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User Manual
用 户 手 册

APG Serie bus gateway

MODBUS-TCP Protocol transfer
MODBUS RTURS485 master station
Model number： APG1506

CATALOGUE

1.Preface

1.1 Document Usage Instructions

This document outlines the product's functional specifications, installation, operation, and settings, as well as information regarding network protocols. This document is intended for use by well-trained electrical automation engineers only.

(1) Disclaimer

The author has conducted necessary checks on the document, but as the product evolves and develops, the document may contain errors in technical parameters or editing. We reserve the right to make adjustments and modifications without prior notice to the users.

(2) Trademark

The industrial Ethernet protocol MODBUS-TCP was developed by Modicon Company in 1979.

(3) Patent Information

The designer of this product has applied for patent protection for the appearance and technical implementation method of the product. Any attempt to copy, imitate or reverse engineer may violate the law.

(4) Copyright

1.2 Safety matters

This product is a professional equipment designed for industrial use and can only be operated by personnel with electrical operation experience. Before use, please carefully read this manual and follow the instructions to operate it properly to avoid causing personal injury or product damage.

This product is designed with an IP20 protection level. When using it, it needs to be installed in a distribution cabinet with dust-proof and moisture-proof functions.

1.3 Document History

Version	Date	Description
V1.1	2024.12	首发

1.4 Reference document

《IEC11631-22007 Programmable controllers –Part 2:Equipment requirements and tests》;

《IEC/TR 61158 Industrial Communication Network - Fieldbus Specification》;

《IEC61784-1Industrial Communication Network - Industry Standards Part 1: Fieldbus Standards》;

2.Specification parameters

2.1 APG1506 Specification Parameter Table

MODBUS-TCP communication parameters		
Serial Number	Item	Specification
1	Agreement	MODBUS-TCP
2	Transmission rate	10/100 Mbaud, automatically detects transmission speed
3	Bus interface	Equipped with dual RJ45 switches, industrial Ethernet compliant with IEEE 802.xx standard, featuring auto negotiation and auto crossover functions
4	Communication address	The only globally unique MAC address
5	Transmission cable	CAT5e shielded cable
6	Port protection	Transformer isolation, 1500V DC (IEC61000-4-2)
Modbus communication format		
1	Transmission mode	Modbus _RTU
2	Physical interface	Open-ended connector 5-pin (with terminal resistor interface)
3	Baud rate (kbps)	2400,4800,9600,19200,38400,57600,115200
4	Function code	01H、02H、03H、04H、05H、06H、0FH、10H
Other specifications		
1	Dimensions (of the shape)	(L) 114 * (W) 30 * (H) 85mm
2	Installation method	35mm guide rail
3	Protection level	IP20
4	Environmental temperature	Transportation and storage: -40℃ to +70℃ Operating temperature: -20℃ to +55℃
5	Power supply voltage	24 VDC(±20%)
6	Rated current	110 mA (24 VDC)

Table 1 Parameter Specifications

3.Hardware description

3.1 Power interface

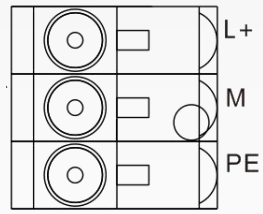


Figure 1 Power Interface

Table 2 Power Indicator

Pin	Logo	Description
1	L	24V, positive terminal of the DC power supply
2	M	negative terminal of the DC power supply
3	PE	ground connection

3.2 Communication interface

The module uses a physical interface with two RJ45 sockets for communication, and it has the function of a switch by itself. They are respectively identified as X1P1 and X1P2.

3.3 LED indication

LED indicators are divided into 3 types. These include power indicator, Modbus status indicator, and CC-Link IE Field Basic status indicator. The definitions are as shown in Table 3.

Name	Colour	Explanation	
Power indicator			
PWR	green	Power indicator light	
Modbus 指示灯			
ALM	yellow	Modbus	Communication failure. Data timeout or incorrect data reception.
RX	green	Modbus	Data is being sent.
TX	green	Modbus	Data is being received.
MODBUS-TCP Indicator light			
RY	Red light	The module enters the operating state and successfully establishes a connection with the main station. Cycle data exchange	
MT	green	The LED indicates that there is a maintenance request for the module at present.	
SF	green	System failure - Hardware or software failure of the module is indicated.	
ER	Red light	MODBUS-TCP bus has not entered the correct mode: There are communication, operation errors, or communication timing monitor issues.	

