UtilityPortable_PoE_V001 User Manual (SOP)

Version 1.0

Applicable Devices: PoE -AI/ DI / DO / DIO Series
Function: Automatically detects the connected device and displays the corresponding UI

Purpose: This manual explains how to operate the UtilityPortable_PoE test/configuration tool. A Modbus address table is included at the end for quick reference during engineering tests and on-site configuration.

Pre-use Notes: This tool communicates via Modbus TCP (default port 502). If the device IP or port is changed, update the settings in the tool accordingly to avoid connection loss.

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Revision History

Version	Release Time	Description
1.0	2026.02	Initial release

1. Hardware Description

This section introduces the front-panel connectors, indicators, and the INIT pinhole of the PoE series module.

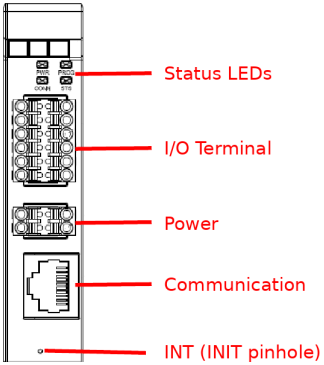

Figure 1: PoE Series Module Front Panel Overview

Table 1-1: Front Panel Items

Item	Description
Status LEDs	Indicate the system status.
I/O Terminal	External I/O terminal for monitoring and control.
Power	Power input.
Communication	Host communication port.
INIT pinhole (INT)	Used to restore the factory default settings.

2. Pre-connection Setup

This section lists the items to verify on the PC network and tool parameters before connecting to the device.

- Verify that the PC and the device are on the same subnet (IP/Mask/Gateway).
- If you need to change the device IP or port, record the original settings first to avoid losing access after the change.
- **IP Address: Enter the device IP.**
- **Subnet Mask: Set the subnet mask.**
- **Gateway: Set the default gateway.**

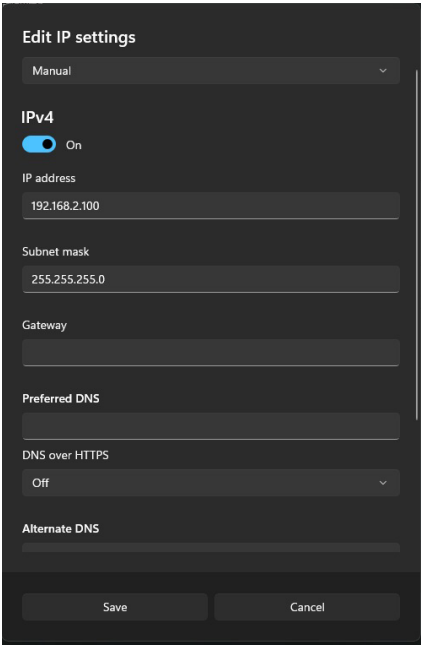

Figure 2: Windows Network IP Settings

3. Initial Screen Overview

This section explains the connection flow and status indicators after the tool starts. Complete this step before entering any module page.

- Enter the device IP and port (default: 502).
- After clicking Connect, confirm that the screen shows "Connected!" and that Model is populated automatically.
- If ConnectErrorCount keeps increasing, return to Section 2 to check the network settings or port.
- **Send IP: Apply the new IP settings (defaults to the last used value).**
- **Send Port: Apply the new port settings (default: 502 for Modbus TCP).**
- **Connect: Establish a connection to the device.**
- **Connected!: Indicates a successful connection.**
- **ConnectErrorCount: Shows the number of connection errors.**
- **Model: Displays the connected device model (the UI changes depending on the model).**

