Before cleaning or retightening terminal externally cut off all phases of power supply. Failure to do so may cause electric shock.
- Make sure to connect the battery for memory backup correctly.
- Do not charge, disassemble, heat, short-circuit, or expose the battery to fire. Doing so may rupture or ignite it.
- Before modifying or disrupting the program in operation or running the PLC, carefully read through this manual and the associated manuals and ensure the safety of the operation.
- An operation error may damage the machinery or cause accidents

◆ CAUTION

- Turn off the power to PLC before attaching or detaching the memory cassette. If the memory cassette is attached or detached while the PLC's power is ON, the data in the memory cassette may be destroyed, and the memory cassette may be damaged.
- Do not disassemble or modify the PLC. Doing so may cause fire, equipment failures or malfunctions. For repair, contact HCFA distributor.
- Turn off the power to the PLC before connecting or disconnecting any extension cables. Failure to do so may cause equipment failures or malfunctions.
- Turn off the power to the PLC before attaching or detaching the following device. Failure to do so may cause equipment failures or malfunction.
- Display module, peripheral devices, expansion boards, and special adapters
- Connector conversion adapter, extension blocks, and HC Series terminal blocks
- Battery and memory cassette

► Disposal precaution

◆ CAUTION

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.

► Transport and storage precautions

◆ CAUTION

- Before transporting the PLC, turn on the power to the PLC and check that the BATT LED is off. If the PLC is transported with the BATT LED on or the battery exhausted, the battery-backed data may be unstable during transportation.
- The PLC is a precision instrument. During transportation, avoid impacts larger than those specified in Section 2.1. Failure to do so may cause failures in the PLC. After transportation, verify the operations of the PLC.

◆ Caution for compliance with EC directive

Installation in Enclosure
Programmable logic controllers are open-type devices that must be installed and used within conductive control boxes. Please use the HCA8 Series programmable logic controllers while installed in conductive shielded control boxes. Please secure the control box lid to the control box (for conduction). Installation within a control box greatly affects the safety of the system and aids in shielding noise from the programmable logic controller.

◆ Caution for analog products in use
The analog special adapters have been found to be compliant to the European standards in the aforesaid manual and directive. However, for the very best performance from what are in fact delicate measuring and controlled output device HCFA would like to make the following points:

As analog devices are sensitive by nature, their use should be considered carefully. For users of proprietary cables (integral with sensors or actuators), these users should follow those manufacturers installation requirements.

HCFA recommend that the shielded cables should be used. If NO other EMC protection is provided, then users may experience temporary induced errors not exceeding +10%~10% in very heavy industrial areas.

However, HCFA suggest that if adequate EMC precautions are followed with general good EMC practice for the users complete control system, users should expect normal errors as specified in this manual.

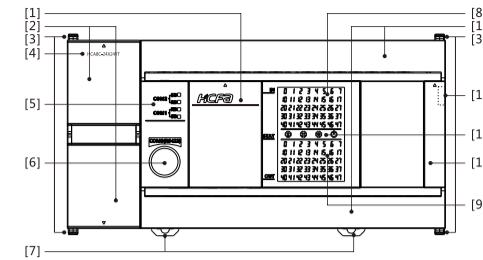
- Sensitive analog cable should not be laid in the same trunking or cable conduit as high voltage cabling. Where possible users should run analog cables separately.

- Good cable shielding should be used. When terminating the shield at Earth - ensure that no earth loops are accidentally created.

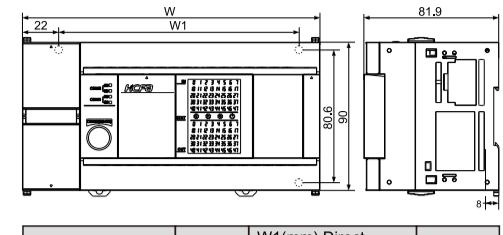
- When reading analog values, EMC induced errors can be smoothed out by averaging the readings. This can be achieved either through functions on the analog special adapter/block or through a user's program in the HCA8 Series PLC main unit.