Table 3 LED Indicator Definitions

3.4 Modbus Communication interface

The module uses its own wiring socket as the physical interface for Mobus communication, where two TRs are terminal resistance selection terminals. An internal terminal resistance of 120R is integrated within the module. When TR1 is short-circuited to DA and TR2 is short-circuited to DB, the terminal resistances are effective. The interface definition is shown in Table 4.

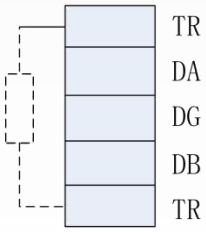


Figure 2 Modubs Interface

Table 4 Modbus Terminal Definitions

Pin	Signal	Description
1	TR1	Terminal resistor connection selection
2	DA	Receive/send data, line A (red)
3	DG	Data ground
4	DB	Receive/send data, line B (red)
5	TR2	Terminal resistor connection selection

4.Product Usage Instructions

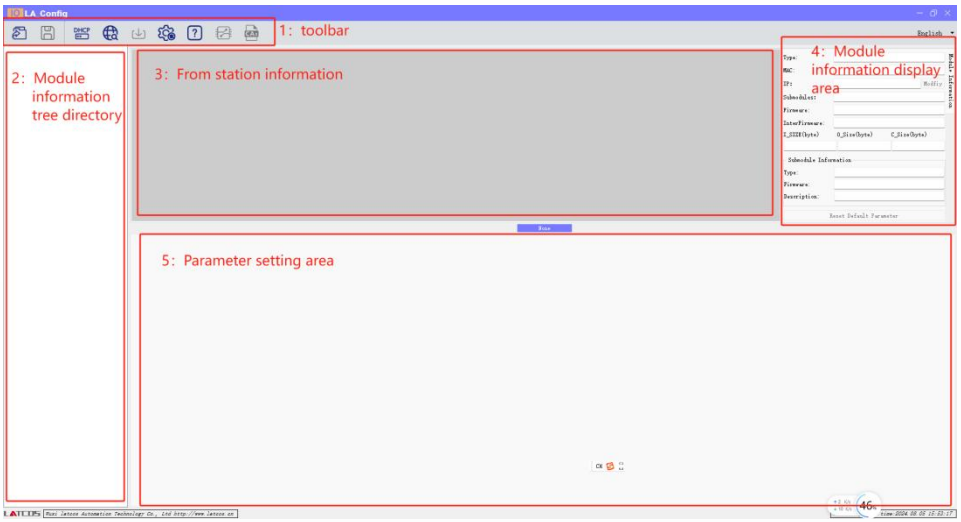
4.1 LAEConfig software configuration module

The module configuration software is named "LAEConfig". LAEConfig is a software developed by our company with independent intellectual property rights. This software is developed by our company specifically for our controllers. This software can be used normally on systems prior to WIN10.

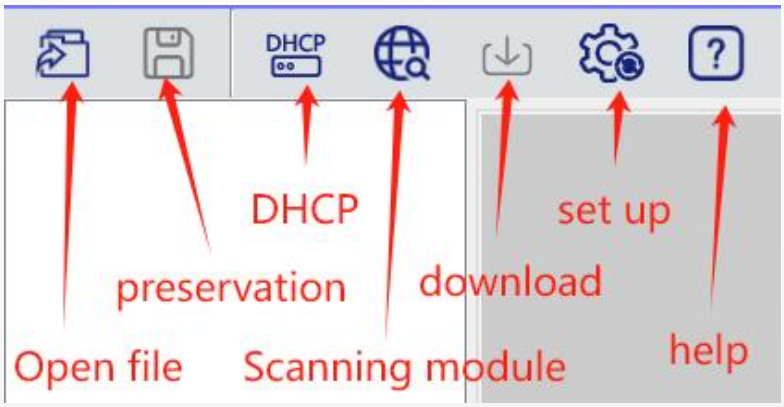
This is the installation file.

This is the desktop icon after the installation is completed.