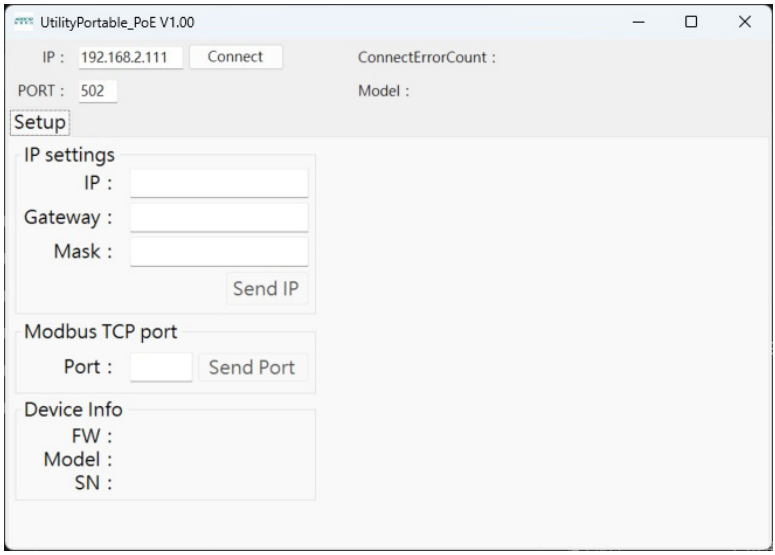

Figure 3: Application Initial Screen

4. A/I Module Operation

The A/I (Analog Input) page provides channel voltage/value monitoring and input type configuration. For the address tables, see Appendix 9.1 and 9.2.

- Type select: Set the input range for each channel (writes to Holding Registers 700-707).
- AO Receive Time: Set the polling interval (ms). Start at 200 ms and adjust as needed to avoid excessive communication load.
- Start: Begin polling Input Registers and convert to Voltage based on the selected input type.
- **Type/CH: Displays module/channel information.**
- **Value HEX: Enter/display the channel value in hexadecimal.**
- **Value DEC: Displays the corresponding decimal value.**
- **Voltage: Displays the calculated voltage (e.g., 0-10 V).**
- **Type select: Dropdown list for selecting the input range or mode (e.g., 0-10 V).**
- **AO Receive Time: Set the data receive interval (ms).**
- **Start: Start data receiving.**

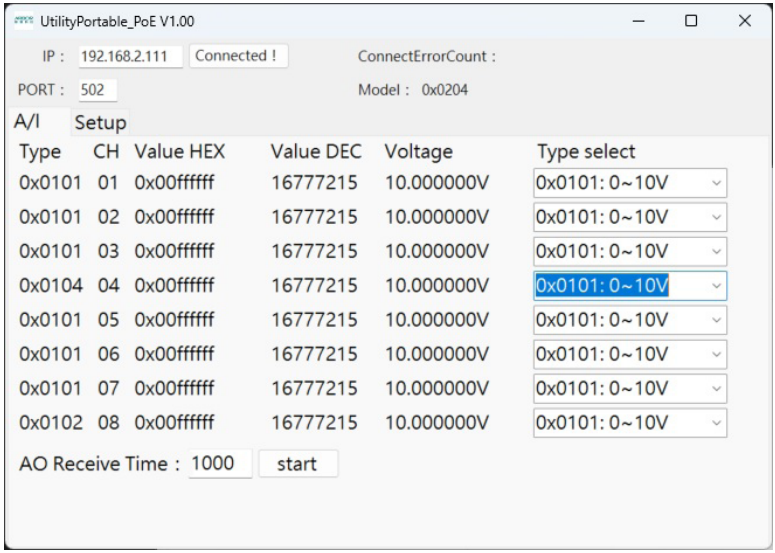

Figure 4: A/I (Analog Input) Page

5. D/I Module Operation

The D/I (Digital Input) page provides DI status monitoring, counter reading, and counter reset. For the address tables, see Appendix 9.3.

- DI Status: Reads Coil status (0-7) and displays it using indicator lamps.
- DI Counter: Reads the counter values from Input Registers (0-7).
- Counter Clear: Writes to the corresponding Coils (144-151) to clear a single-channel counter.
- Input Active Value: Sets the input active threshold/polarity (Holding Register 129).
- **DI Status: Indicator lamps show each DI channel status (On: signal present; Off: no signal).**
- **DI Counter: Displays the counter value for each channel.**
- **Counter Clear: Clears a single-channel counter.**
- **Input Active Value: Select the input trigger criterion/value.**
- **DI Receive Time: Set the receive interval (ms).**