1. Product overview

► 1.1 Part names



No.	Name	No.	Name
[1]	Battery cover	[8]	Input display LED
[2]	Top cover	[9]	Output display LED
[3]	Left-side/ right-side extension hooks	[10]	Terminal block covers
[4]	Model name (abbreviation)	[11]	Extension device connecting connector cover
[5]	Communication display LED	[12]	Operation status display
[6]	Peripheral device connecting connector	[13]	SD card cover (Some models are excluded)
[7]	DIN rail mounting hooks		

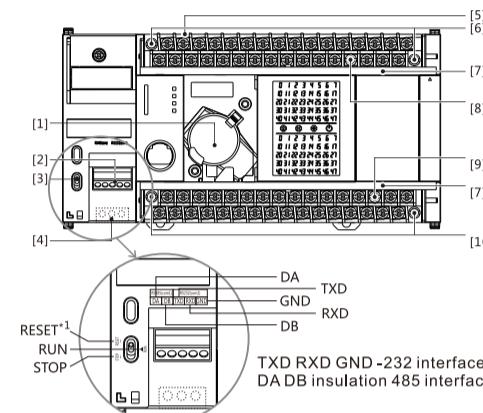


Model name	W(mm)	W1(mm) Direct mounting hole pitches	Weight(kg)
HCA8P-24X24YT□	180.7	146.2	0.85
HCA8P-32X32YT□	218.8	184.2	1.00
HCA8P-40X40YT□	284	249.4	1.20

2. Installation (general specification) ►

► 2.1 Generic specification

Items	Specification						
Ambient temperature	0 to 55°C (32 to 131°F) when operating and -25 to 75°C (-13 to 167°F) when stored						
Ambient humidity	5 to 95%RH (no condensation) when operating						
Vibration resistance	Frequency (Hz)	Acceleration (m/s ²)	Half amplitude (mm)	Sweep Count for X, Y, Z: 10 times (80 min in each direction)			
	When installed on DIN rail	10~57 57~150	4.9 0.075	—			
Shock resistance	When installed directly	10~57 57~150	9.8	—			
				147 m/s ² acceleration; Action time: 11ms; 3 times by half-sine pulse in each direction X, Y and Z.			
Noise resistance	By noise simulator at noise voltage of 1,000 Vp-p, noise width of 1 μs, rise time of 1 ns and period of 30 to 100 Hz						
Dielectric withstand voltage	500V AC for one minute	Between all terminal and ground terminal					
Insulation resistance	5MΩ or more by 500V DC megger	Class D grounding(grounding resistance: 100 Ω or less)<Common grounding with a heavy electrical system is not allowed.> ^{*3}					
Grounding	Free from corrosive gas, flammable gas or excessive conductive dusts						
Working atmosphere	<2000m						



*1 It's not necessary to turn off the power when write in parameters, just reset is OK.
*2 Do not connect GND of 232 when using.

No.	Name	No.	Name
[1]	Battery (standard accessory)	[6]	Terminal block mounting screws
[2]	Communication terminal	[7]	Terminal name
[3]	Dial switch	[8]	Input terminal (X)
[4]	Power input	[9]	Output terminal(Y)
[5]	Terminal block cover	[10]	Terminal block mounting screws

► 1.2 External dimension and weight

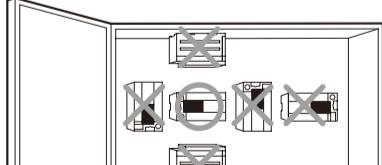
3 HCFA CORPORATION LIMITED

Terminal	Dielectric strength	Insulation resistance
Terminals of main unit, I/O extension units/ blocks		
Between power supply terminal (AC power) and ground terminal	1.5 kV AC for one minute	5MΩ or more on 500V DC Megger
Between power supply terminal (DC power) and ground terminal	500V AC for one minute	
Between 24VDC service power supply connected to input terminal 24VDC and ground terminal	500V AC for one minute	
Between input terminal (100VAC) and ground terminal	1.5 kV AC for one minute	
Between output terminal(relay) and ground terminal	1.5kV AC for one minute	
Between output terminal(transistor) and ground terminal	500 V AC for one minute	
Between output terminal(triac) and ground terminal	1.5kV AC for one minute	
Terminals of expansion board, special adapters, and special function unit/ block		
Between terminals of expansion board and ground terminal	Not allowed	Not allowed
Between terminals of special adapters and ground terminal	500 VAC for one minute	5MΩ or more on 500V DC Megger
Special function unit/ block	Refer to the manual for each special function unit/ block.	

