

# IVC3 Series No-power I/O Extension Module User Manual

Thanks for choosing the programmable logic controllers (PLCs) developed and produced by INVT Auto-Control Technology (Shenzhen) Co., Ltd. Before using the PLC, read this manual carefully to understand the product features, so that you can install and use the product properly and make full use of its functions.

**Note:**

Before using the product, read the operation instructions and precautions carefully to prevent accidents. Only trained personnel can install and operate the product, and when installing and operating the product, the operators must strictly follow the related industrial safety specifications and the precautions and special safety guide provided in this manual to perform proper operations.

## 1 Product introduction

### 1.1 Appearance and structure

Figure 1-1 shows the appearance and structure of the IVC3 series no-power supply I/O extension module.

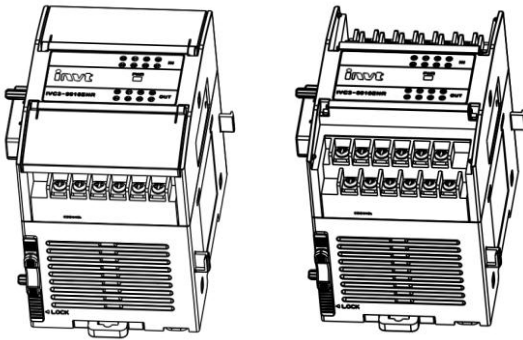


Figure 1-1 Appearance, structure, and components of the no-power supply I/O extension module

### 1.2 Model description

Figure 1-2 describes the product model.