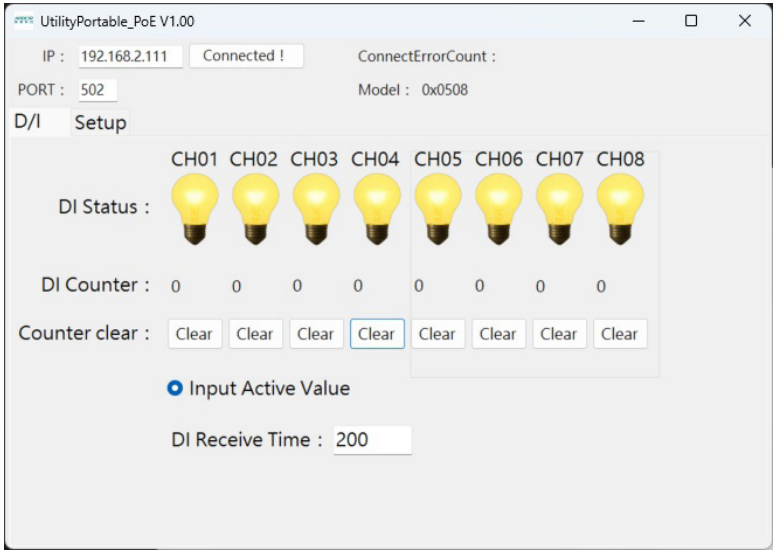

Figure 5: D/I (Digital Input) Page

6. D/O Module Operation

The D/O (Digital Output) page provides DO output control and power-on default state configuration. For the address tables, see Appendix 9.4.

- DO Switch: Toggle outputs (writes to Coils 256-263).
- Power on status + Status Save: Configure and save the power-on default outputs (Holding Register 257).
- Output Active Value: Set the output active value/polarity (Holding Register 385).
- **DO Switch: Manually control each DO channel output.**
- **DO Status: Indicator lamps show DO status (On: high output; Off: low output).**
- **Power on status: Set the initial DO states after the device power cycles.**
- **Status Save: Save the current state settings.**
- **Output Active Value: Set the output trigger value.**

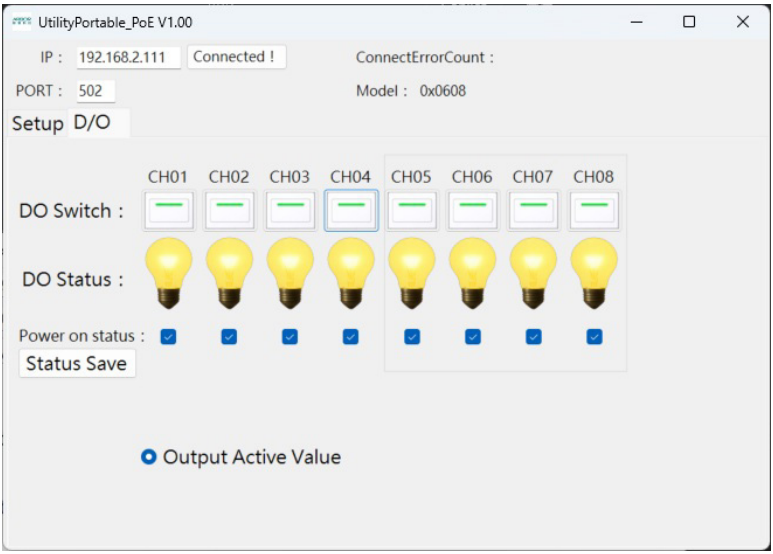

Figure 6: D/O (Digital Output) Page

7. DIO Module Operation

The DIO module includes both DI and DO functions. Refer to Sections 4 and 5 for operation details. The difference is that DI/DO are shown in separate areas on the same page and the I/O mode can be switched.

- D/I area: Status and counter reading are the same as in the D/I page.
- D/O area: Output switching is the same as in the D/O page.
- If "DI read error" is shown, check the connection status and whether the polling interval is too short (too frequent).
- **D/I area: Displays input channel status and counters.**
- **D/O area: Displays output channel status and allows output toggling.**
- **DI read error: Error message shown when inputs cannot be read.**
- **CH status indicators: Different lamp icons indicate the input/output state of each I/O channel.**