► 2.2 Installation location

Install the PLC in an environment conforming to the generic specification(section 2.1), installation precautions and notes.

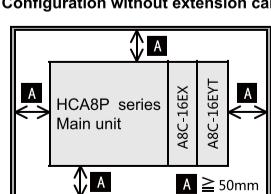
Installation location in enclosure



Space in enclosure

Extension devices can be connected on the left and right sides of the main unit of PLC. If you intend to add extension devices in the future, deep necessary space on the left and right sides.

Configuration without extension cable



2.2.1 Affixing the dust proof sheet

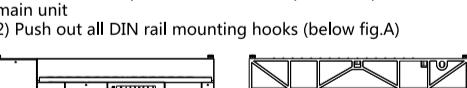
The dust proof sheet should be affixed to the ventilation port before beginning the installation and wiring work. For the affixing procedure, refer to the instructions in the dust proof sheet. Be sure to remove the dust proof sheet when the installation and wiring is completed.

2.3 Procedure for installing to or detaching from DIN rail

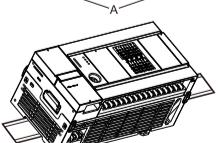
The main unit can be installed on a DIN46277 rail [35 mm (1.38") wide].

2.3.1 Installation

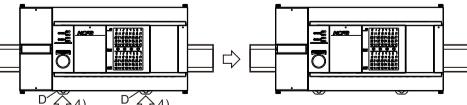
- Connect the expansion boards and special adapters to the main unit
- Push out all DIN rail mounting hooks (below fig.A)



- Fit the upper edge of DIN rail mounting groove (below fig.C) onto the DIN rail



- Lock the DIN rail mounting hooks(below fig.D) while pressing the PLC against the DIN rail.



2.4 Procedure for installing directly(With M4 screw)

This product can be installed directly on the panel(with screws)

4 HCFA CORPORATION LIMITED

2.4.1 Mounting hole pitches

Refer to external dimensions(section 1.2) for the product's mounting hole pitches information.

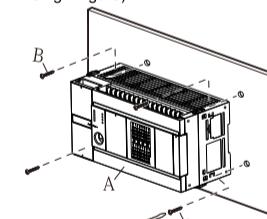
As for the details of the mounting hole pitches for extension unit/ block and special adapters, refer to this manual.

2.4.2 Installation

- Making the mounting holes in the mounting surface referring to the external dimensions diagram.

- Fit the main unit (A in the right figure) based on the holes, and secure it with M4 screws(B in the right figure).

The mounting hole pitches and the number of screws depend on product. Refer to the external dimensions diagram.



3. Power supply/ input/output specifications and examples of external wiring

► Design precaution

◆ DANGER

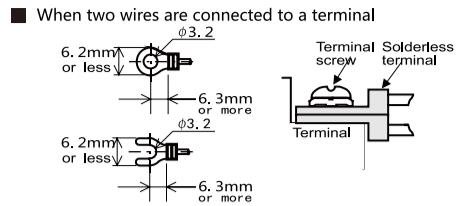
- Make sure to have the following safety circuits outside of the PLC to ensure safe system operation even during external power supply problems or PLC failure. Otherwise, malfunction may cause series accidents.

- Most importantly, have the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movement(such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper or lower positioning limits)

- Note that when the PLC CPU detects an error, such as a watchdog timer error, during self-diagnosis, all outputs are turned off. Also, when an error that cannot be detected by the PLC CPU occurs in an input/output control block, output control may be disabled.

External circuits and mechanisms should be designed to ensure safe machinery operation in such a case.

- Note that when an error occurs in a relay, triac or transistor output devices, the output could be held either on or off. For output signals that may lead to series accidents, external circuits and mechanisms should be

**3.1.2 Removal and installation of quick-release terminal block**

Removal: Unscrew terminal block mounting screws [both left and right screws] evenly, and remove the terminal block.

Installation: Place the terminal block in the specified position, and tighten the terminal block mounting screw evenly [both left and right screw].

