



Thank you for purchasing the H0U series programmable logic controller (PLC) independently developed by Inovance Control Technology Co., Ltd. Read the manual carefully to be familiar with the product features and be able to use the product safely.

This manual describes the specification, features and usage of the H0U series PLC. For the developing environment and design method of user programs, see the H0U Series PLC Programming Manual and the H1U/H2U Series PLC Instruction & Programming Manual issued by Inovance.

The H0U series PLC has the following features:

- ◆ It integrates PLC and TOD programs and allows programming of control logics & display interface.
- ◆ It reaches the user memory space of 8k steps and the maximum capacity of the user TOD programs of 56 KB.
- ◆ It has two independent communication ports (COM1, COM2), making it act as master or slave.
- ◆ It supports 6-channel high-speed inputs and 2-channel high-speed outputs (only transistor outputs).
- ◆ It supports display in both simplified Chinese and English, and switchover between the two languages online.
- ◆ It has a total of 25 functional keys, whose functions can be defined freely.
- ◆ It allows you to download the PLC and TOD programs via AutoShop and HTodEditor.

Safety Information and Precautions

In Design

DANGER

- ◆ Provide a safe circuit outside the PLC in the application so that the control system can still work safely even if external power failure or PLC fault occurs. Take the following aspects into considerations in the design:
- ◆ In the external circuit of the PLC, an emergency stop circuit, a protection circuit, an interlock circuit of forward/reverse rotation operation, and upper/lower position limit interlock circuit are necessary to prevent equipment damage
- ◆ To ensure safe running of the equipment, external protection circuits and safety mechanisms must be designed for the output signals that may cause serious accidents.
- ◆ When the CPU of the PLC detects an abnormality of its own system, all outputs may be cut off. When a failure occurs on the controller circuit, related outputs may be out of control. Thus, an appropriate external circuit must be designed to ensure normal running of the equipment.
- ◆ When the output units such as relay or transistor are damaged, related outputs will be out of control and be continuously kept ON or OFF. Return the PLC with damaged output unit to Inovance for repair.
- ◆ The PLC is designed for indoor electric environment. A lightning protection device must be installed for the power supply system, so that overvoltage caused by lightning is not applied on terminals of the PLC, avoiding damage to the equipment.

During Installation

WARNING

- ◆ Install the PLC in places free from dust, oil smoke, conducting dust, corrosive gas, combustible gas, high temperature, condensation, wind & rain, vibration and shock. In addition, electric shock, fire, malfunction may also cause damage and deterioration to the equipment.
- ◆ During screw holes processing and wiring, ensure that no metal filing and cable end falls into the ventilation hole of the controller, because such stuff may causes a fire, fault, or malfunction.
- ◆ After installation of the newly purchased PLC is complete, ensure that there is no foreign stuff on the surface of ventilation. Failure to comply may result in poor cooling effect during running, which may lead to a fire, fault or malfunction.
- ◆ The installation and wiring must be secure and reliable. Poor contact may cause malfunction.

Wiring Precautions

DANGER

- ◆ Ensure that all power supplies are cut off before installation or wiring.
- ◆ During screw hole processing and wiring, ensure that no metal filings or cable end drops into ventilation holes of the controller. Failure to comply may result in a fire, fault or malfunction.
- ◆ Perform wiring or plug/remove the cable connector only after power-off. Failure to comply may result in electric shock or damage to the circuit.

WARNING

- ◆ Don't provide external power supply to terminal 24+ of the main unit or expansion unit.
- ◆ Use shielded cables for high-frequency signal input/output in applications with severe interference to enhance immunity capacity of the system.

During Running and Maintenance

DANGER

- ◆ Connection or removal of the communication cable, cables of the extension card and cables of the control unit can be performed only after power-off. Failure to comply may result in damage to the equipment or malfunction.
- ◆ The operations such as online modification, forcible output, RUN and STOP can be performed only after you read the manual and guarantee safety.

WARNING

- ◆ Treat scrapped PLC as ordinary industrial waste.