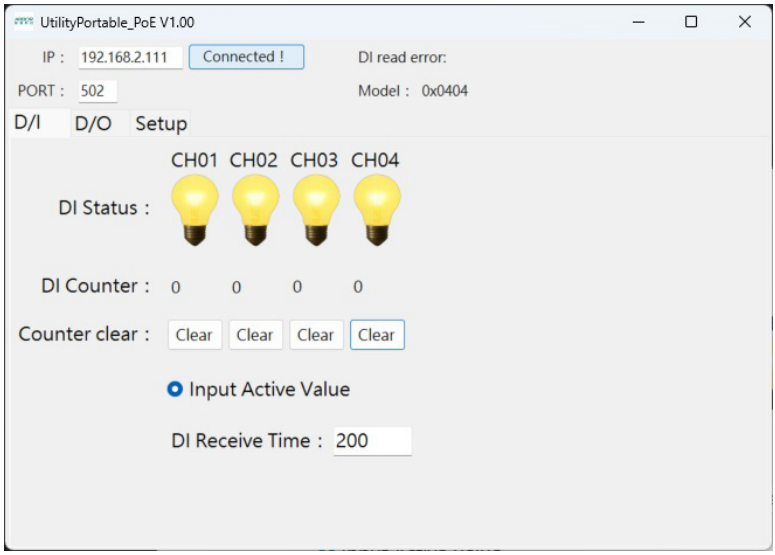

Figure 7: DIO Module - Input Mode

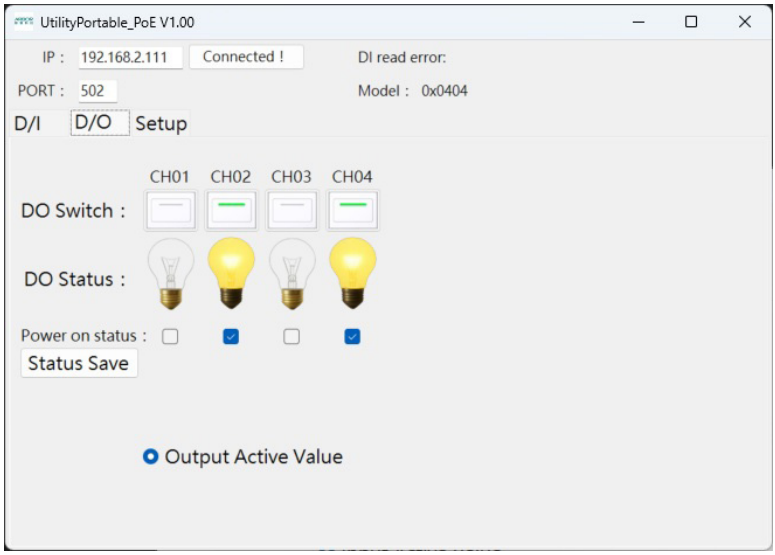

Figure 8: DIO Module - Output Mode

8. Setup Page

The Setup page provides basic device information and network parameter settings. For the address tables, see Appendix 9.5.

- Device Info: Read FW/Model/SN (starting from Holding Register 4000).
- IP settings: Read/write IP, Gateway, and Mask (Holding Registers 4021-4026).
- Modbus TCP port: Read/write the communication port (Holding Register 4020). After changing it, reconnect using the new port.
- **IP settings: View and configure the device IP, Gateway, and Mask.**
- **Modbus TCP port: View and configure the port number.**
- **Device Info: Shows firmware version (FW), model, and serial number (SN).**