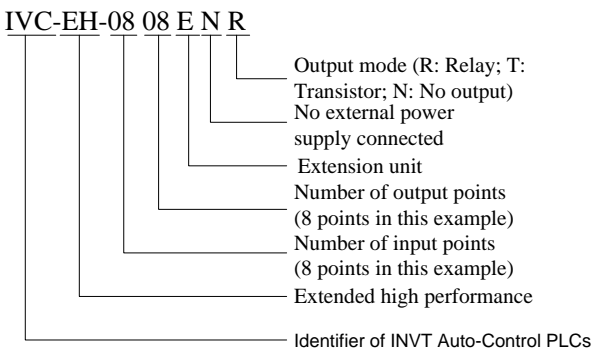


Figure 1-2 Product model description

### 1.3 Appearance and terminals

Appearance and terminals of IVC-EH-0808ENR

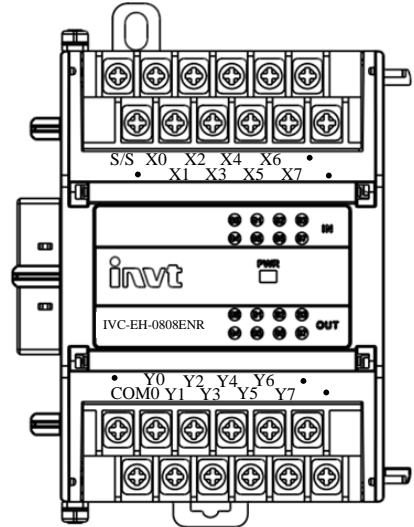


Figure 1-3 Appearance and terminals of IVC-EH-0808ENR

Appearance and terminals IVC-EH-0808ENT

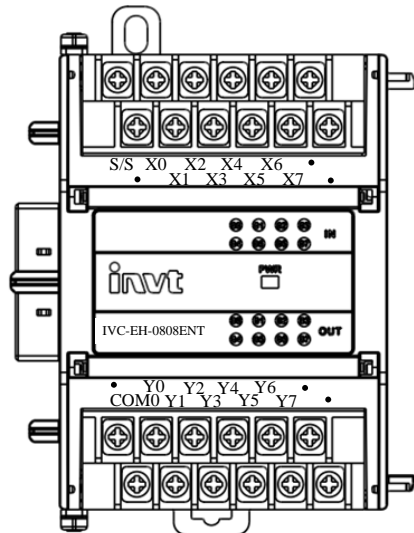


Figure 1-4 Appearance and terminals of IVC-EH-0808ENT

Appearance and terminals of IVC-EH-0016ENT

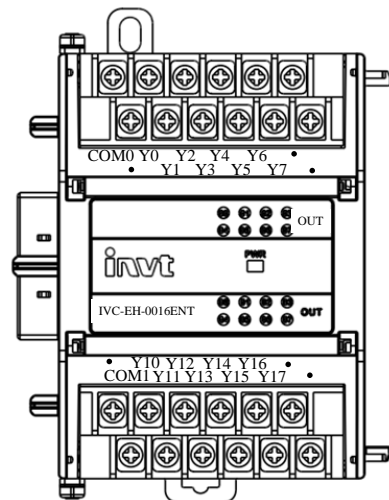


Figure 1-5 Appearance and terminals of IVC-EH-0016ENT

## Appearance and terminals of IVC-EH-1600ENN

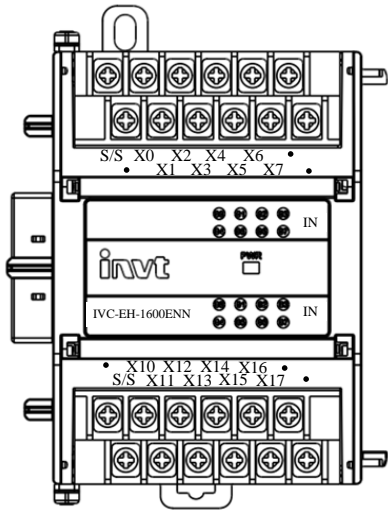


Figure 1-6 Appearance and terminals of IVC-EH-1600ENN

## Appearance and terminals of IVC-EH-0016ENR

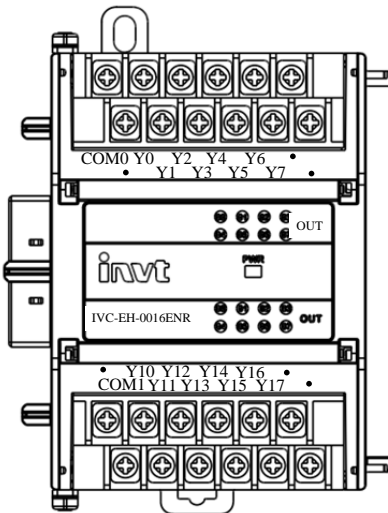


Figure 1-7 Appearance and terminals of IVC-EH-0016ENR

## 2 Installation

### 2.1 Dimensions and specifications

The no-power I/O extension modules include five models, namely IVC-EH-1600ENN, IVC-EH-0808ENR, IVC-EH-0808ENT, IVC-EH-0016ENR, and IVC-EH-0016ENT. Figure 2-1 shows the appearance and installation holes of a no-power I/O extension module.

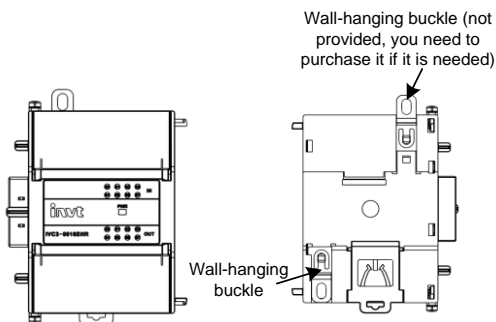


Figure 2-1 Appearance and installation holes of the no-power I/O extension module (unit: mm)

Table 2-1 Dimensions of the extension module

Width	Depth	Height
90 mm	65 mm	90 mm

### 2.2 Installation modes

The installation modes are the same as those of the main modules. For details, see the *IVC3 Series PLC User Manual*. Figure 2-2 shows the installation diagram.