Tightening torque 0.4 to 0.5 N·m

Loose connections may cause malfunctions.

*Pay attention so that the center of the terminal block is not lifted.

3.2 Power supply specification and example of external wiring**3.2.1 Power supply specification [Main unit/ I/O extension units]**

Items	Specification	
	AC Power type	DC Power type ^⑥
Supply voltage	AC100~240V	DC24V
Rated frequency	50/60Hz	—
Allowable momentary power failure period	Operation can be continued upon occurrence of momentary power failure for 10 ms or less. ^④	Operation can be continued upon occurrence of momentary power failure for 5 ms or less. ^④
Power fuse	HCA8P-24X24YT□ ~40X40YT□	250V 5A
Inrush current	Main unit	30 A max. 5 ms or less/100 V AC 65 A max. 5 ms or less/240 V DC
Power consumption ^⑤	HCA8P-24X24YT□	40W
	HCA8P-32X32YT□	45W
	HCA8P-40X40YT□	50W
24V DC service power supply ^③	HCA8P-24X24YT□ ~40X40YT□	600 mA or less
		—

^① Does not include the power consumption of extension units/ special extension units, and of the extension blocks/ special extension blocks connected to these units.

For the power(current) consumed by the extension units/ blocks for input/ output, refer to HCA8 series user's manual-hardware edition.

For the power consumed by special extension units/ blocks, refer to the appropriate manual.

^② When the input/ output extension blocks are connected, the 24V DC service power supply will be consumed by the blocks, and the current value to be used by the main unit will be reduced. AC power type(AC input) and DC power type do not have 24V DC power supply.

^③ Cannot be used to power supply to an external destination.

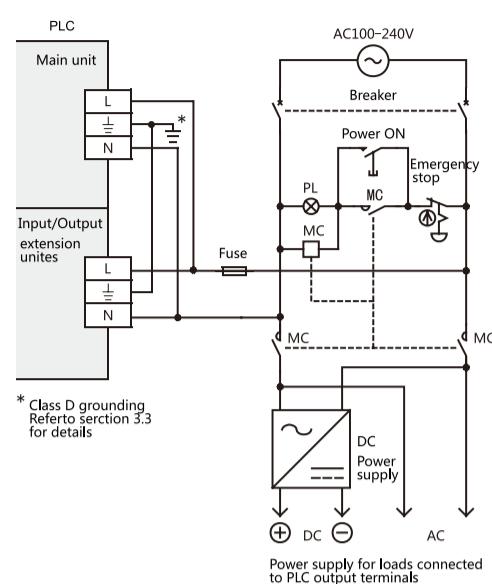
^④ The power is supplied to input/ output extension blocks, special extension blocks, special adapters and expansion boards.

^⑤ When the power supply voltage is 200 V AC, the time can be changed to 10 to 100 ms by editing the user program.

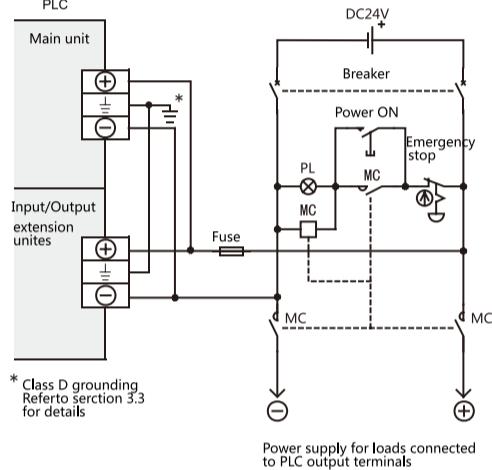
^⑥ When the power supply voltage is DC 16.8 - 19.2V, the connectable extension equipment decreases.