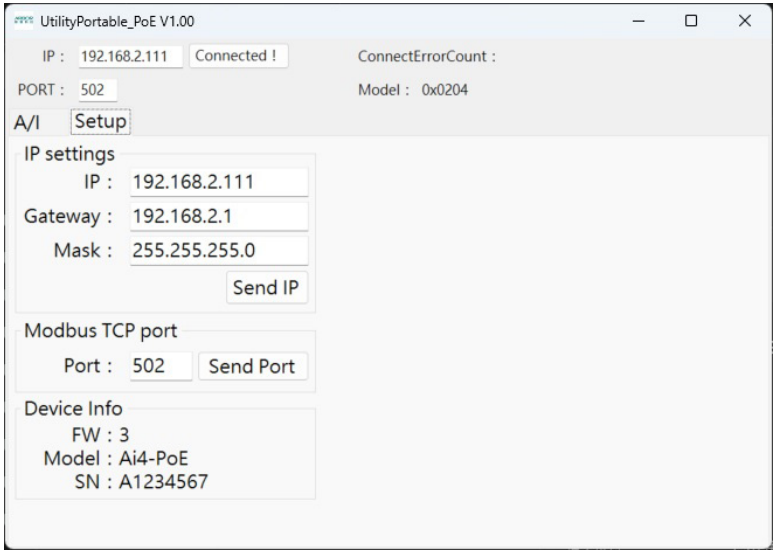

Figure 9: Setup Page

9. Appendix: PoE Modbus Address Table and Operation Reference

This appendix summarizes the Modbus address tables in PoE_Modbus.xlsx and groups them by module/function for quick lookup when using UtilityPortable_PoE or a third-party Modbus master tool for testing and debugging.

Note: Different Modbus tools may use 0-based or 1-based addressing. This document follows the Address/addr fields in the tables. When using third-party tools, confirm their address offset rules first.

9.1 UtilityPortable_PoE Function-to-Address Quick Reference

Table 9-1: Function-to-Address Quick Reference

Function / UI Item	R/W	Register Type	Address (Range)	Description
Connect / Model Display	R	Holding Register	4001~4016	Read the Model string; the tool switches the UI based on the model.
Setup > FW	R	Holding Register	4000	Firmware version
Setup > SN	R	(If applicable) Holding Register	(Defined by firmware)	If the UI shows a serial number, read it from the firmware-defined address.
Setup > Modbus TCP port	R/W	Holding Register	4020	After changing the port, reconnect using the new port.
Setup > IP / Gateway / Mask	R/W	Holding Register	4021~4026	Each field occupies 2 registers (32-bit).
A/I > Type select	W	Holding Register	700~707	Input type code per channel (see Table 8-2).
A/I > Value / Voltage	R	Input Register	00~15	32-bit raw value per channel (byte order: see Data Structure).
D/I > DI Status	R	Coil	0~7	Status per channel.
D/I > DI Counter	R	Input Register	0~7	Counter value per channel (16-bit).
D/I > Counter Clear	W	Coil	144~151	Write 1 to trigger clear (per-channel mapping).
D/I > Input Active Value	W	Holding Register	129	Input active value/ polarity setting (defined by firmware).

D/O > DO Switch	W	Coil	256~263	Output switch per channel.
D/O > Power on status / Status Save	W	Holding Register	257	Power-on default output bit map.
D/O > Output Active Value	W	Holding Register	385	Output active value/ polarity setting (defined by firmware).

9.2 A/I (AI4-PoE) Address Table

The following tables list the commonly used Holding Registers and Input Registers for the A/I module. Input Type code mapping and voltage conversion formulas are shown in Table 9-4.

Table 9-2: A/I Holding Registers (Settings / Device Info)

Address	R/W	Functing	type	Default	Data Structure	Sample
700	R/W	Input_Type_CH0	uint16_t (HEX)	0x0101		0x0101
701	R/W	Input_Type_CH1	uint16_t (HEX)	0x0101		0x0101
702	R/W	Input_Type_CH2	uint16_t (HEX)	0x0101		0x0101
703	R/W	Input_Type_CH3	uint16_t (HEX)	0x0101		0x0101
704	R/W	Input_Type_CH4	uint16_t (HEX)	0x0101		0x0101
705	R/W	Input_Type_CH5	uint16_t (HEX)	0x0101		0x0101
706	R/W	Input_Type_CH6	uint16_t (HEX)	0x0101		0x0101
707	R/W	Input_Type_CH7	uint16_t (HEX)	0x0101		0x0101
4000	R	Firmware ver	uint16_t	0x0001		
4001~ 4016	R/W	Model	uint16_t[16] (ASCII)	Ai4-PoE		
4017	R/W	Report time	uint16_t	2		2
4018						
4019	R/W	DHCP Enabled	bool	False		0
4020	R/W	Modbus TCP port	uint16_t	502		502
4021~ 4022	R/W	IP	uint_32_t	(A8、C0)、(6F、02)	BA、DC	192.168.2.111
4023~ 4024	R/W	Gateway	uint_32_t	(A8、C0)、(01、02)	BA、DC	192.168.2.1
4025~ 4026	R/W	Mask	uint_32_t	(FF、FF)、(00、FF)	BA、DC	255.255.255.0