4.2 Software Interface Introduction

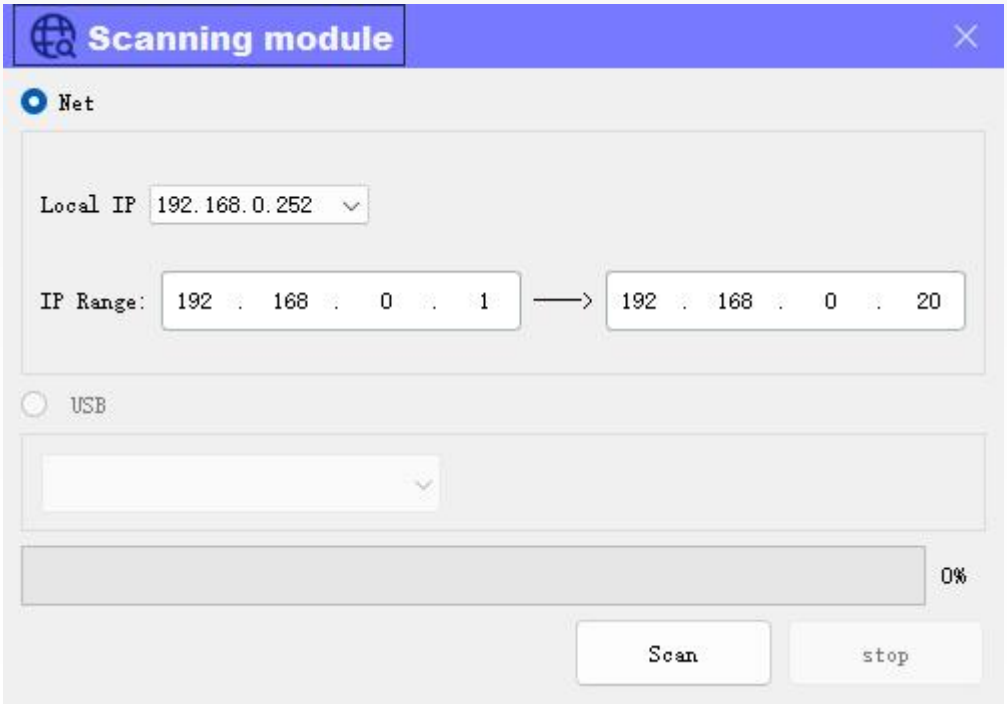


The interface of this software includes: toolbar, module information tree directory, parameter setting area, module information display area, and so on.



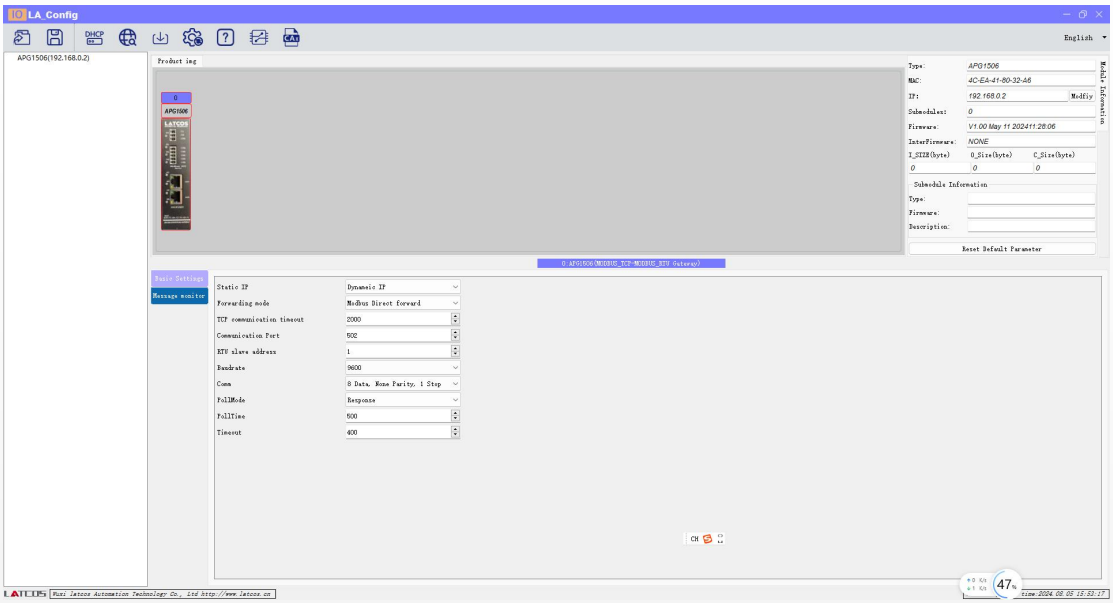
4.3 Scan the gateway module in the network.

Click the scan module button. 