Product Information

Designation Rules

H0U-0808MRT-XP-6AT
1 2 3 4 5 6 7 8 9 10

- | | |
|----------------------------------|---|
| 1: Product information | H: Inovance controller |
| 2: Series No. | 0U: TOD+PLC integrated controller |
| 3: Input points | 08: 8 inputs |
| 4: Output points | 08: 8 outputs |
| 5: Module classification | M: Main module of general-purpose controller |
| 6: Output type | R: Relay, T: Transistor |
| 7: Output type | Mixed output |
| 8: Reserved for future expansion | |
| 9: CPU type | XP: NXP-type CPU |
| 10: Special function | 6AT (standard): built-in analog extension card; |

Basic Parameters

The following table describes the basic parameters of the H0U series PLC.

PLC Model	Total I/Os	I/O Features				Communication interface	Built-in Analog Card	
		Total Inputs	High-Speed Inputs	Total Outputs	High-Speed Outputs			Output Type
H0U-0808MR-XP	16	8	2 x 60 kHz 4 x 10 kHz	8	-	Relay	2 x RS485 1 x USB	
H0U-0808MRT-XP					2 x 100 kHz			Transistor
H0U-1616MR-XP	32	16	2 x 60 kHz 4 x 10 kHz	16	-	Relay		
H0U-1616MRT-XP					2 x 100 kHz			Transistor
H0U-0808MR-XP-6AT	16	8	2 x 60 kHz 4 x 10 kHz	8	-	Relay		2 x RS485 1 x USB
H0U-0808MRT-XP-6AT					2 x 100 kHz			
H0U-1616MR-XP-6AT	32	16	2 x 60 kHz 4 x 10 kHz	16	-	Relay		
H0U-1616MRT-XP-6AT					2 x 100 kHz			

Note
 Total frequencies of high-speed inputs do not exceed 70 kHz.

The following table describes the functions of the built-in extension cards.

Extension Card Model	Analog Input	Analog Output	Temperature Detection
6AT	Voltage: 0-10 V Current: 4-20 mA Current: 0-20 mA They are switched over via configuration of dedicated registers.	Voltage: 0-10 V Current: 4-20 mA Current: 0-20 mA They are switched over via configuration of dedicated registers.	A total of three terminals are available, supporting 2-channel temperature detection and also PT100 and TC detection, which are switched over via configuration of dedicated registers.

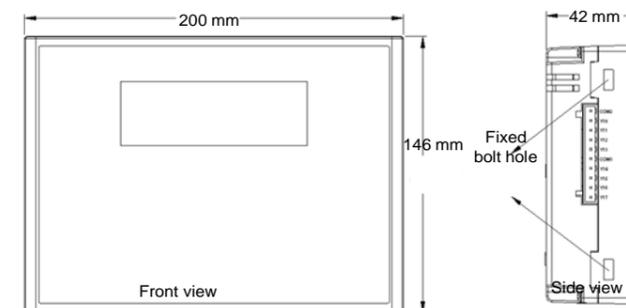
General Specifications

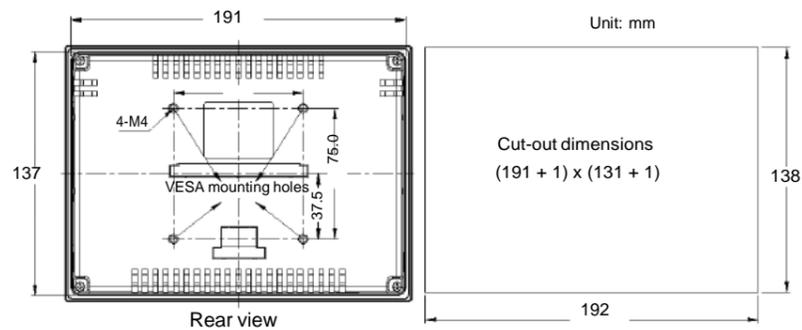
The following table describes the general specifications of the H0U series PLC.