4027~4032	R/W	MAC Address	uint16_t[6]	0x00, 0x05, 0xB7, 0xF8, 0x0F, 0xF9		0x00, 0x05, 0xB7, 0xF8, 0x0F, 0xF9

Table 9-3: A/I Input Registers (Measurement Readout)

Address	R/W	Functing	Type	Read Value(HEX)	Data Structure	Sample(DEC)
00~01	R	input_data0	uint32_t	0x9A6E0158	CD、AB	22583918
02~03	R	input_data1	uint32_t	0x9A6E0158	CD、AB	22583918
04~05	R	input_data2	uint32_t	0x9A6E0158	CD、AB	22583918
06~07	R	input_data3	uint32_t	0x9A6E0158	CD、AB	22583918
08~09	R	input_data4	uint32_t	0x9A6E0158	CD、AB	22583918
10~11	R	input_data5	uint32_t	0x9A6E0158	CD、AB	22583918
12~13	R	input_data6	uint32_t	0x9A6E0158	CD、AB	22583918
14~15	R	input_data7	uint32_t	0x9A6E0158	CD、AB	22583918

9.3 A/I Input Type Mapping and Voltage Conversion

Type select writes the Input_Type code to each channel's Holding Registers (700-707). The tool converts raw values to Voltage using the formulas in the table below.

Table 9-4: Input Type Codes and Conversion Formulas

Input_Type	R/W	Input Value Range	Value Range	Method	Sample (6777215.0f)
0x0101	R/W	0.0f~16777215.0f	0V~10V	10 / 16777215.0f * Input Value	4.039V
0x0102	R/W	0.0f~16777215.0f	0V~5V	5 / 16777215.0f * Input Value	2.019V
0x0103	R/W	0.0f~16777215.0f	0V~1V	1 / 16777215.0f * Input Value	0.403V
0x0104	R/W	0.0f~16777215.0f	0V~0.5V	0.5 / 16777215.0f * Input Value	0.201V
0x0105	R/W	0.0f~16777215.0f	0V~0.1V	0.1 / 16777215.0f * Input Value	0.403V
0x0106	R/W	0.0f~16777215.0f	±10V	(10 / 16777215.0f * Input Value) - 10.0f	-5.960V
0x0107	R/W	0.0f~16777215.0f	±5V	(5 / 16777215.0f * Input Value) - 5.0f	-2.980V
0x0108	R/W	0.0f~16777215.0f	±1V	(1 / 16777215.0f * Input Value) - 1f	-0.596V
0x0109	R/W	0.0f~16777215.0f	±0.5V	(0.5 / 16777215.0f * Input Value) - 0.5f	-0.298V
0x010A	R/W	0.0f~16777215.0f	±0.1V	(0.1 / 16777215.0f * Input Value) - 0.1f	-0.059V
0x0201	R/W	0.0f~16777215.0f	4mA~20mA	(16 / 16777215.0f * Input Value) + 4.0f	10.463mA
0x0202	R/W	0.0f~16777215.0f	0mA~20mA	20 / 16777215.0f * Input Value	8.079mA
0x0203	R/W	0.0f~16777215.0f	±20mA	(20 / 16777215.0f * Input Value) - 20.0f	-11.920mA

9.4 D/I Address Table

The D/I module includes DI status (Coils), counter values (Input Registers), and clear/active settings (Coils/Holding Registers).

Table 9-5: D/I Coils (Status / Clear)

Address	R/W	Functing	Type	Read Value(bool)	Data Structure	Sample(DEC)
0	R	coils_port0	bool	0		0
1	R	coils_port1	bool	0		0
2	R	coils_port2	bool	0		0
3	R	coils_port3	bool	0		0
4	R	coils_port4	bool	0		0
5	R	coils_port5	bool	0		0
6	R	coils_port6	bool	0		0
7	R	coils_port7	bool	0		0
144	W	counter clear CH0	bool	0		1
145	W	counter clear CH1	bool	0		1
146	W	counter clear CH2	bool	0		1
147	W	counter clear CH3	bool	0		1
148	W	counter clear CH4	bool	0		1
149	W	counter clear CH5	bool	0		1
150	W	counter clear CH6	bool	0		1
151	W	counter clear CH7	bool	0		1