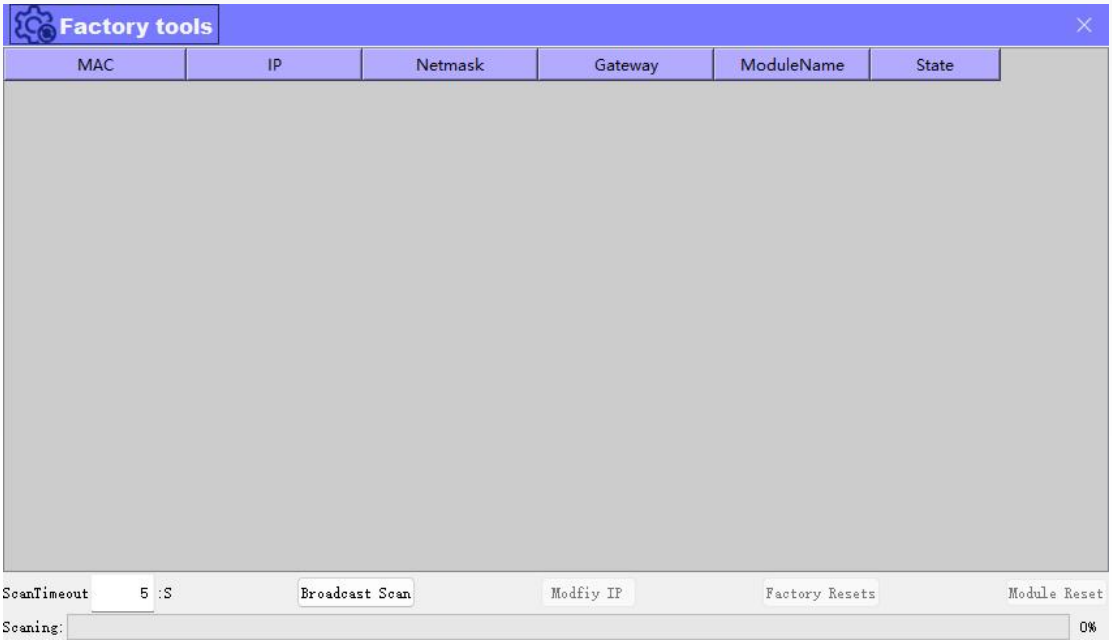
Set the IP address range to be scanned (in the display area), and ensure that the network IP parameters of the computer are in the same network segment as the set ones. Click "Start" to enter the scanning stage. Modules that are scanned will be displayed within the set IP range.

Note: The IP address of the module must be in the same network segment as the local network card address. (The factory default network segment for the module is 192.168.0.*)

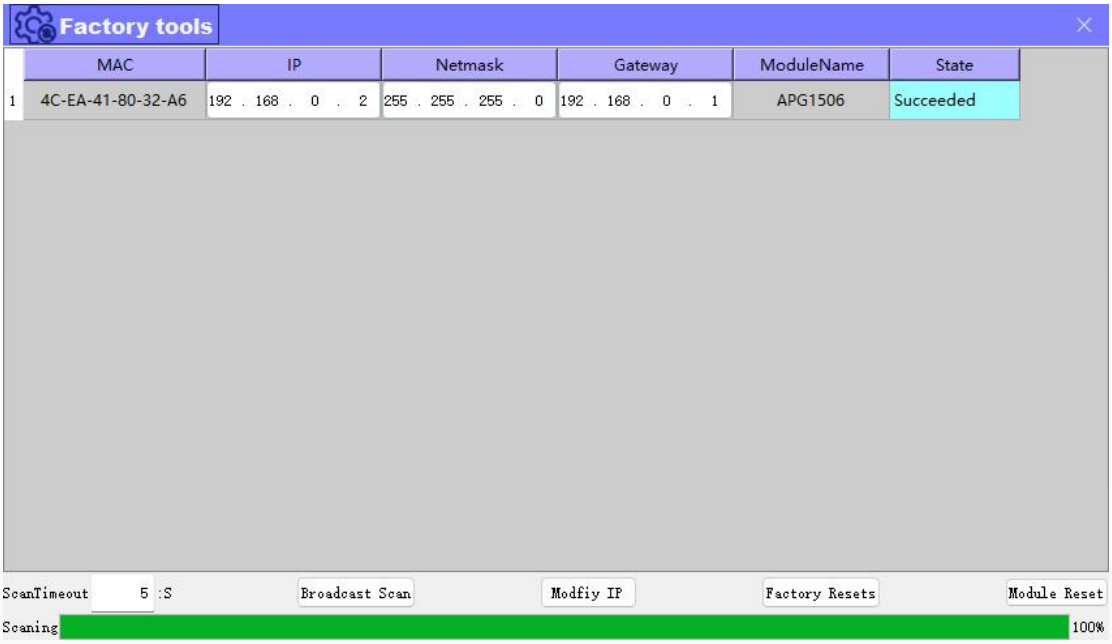


4.4 Modify the IP address of the module

Click the button  in the toolbar to display the interface shown in the following picture.