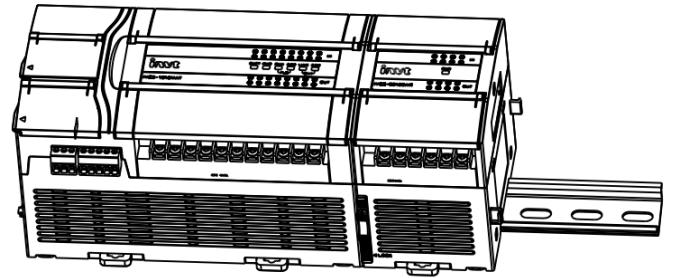


Figure 2-2 Diagram of installation by using a DIN slot

## 3 Product specifications

Table 3-1 Types and configurations of IVC3-EH series no-power I/O extension modules

Model	Power supply voltage (V AC)	Number of input/output points	Output type
IVC-EH-0808ENR	–	8/8	Relay
IVC-EH-0808ENT	–	8/8	Transistor
IVC-EH-1600ENN	–	16/0	–
IVC-EH-0016ENR	–	0/16	Relay
IVC-EH-0016ENT	–	0/16	Transistor

Table 3-2 Power requirements on the no-power I/O extension modules

Model	DC5V/GND	DC24V/GND	DC24V/COM
IVC-EH-0808ENR	50 mA	50 mA	50 mA
IVC-EH-0808ENT	130 mA	–	45 mA
IVC-EH-1600ENN	75 mA	–	90 mA
IVC-EH-0016ENR	65 mA	75 mA	–
IVC-EH-0016ENT	190 mA	–	–

### Note:

- DC5V/GND: Logic circuit operation power supply for the extension module, provided by the extension bus
- DC24V/COM: Power supply for input state detection, provided through the 24V terminal of the main module or by an external switch-mode power supply of 24 V.
- DC24V/GND: Relay circuit operation power supply for the extension module, provided by the extension bus

Before connecting an extension module to the main module, you need to calculate the current consumption sum of all the power supplies. Ensure that the sum of the current consumption is lower than the output current of the main module power supply to prevent overload of the power supply.

The solution to insufficient capacity of the power supply is to use extension modules with built-in power supplies. Such modules not only supply power for themselves, but their DC5V/GND, DC24V/COM, and DC24V/COM output can also supply power for subsequent extension modules.

## 4 Input characteristics

### 4.1 Internal equivalent input circuits

The extension module needs to connect to an external power

supply (24 V DC) for user switch state detection. The internal equivalent resistance of the input circuit is about 5 kΩ, and the signals are detected by using a bidirectional optocoupler. You can select the source-type or sink-type mode, but ensure that the dry contact switch signal is connected. If the output signal of an active transistor sensor, the OC output mode signal is required. The internal equivalent power supplies and input signal wiring are similar to those of the input circuits of the main module, as shown in Figure 4-1.

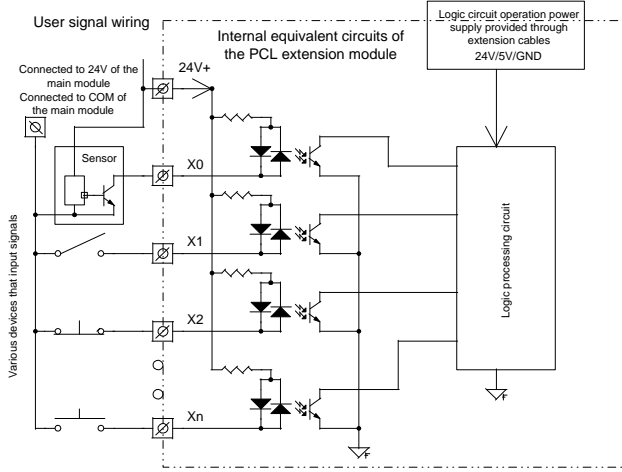


Figure 4-1 Internal equivalent input circuits of the I/O extension module

## 4.2 Input/output signal state indication

The state of a user input terminal can be indicated by an input LED indicator. When the input port is switched on (in the ON state), the input indicator is on; and when it is switched off, the input indicator is off.