3.2.2 Example of external wiring (AC power type)

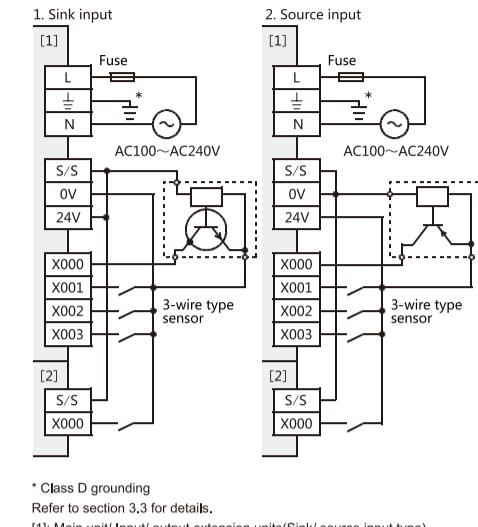
100~240V AC power is supplied to the main unit. For the details of wiring work, refer to section 3.1.

**3.2.3 Example of external wiring (DC power type)**

24V DC power is supplied to the main unit. For the details of wiring work, refer to section 3.1.

**3.3 Input specification and external wiring****3.3.1 Input specification[24VDC input type]**

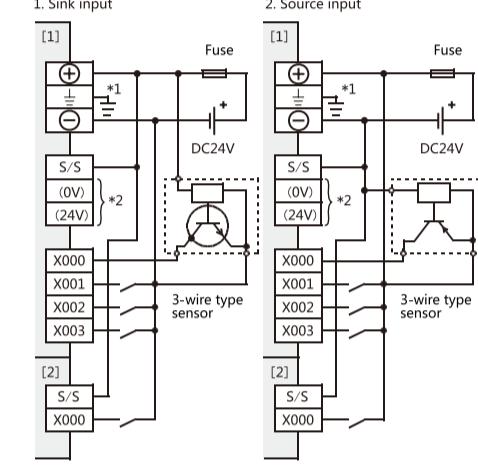
Items	Specification
Number of input points	HCA8P-24X24YT□ 24 points HCA8P-32X32YT□ 32 points HCA8P-40X40YT□ 40 points
Input connecting type	Refer to HCA8 user manual [hardware edition].
Input form	Main unit AC power type DC power type
Input signal voltage	DC24V ±10% DC24V +20%, -30%
I/O extension units	AC power type DC power type
Input impedance	X000~X005 3.9kΩ X006,X007 3.3kΩ X010 and more 4.3kΩ (Does not apply to TX3U-16M).
I/O extension units/ blocks	4.3kΩ
Input signal current	Main unit X000~X005 6mA/DC24V X006, X007 7mA/DC24V X010 and more 5mA/24V DC Does not apply to TX3U-16M)
I/O extension units/ blocks	5mA/DC24V
On input sensitivity current	Main unit X000~X005 3.5 mA or more X006, X007 4.5 mA or more X010 and more 3.5 mA or more (Does not apply to TX3U-16M)
OFF input sensitivity current	1.5 mA or less
Input response time	Approx. 10ms
Input signal form	• Sink input: No-voltage contact input NPN open collector transistor • Source input: No-voltage contact input PNP open collector transistor
Input circuit insulation	Photocoupler insulation
Input operation display	LED on panel lights when photocoupler is driven.

3.3.2 Examples of 24VDC input wiring[AC power type]

* Class D grounding
Refer to section 3.3 for details.

[1]: Main unit/ Input/ output extension units(Sink/ source input type)

[2]: Input/ output extension blocks(Sink/ source input type)

3.3.3 Examples of 24VDC input wiring[DC power type]

*1 Class D grounding
Refer to section 3.3 for details.

*2 Do not connect the (0V) and (24V) terminal with others, since they are not available.

[1]: Main unit/ Input/ output extension units(Sink/ source input type)

[2]: Input/ output extension blocks(Sink/ source input type)