Click on the global scan option to scan all the modules within the entire local network.

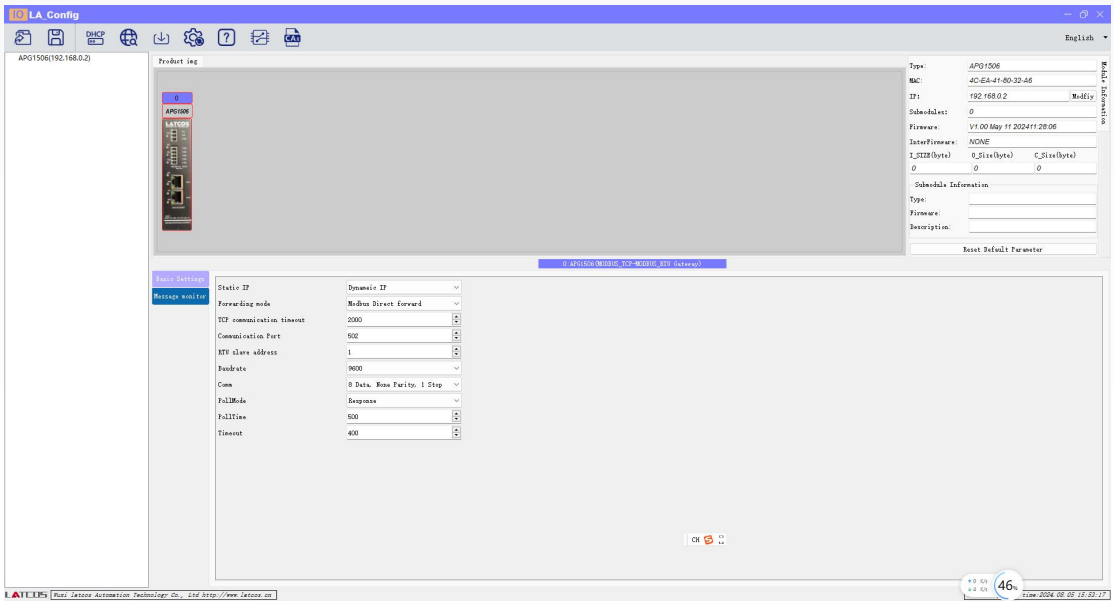


Modify the IP address in the table. After the modification is completed, click "Modify IP" to download the modified IP into the module. Check the status bar at the end to see if the allocation is successful.

4.5 Modify the MODBUS parameters of the module

First, scan the module into the display area (as shown in the following figure)

1. Match the Modbus master communication parameters with the corresponding Modbus parameters of the communication target.



Note: The addresses of MODBUS-TCP and MODBUS-RTU are directly mapped.

Click to download the parameters to the module.

Register types	Explanation	Comparison with PLC	Examples
(Coil Status)	Output port. It allows setting the output state of the port and also enables reading the output state of this bit. It can be divided into two different operating states, such as hold type or edge-triggered type.	DO (Digital Output)	Electromagnetic valve output, MOSFET output, LED display, etc.
(Input Status)	Input port. The input status can be changed through external settings, but it is read-only and not writable.	DI (Digital Input)	Dip switch, proximity switch, etc.
(Holding Register)	Output parameters or hold parameters, certain parameters set by the controller during operation, readable and writable	AO (Analog Output)	Set values for analog output, PID operating parameters, variable valve output size, sensor alarm upper and lower limits
(Input Register)	Input parameters. Parameters obtained by the controller from external devices during operation, which are readable but not writable.	AI (Analog Input)	Analog input

Modbus register address allocation

Register types	Register PLC address	Register Modbus protocol address	Symbolic name	Read/write status
(Coil Status)	00001~09999	0000H~FFFFH	0x	Readable and writable
(Input Status)	10001~19999	0000H~FFFFH	Ix	Read-only
(Holding Register)	40001~49999	0000H~FFFFH	4x	Readable and writable
(Input Register)	30001~39999	0000H~FFFFH	3x	Read-only

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