	Environmental Parameters			Usage	Transportation	Storage
	Type	Parameter	Unit			
Climate condition	Ambient temperature	Low temperature	°C	-5	-40	-40
		High temperature	°C	55	70	70
	Humidity	Relative humidity	%	95 (30°C ± 2°C)	95 (40°C ± 2°C)	-
		Air pressure	Low pressure	kPa	70	70
Mechanical stress	Sine vibration	Displacement	mm	3.5 (5-9 Hz)	-	-
		Acceleration	m/s ²	10 (9-150 Hz)	-	-
	Random vibration	Acceleration spectral density	m ² /s ³ (dB/Oct)	-	5-20 Hz: 1.92 dB 20-200 Hz: -3 dB	-
		Frequency range	Hz	-	5-200	-
		Vibration direction	-	-	X/Y/Z	-
	Shock	Type	-	-	Half-sine	-
		Acceleration	m/s ²	-	180	-
	Dip	Dip height	m	-	1	-

Mechanical Design

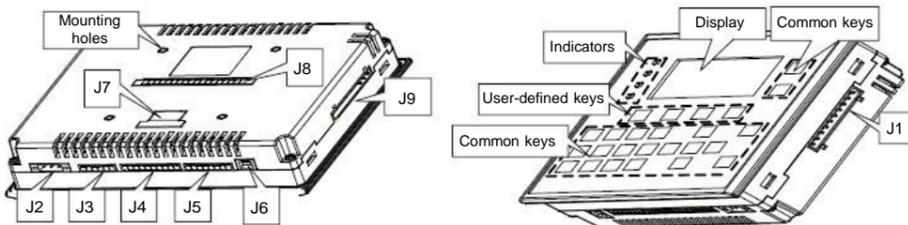
The following figure shows the installation dimensions of the H0U series PLC.





Electrical Design

The following figure shows the structure of the H0U series PLC.

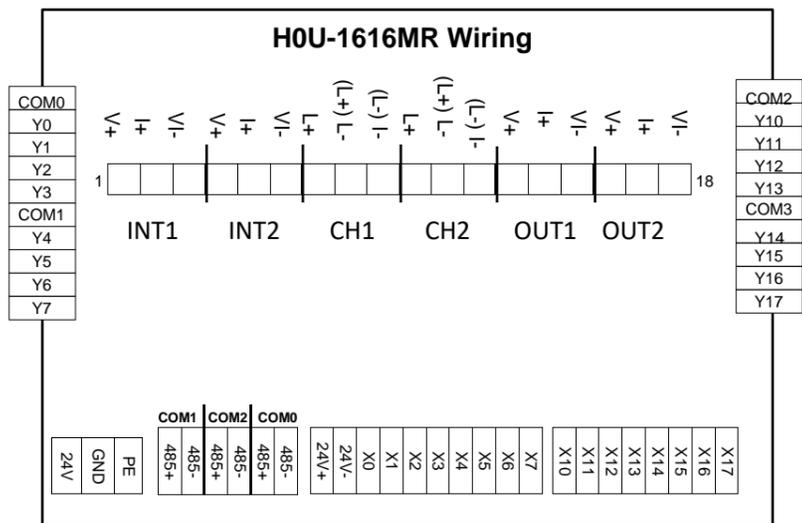


The following table describes the structure of the H0U series PLC.

Terminal	Terminal Name	Terminal	Terminal Name
J1	Output terminals (Y0 to Y7)	J2	Power supply interface
J3	Serial communication port (RS485)	J4	Input terminals (X0 to X7)
J5	Input terminals (X10 to X17)	J6	USB client (Type B)
J7	Used for extended CAN function	J8	Interface for built-in analog extension card
J9	Output terminals (Y10 to Y17)		

Wiring

The following figure shows the wiring of the H0U series PLC.