The state of an output port can be indicated by an output LED indicator. When the output port is switched on (in the ON state, Yn and COMn are connected), the output indicator is on; and when it is switched off, the output indicator is off, as shown in Figure 4-2.

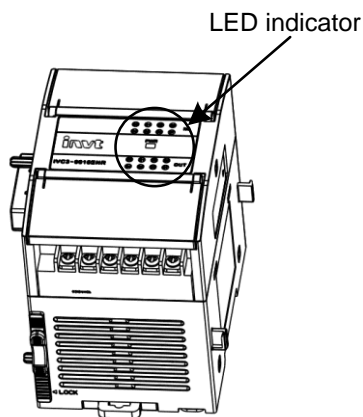


Figure 4-2 State indicators of the IVC-EH series extension module

# 5 Output characteristics

## 5.1 Electrical specifications of relay-type output ports

Table 5-1 Electrical specifications of relay-type output ports

Item	Relay-type output port
Circuit power supply voltage	Lower than 250 V AC or 30 V DC
Circuit insulation	Relay-type mechanical insulation

Item	Relay-type output port	
Action indication	The LED indicator is on when the relay output contact is closed.	
Open-circuit leakage current	/	
Min. load	2 mA/5 V DC	
Max. output current	Resistive load	2 A/1 point: The total current of the eight points of the common terminal COM is lower than 8 A.
	Inductive load	220 V AC, 80 VA
	Lamp load	220 V AC, 100 W
Time for responding to the ON state	Max. time: 20 ms	
Time for responding to the OFF state	Max. time: 20 ms	

## 5.2 Electrical specifications of transistor-type output ports

Table 5-2 Electrical specifications of transistor-type output ports

Item	Transistor-type output port	
Circuit power supply voltage	5–24 V DC	
Circuit insulation	Optocoupler insulation	
Action indication	The indicator is on when the optocoupler is driven.	
Open-circuit leakage current	Lower than 0.1 mA/30 V DC	
Min. load	5 mA (5–24 V DC)	
Max. output current	Resistive load	0.3 A/1 point; 0.8 A/4 points; 1.6 A/8 points; for those more than 8 points, the total current is allowed to increase by 0.1 A.
	Inductive load	24 V DC, 7.2 W
	Lamp load	24 V DC, 1.5 W
Time for responding to the ON state	Max. time: 0.5 ms (100 mA/24 V DC)	
Time for responding to the OFF state	Max. time: 0.5 ms (100 mA/24 V DC)	

## 5.3 Output connection instance

Figure 5-1 shows the connection of IVC3-1616MAT and IVC-EH-0808ENR. The output groups can be connected to different signal voltage circuits. For examples, the output group Y4-COM2 can be connected to the +24V DC circuit, and the power can be supplied by DC24V/COM of the controller; the output group Y6-COM3 can be connected to the +5V DC low-voltage signal circuit; that is, different output groups can operate in circuits with different voltage classes.