Table 9-6: D/I Holding Registers (Active Settings / Device Info)

Address	R/W	Functing	Type	Default	Data Structure	Sample
129	R/W	Input_Active_Value	uint16_t	1		1
4000	R	Firmware ver	uint16_t	0x0001		
4001~4016	R/W	Model	uint16_t[16](ASCII)	Ai4-PoE		
4017	R/W	Report time	uint16_t	2		2
4018						
4019	R/W	DHCP Enabled	bool	False		0
4020	R/W	Modbus TCP port	uint16_t	502		502
4021~4022	R/W	IP	uint_32_t	(A8、C0)、(6F、02)	BA、DC	192.168.2.111
4023~4024	R/W	Gateway	uint_32_t	(A8、C0)、(01、02)	BA、DC	192.168.2.1
4025~4026	R/W	Mask	uint_32_t	(FF、FF)、(00、FF)	BA、DC	255.255.255.0
4027~4032	R/W	MAC Address	uint16_t[6]	0x00, 0x05, 0xB7, 0xF8, 0x0F, 0xF9		0x00, 0x05, 0xB7, 0xF8, 0x0F, 0xF9

Table 9-7: Input Registers (Counter Values)

Address	R/W	Functing	Type	Read Value(bool)	Data Structure	Sample(DEC)
0	R	counter value CH0	uint16_t	0xFFFF		65535
1	R	counter value CH1	uint16_t	0xFFFF		65535
2	R	counter value CH2	uint16_t	0xFFFF		65535
3	R	counter value CH3	uint16_t	0xFFFF		65535
4	R	counter value CH4	uint16_t	0xFFFF		65535
5	R	counter value CH5	uint16_t	0xFFFF		65535
6	R	counter value CH6	uint16_t	0xFFFF		65535
7	R	counter value CH7	uint16_t	0xFFFF		65535

9.5 D/O Address Table

The D/O module includes DO output control (Coils) and power-on default/active settings (Holding Registers).

Table 9-8: D/O Coils (Output Control)

Address	R/W	Functing	Type	Read Value(bool)	Data Structure	Sample(DEC)
256	R/W	coils_port0	bool	0		0
257	R/W	coils_port1	bool	0		0
258	R/W	coils_port2	bool	0		0
259	R/W	coils_port3	bool	0		0
260	R/W	coils_port4	bool	0		0
261	R/W	coils_port5	bool	0		0
262	R/W	coils_port6	bool	0		0
263	R/W	coils_port7	bool	0		0

Table 9-9: D/O Holding Registers (Settings / Device Info)

Address	R/W	Functing	type	Default	Data Structure	Sample
257	R/W	Power_On_Value	uint16_t	0b00000000		0b00000000
385	R/W	Output_Active_Value	uint16_t	1		1
4000	R	Firmware ver	uint16_t	0x0001		
4001~4016	R/W	Model	uint16_t[16] (ASCII)	Ai4-PoE		
4017	R/W	Report time	uint16_t	2		2
4018						
4019	R/W	DHCP Enabled	bool	False		0
4020	R/W	Modbus TCP port	uint16_t	502		502
4021~4022	R/W	IP	uint_32_t	(A8、C0)、(6F、02)	BA、DC	192.168.2.111
4023~4024	R/W	Gateway	uint_32_t	(A8、C0)、(01、02)	BA、DC	192.168.2.1
4025~4026	R/W	Mask	uint_32_t	(FF、FF)、(00、FF)	BA、DC	255.255.255.0
4027~4032	R/W	MAC Address	uint16_t[6]	0x00, 0x05, 0xB7, 0xF8, 0x0F, 0xF9		0x00, 0x05, 0xB7, 0xF8, 0x0F, 0xF9

9.6 How to Read the Address Tables and Data Format Notes

Register types: Holding Registers typically use FC03 for reading and FC06/FC16 for writing; Input Registers use FC04 for reading; Coils use FC01 for reading and FC05/FC15 for writing. Actual supported functions depend on device firmware.

Data Structure column: Describes how 32-bit or multi-register data are arranged across 16-bit registers (byte/word order). When parsing 32-bit data with third-party tools, adjust the byte order according to the table.