Communication Ports

The H0U series PLC has four communication ports as standard configuration (COM0, COM1, COM2 and USB). COM0, COM1 and COM2 are standard RS485 communication interfaces. COM0 is used for user program downloading, commissioning and monitoring. COM1 and COM2 are free interfaces and support the Modbus protocol, N:N protocol, parallel protocol, HMI protocol, PC link protocol, RS instruction and Modbus instruction. The other one is USB interface, which has the same function as COM0.

Power Supply Specification

The H0U PLC has an internal DC/DC power supply. The input voltage of the DC/DC power supply is 24 V. The outputs are +5V/+24VDD/GND and +5V/COM

respectively. +5V/+24VDD/GND provides power supply to the digital circuits and relays of the H0U, while +5V/COM provides power supply to transistor in the mixed outputs.

The power supply voltage of the main circuit is +5V/GND.

The following table describes the power supply specification of the H0U series PLC

Item	Voltage(V)	Current (mA)	Power (W)
Input		19.2~28.8	
Output	+5V	4.5~5.5	800
	+24VDD	18.5~26.5	150
	+5V	4.5~5.5	100
Output Power			8.1

Digital Input Specifications

For the X terminals, the rated input voltage is 24 VDC. Relative to COM (0V), the X terminals is OFF when the input voltage is below 4.0 V, is ON when the input voltage is above 15.0 V and is not fixed when the input voltage is 4.0~15.0 V. On the condition of rated input voltage of 24 VDC, the input current is 4~6 mA.

Item	High-speed Inputs X0 to X5	General Inputs
Signal input mode		Sink input
Electrical parameters	Input voltage	24 VDC
	Input impedance	3.3 kΩ
	Input ON	Input current > 4.5 mA
	Input OFF	Input current < 1.5 mA
Filter function	Hardware filter	The other I/O terminals except X0 to X7 provide hardware filter. The filter time is about 10 ms.
High-speed function		The maximum frequency at X0 and X1 can reach up to 60 kHz. The maximum frequency at X2 to X5 can reach up to 10 kHz. The total frequency is not higher than 70 kHz.

Output Specification

For the output terminals (Y), the output mode is dry-contact. The output is active (ON) when the logical state is "1" and the output is not active (OFF) when the logical state is "0".

The 250 VAC reinforced insulation must be satisfied between the relay outputs and the logic circuit of the PLC. In addition, the 250 VAC reinforced insulation must be satisfied between the output terminals of different common terminals.

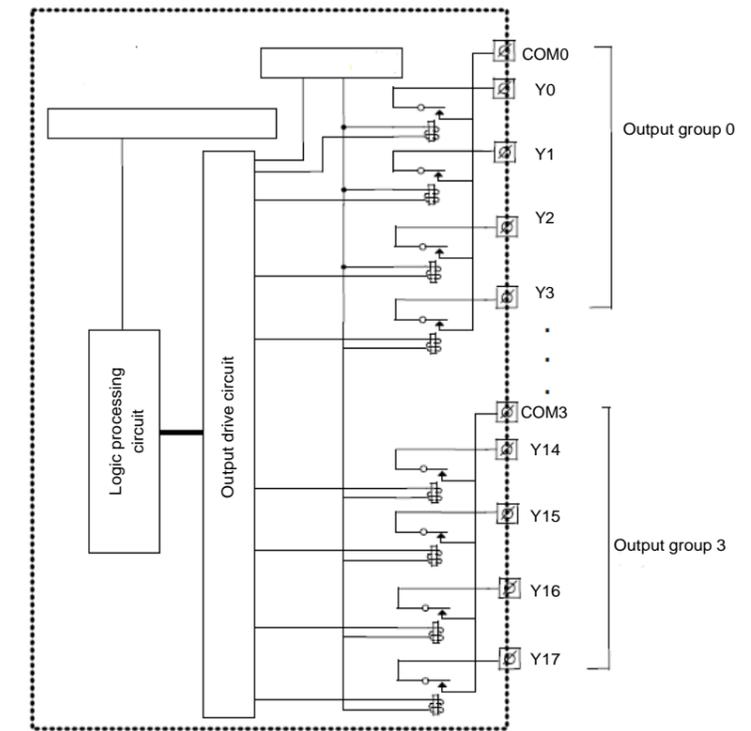
Item	Relay Output	Transistor Output
Circuit voltage	250 VAC, 30 VDC or below	5~24 VDC
Circuit insulation	Relay mechanical insulation	Optical coupling insulation
Action indication	Output contact closing	Transistor active when optical coupling is driven
Leakage current at open circuit	-	< 0.1 mA/30 VDC
Minimum load	2 mA/5 VDC	5 mA (5~24 VDC)
Maximum output current	Resistive load	2 A for a point 8 A for 4 points in a group sharing a common terminal 8 A for 8 points in a group sharing a common terminal
	Inductive load	0.5 A for a point 0.8 A for 4 points 1.6 A for 8 points
ON response time	20 ms (max.)	High-speed outputs: 7.2 W/24 VDC Others: 12 W/24 VDC
OFF response time	20 ms (max.)	High-speed outputs: 10μs Others: 0.5 ms
High-speed output frequency	-	100 kHz per channel (max.)
Output common terminal	Each group shares a common terminal COM. The groups are insulated.	
Fuse protection	-	