3.4 Relay output specification and example of external wiring**3.4.1 Relay output specification**

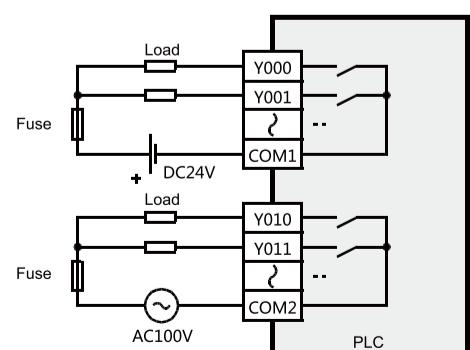
Items	Specification
Number of output points	HCA8P-24X24YT□ 24 points HCA8P-32X32YT□ 32 points HCA8P-40X40YT□ 40 points
Output connecting type	Refer to HCA8 user manual [Hardware edition]
Output form	Relay
External power supply	30V DC or less 240V AC or less (250V AC or less if not a CE, UL, cUL compliant item)
Max. load	Resistance load 2A/ 1 point ^① Inductive load 80VA
Min. load	5V DC, 2 mA (Reference value)
Open circuit leakage current	—
Response time	OFF→ON Approx. 10ms ON→OFF Approx. 10ms
Circuit insulation	Mechanical insulation
Display of output operation	LED lights when the power is applied to relay coil.

^① The total load current of resistance load per common terminal should be the following value or less.

*1 output point/ common terminal: 2A

*4 output point/ common terminal: 8A

*8 output point/ common terminal: 8A

3.4.2 Example of relay output wiring**3.5.1 Transistor output specification**

Item	Specification
Number of output points	HCA8P-24X24YT□ 24 points HCA8P-32X32YT□ 32 points HCA8P-40X40YT□ 40 points
Output connecting type	Refer to HCA8 user manual [Hardware edition]
External power supply	5~30V DC
Load	A8P-□□YT□/ A8C-16EX/A8C-16YT
Resistance load	A8P-□□YT□/ A8C-16EX/A8C-16YT
Min. load	—
Open circuit leakage current	0.1 mA or less/30V DC
ON voltage	1.5 V or less
Response time	OFF → ON Main unit Y000 ~ Y002 5 μs or less/10 mA or more (5 to 24V DC) Y003 or more 0.2 ms or less/200 mA or more (at 24V DC) I/O extension units/ blocks ^⑦ 0.2 ms or less/200 mA or more (at 24V DC) ON → OFF Main unit Y000 ~ Y002 5 μs or less/10 mA or more (5 to 24V DC) Y003 or more 0.2 ms or less/200 mA or more (at 24V DC) I/O extension units/ blocks ^⑦ 0.2 ms or less/200 mA or more (at 24V DC)
Circuit insulation	Photocoupler insulation
Display of output operation	LED on panel lights when photocoupler is driven.

^① Does not include the power consumption of extension units/ special extension units, and of the extension blocks/ special extension blocks connected to these units.

For the power(current) consumed by the extension units/ blocks for input/ output, refer to HCA8 series user's manual-hardware edition.

For the power consumed by special extension units/ blocks, refer to the appropriate manual.

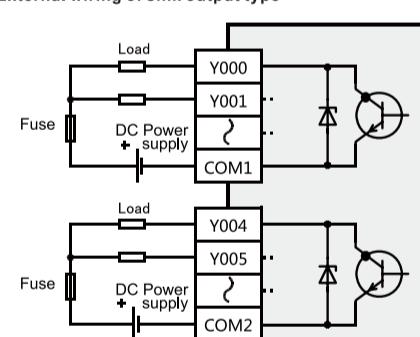
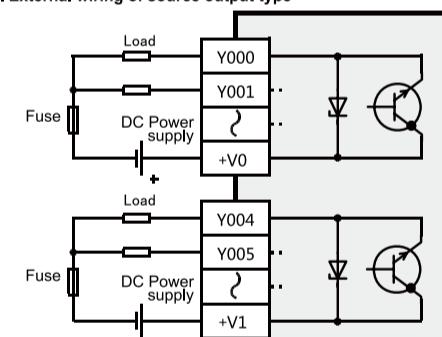
^② When the input/ output extension blocks are connected, the 24V DC service power supply will be consumed by the blocks, and the current value to be used by the main unit will be reduced. AC power type(AC input) and DC power type do not have 24V DC power supply.

^③ Cannot be used to power supply to an external destination.

^④ The power is supplied to input/ output extension blocks, special extension blocks, special adapters and expansion boards.

^⑤ When the power supply voltage is 200 V AC, the time can be changed to 10 to 100 ms by editing the user program.

^⑥ When the power supply voltage is DC 16.8 - 19.2V, the connectable extension equipment decreases.

3.5.2 External wiring of transistor output**1. External wiring of sink output type****2. External wiring of source output type****4. Terminal block layouts**