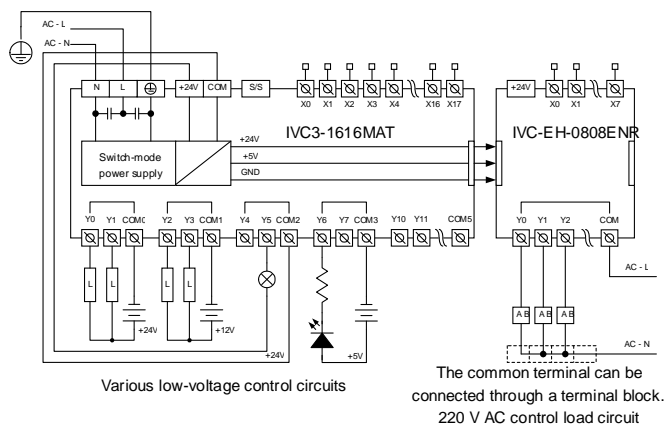


Figure 5-1 Connection instance of IVC3-1616MAT and IVC-EH-0808ENR

## 6 Extension module connection

### 6.1 Extension bus connection

Ensure that the main module is not powered on. Remove the small cover of the extension cable socket on the right side of the main module, and then insert the bus cable terminal of the extension module to the socket. If multiple extension modules are to be connected, you can connect them in sequence. Note that extension cable socket covers are detachable parts. Do not lose them after removing them from the main module.

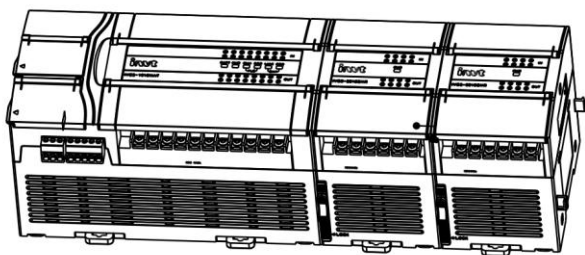


Figure 6-1 Diagram of extension module connection in series mode

### 6.2 Extension module addressing

IVC3 series PLCs automatically identify extension modules that are connected to them and automatically perform sequential addressing on the extension modules. No user operation is required.

Automatic addressing is performed once after the PLC is properly powered on, and then the addresses of all the extension modules do not change in the running. Do not insert or remove any I/O extension module or special function module when the PLC is running. Otherwise, the PLC may be damaged or operation exceptions may be caused.

Extension modules with power supplies must be powered on simultaneously with or before the main module to ensure effective addressing on the extension modules.

The octonary system is adopted for numbering I/O points, for example, 0, 1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, ... The digits 8 and 9 are not used.

Input ports of the main module and extension modules are numbered X0, X1, X2, ... X7, X10, X11, ...; and output ports are numbered Y0, Y1, Y2, ... Y7, Y10, Y11, ... The point numbers are grouped with 8 number in one group, and the groups with less than 8 point number are left out.

For example, IVC3-1616MAT provides 16 input points, which are

numbered X0 to X17. No terminal is numbered X24 to X27. The X terminal of a subsequent extension module is numbered from X30. In the same way, if 12 output points are provided, they are numbered Y0 to Y13, and no terminal is numbered Y14 to Y17; and the Y terminals of subsequent extension modules are numbered from Y20.

The X terminals and Y terminals of I/O extension modules are numbered in ascending mode based on the sequence they are connected to the extension connectors of the main module.

The following table describes logical numbering examples of the ports of the main module and extension modules.

IVC3-1616MAT	0808ENT	1600ENN	4AD	4AD	4DA	0016ENR
X0-X17	X20-X27	X30-X47	0	1	2	
Y0-Y17	Y20-Y27					Y30-Y47

### User notice

- The warranty covers only the PLC machine.
- The warranty period is 18 months. We provide free-of-charge maintenance and repairs for the product if it is faulty or damaged during proper operation within the warranty period.
- The warranty period starts from the ex-factory date of the product. The machine No. is the only basis for determining whether the machine is within the warranty period. A device without the machine No. is deemed out-of-warranty.
- Maintenance and repair fees are charged in the following scenarios even the product is within the warranty period:
  - Faults are caused due to misoperations. Operations are not performed following the instructions provided in the manual.
  - The machine is damaged due to causes such as fire, flood, or voltage exceptions.
  - The machine is damaged due to improper use. You use the machine to perform some unsupported functions.
- The service fees are calculated based on the actual fees. If there is a contract, the provisions stated in the contract prevail.
- Keep this warranty card. Show it to the maintenance unit when you seek maintenance services.
- Contact the local dealer or directly contact our company if you have any questions.

Customer Service Center (China)

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