Note

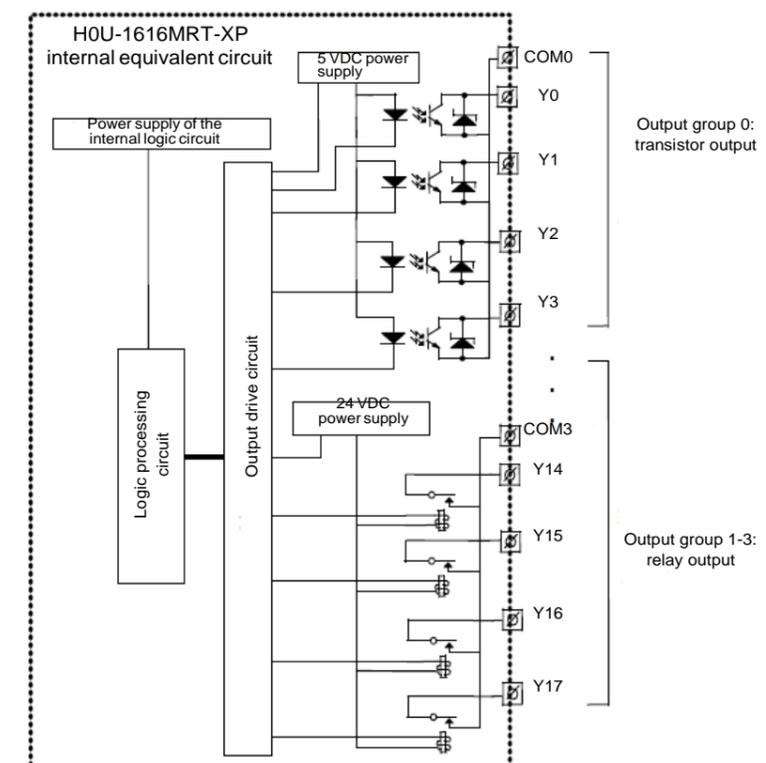
When some or all transistors in each group are with load, the average current for each channel must not exceed 0.2 A. The maximum current for a single channel must not exceed 0.5 A.

Internal Equivalent Circuit

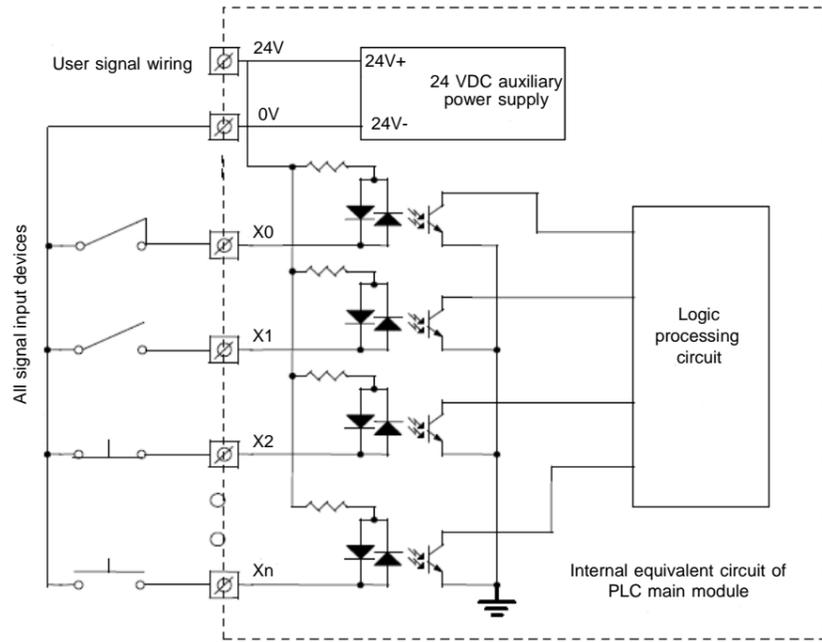
The following figure shows the internal equivalent circuit of relay outputs. Output terminals are divided into several groups, with each group electrically isolated. The output contacts of different groups are connected to different power circuits.



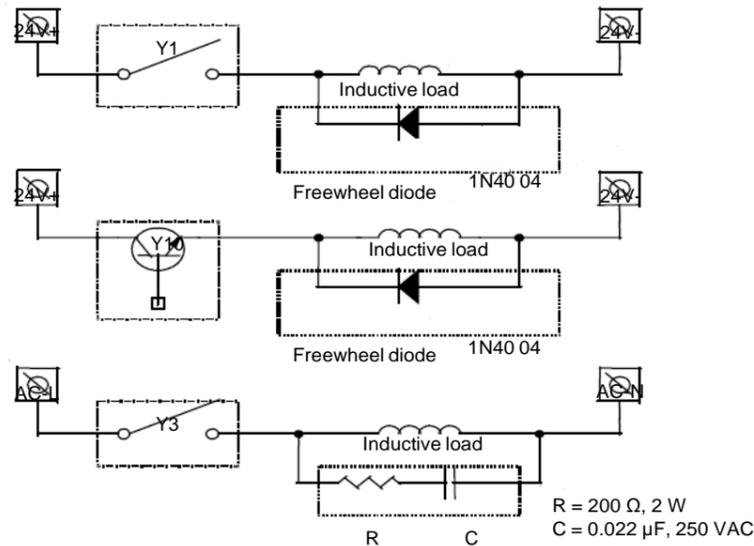
The following figure shows the internal equivalent circuit of mixed output of transistors and relays. Output terminals are divided into several groups, with each group electrically isolated. The output contacts of different groups are connected to different power circuits. Transistor outputs can be applied only to 24 VDC load circuits.



The following figure shows the internal equivalent circuit of PLC signal input. The user circuit is connected to the internal PLC circuit via wiring terminals. Sink input wiring is always used for H0U.



For the inductive load connected to the AC circuit, use the RC transitory voltage snubber circuit for the external circuit. For the inductive load connected to the DC circuit, add a freewheel diode, as shown in the following figure.



Programming Reference

Basic Specifications of the Integrated Equipment

1. Text specifications

Item	Specifications	
Display property	Display area	192 x 64
	LCD type	Yellow green background, dark blue character
	Background light	Yellow green LED background light
	Language	English/Chinese
	Physical dimensions	130 x 65 mm
	Display size	104 x 39 mm
	Weight	105 g
Storage	Power supply	3.3 V
	Flash	56 KB

2. PLC specifications

Item	Specifications
Program execution mode	Cycling scanning
Programming mode	Ladder logic diagram, instruction list, SFC
Processing speed	0.26 ns (basic instruction)
Retentive at power failure	Flash ROM retentive
User program capacity	8 k steps
I/O points	8 inputs 8 outputs, 16 inputs 16 outputs
High-speed processing capability	2-channel high-speed counting, 2 pulse output
Communication function	RS485/USB communication

Description of Keys on the Operation Panel

1. Key setting

The operation panel consists of 25 keys. The functions of the keys are the same as those of the HMI.

2. Functions of the keys

Key	Name	Function Description
	ESC	On the default page, press this key to enter the main menu. When an alarm occurs, press this key to return to the page before occurrence of the alarm. In the menu mode or parameter edit mode, press this key to return to the previous operation or discard current operation.
	SET	When an editable register parameter exists and allows edition, press this key to enter the editing mode. In the parameter editing mode, press this key to stop editing of this parameter and go to the next parameter. If there is no next parameter to be edited, the editing mode will be exited. If there is no editable parameter or the parameters do not allow edition, pressing this key is invalid.
	Down	In the menu control, if there is a cursor line, press this key to move the cursor down to the next cursor line. If a parameter is being set, press this key to increase the value by 1 where the cursor is located.
	Up	In the menu control, if there is a cursor line, press this key to move the cursor up to the previous cursor line. If a parameter is being set, press this key to decrease the value by 1 where the cursor is located.
	Left	If there is a cursor during parameter or item setting, press this key to move the cursor left.
	Right	If there is a cursor during parameter or item setting, press this key to move the cursor right.
	Confirm	In the menu mode with a cursor line, press this key to go to the next-level menu or view parameter information of the selected item. In the parameter editing state, press this key to confirm edition of the parameter and enter the editing state of the next parameter.
	Numbers 0-9	Press these keys to enter the corresponding number when setting parameters.
	+/-	Press this key to set the positive or negative value of the data.
	CLR	Press this key to clear the setting.

Note

Besides the default functions, basic function keys can also be used as user-defined keys, and you can define their functions by using the configuration PC software.

3. User-defined keys

Another six user-defined keys are available, including F1 to F4, RUN, and STOP. You can define the functions of these keys by using the configuration PC software. The functions include coil setting, page skip, and register setting.

4. Indicators

The H0U has four indicators, as described in the following table.

Indicator	State	Description
POWER	OFF	There is no power supply.
	Steady ON	The system is powered on.
RUN	OFF	The H0U is partially stopped.
	Steady ON	The H0U is running.
ALARM	OFF	The system is in normal state without fault, or the faults have been resolved.
	Steady ON	The system is faulty with alarm.
Standby indicator	N/A	N/A

H0U Soft Component

The use of soft components of the H0U series PLC is the same as that of the H1U series PLC.

PLC Instruction List

The basic PLC instructions of H0U are the same as those of H1U.

Inovance Warranty Agreement

- The warranty period of the product is 18 months. During the warranty period, if the product fails or is damaged under the condition of normal use by following the instructions, Inovance will be responsible for free maintenance.
- Within the warranty period, maintenance will be charged for the damages caused by the following reasons:
 - Improper use or repair/modification without prior permission
 - Fire, flood, abnormal voltage, other disasters and secondary disaster
 - Hardware damage caused by dropping or transportation after procurement
 - Improper operation
 - Trouble out of the equipment (for example, external device)
- If there is any failure or damage to the product, please correctly fill out the Product Warranty Card in detail.
- The maintenance fee is charged according to the latest Maintenance Price List of Inovance.
- The Product Warranty Card is not re-issued. Please keep the card and present it to the maintenance personnel when asking for maintenance.
- If there is any problem during the service, contact Inovance's agent or Inovance directly.
- This agreement shall be interpreted by Shenzhen Inovance Technology Co., Ltd.

Inovance Product Warranty Card

Customer information	Add. of unit:	
	Name of unit:	Contact person:
	P.C.:	Tel.:
Product information	Product model:	
	Body barcode (Attach here):	
Failure information	Name of agent:	
	(Maintenance time and content):	
	Maintenance personnel:	

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