Serial /PROFIBUS DP Adapter
PM-125

User Manual

REV 3.1

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1 About This Document

1.1 General

To facilitate the operation of users, all the parameters of the adapter PM-125, application methods and cautions are described in this document. Please carefully read this document before operating this unit.

1.2 Important User Information

The data and cases mentioned in this manual shall not be copied without authorization. SiboTech may upgrade the product and revise the user manual during the development process of the product without notifying users.

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The product has many applications. Users must make sure all operation steps and results conform to the safety of relevant field including laws, rules, codes and standards.

1.3 Related Products

Related products including: PM-160, PM-127, PM-126, ENB-302MT etc.

To obtain the user manual of the products above, please access the company website www.sibotech.net/en or send E-mail to gt@sibotech.net or call technical support hotline: +86-21-51028348.

1.4 Terms

PROFIBUS DP: PROFIBUS DP protocol

RS232/RS485/RS422: widely used in electrical interface standards, able to operate various communication protocols, e.g. UART.

RS485: Hardware specifications of serial interface

PM-125: Serial /PROFIBUS DP adapter

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RS-25:RS232 to RS485 converter

2 About the Adapter

2.1 Product Function

Adapter PM-125 implements data communication between serial port and PROFIBUS DP. Equipment with RS232 or RS485 or RS422 interface can be connected to PROFIBUS DP network by using this adapter.

2.2 Product Feature

➢ **Wide application:** All Modbus RTU protocol devices with RS485/RS232/RS422 interface are able to be connected to PROFIBUS DP network through PM-125. Such as frequency converters with Modbus protocol interface, motor startup protection devices, intelligent high and low voltage electrical appliances, power measuring devices, transmitters, intelligent field measuring equipment and instruments etc.

➢ **Easy implementation:** Users don't need to know the technical details of PROFIBUS and Modbus, but refer to this manual and the application cases provided, complete configuration according to the requirements without complex programming and implement the communication in a short time.

➢ **Transparent communication:** Users can establish data transparent communication between PROFIBUS DP and Modbus according to the mapping relationship between PROFIBUS DP data communication area and Modbus data communication area.

2.3 Technical Specification

[1] PM125 acts as a PROFIBUS DP Slave at the side of PROFIBUS DP, while it acts as a Modbus Master or universal mode at the side of serial port;

[2] When PM-125 acts as a Modbus Master:

➢ PM-125 establishes transparent communication between PROFIBUS DP and Modbus through the mapping relationship between PROFIBUS DP data communication area and Modbus data communication area;

➢ Supports 01H, 02H, 03H, 04H, 05H, 06H, 0FH and 10H function codes;

➢ Support maximum configuring 48 Modbus commands;

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➢ Modbus function codes 03H and 04H support function of "Byte-Swapping" and make users easily solve the problem of the format of big end data and small end data between the two networks;

[3] When PM-125 is set in universal mode, the control mode of time interval between characters, frame length and delimiter are supported and available to automatic sending;

[4] Complete PROFIBUS DP V0 slave functionality according to EN50170 (IEC61158): Measuring and control digital data communication industrial control system by using the third part of field bus: PROFIBUS standard;

[5] As a PROFIBUS DP slave. Automatic baud rate detection on PROFIBUS DP (9600 bit/s ~ 12 Mbit/s);

[6] PROFIBUS input/output bytes number can be set through Step7 freely, the maximum number of bytes:

①Max Input Bytes ≤168 Bytes

②Max Output Bytes ≤168 Bytes

③Max Data Bytes ≤336 Bytes

[7]Max Module: 50

Modules: Status/Control (Optional)-Occupy one input-byte and one output-byte.

Bit 0 of input-byte: Serial device fault indication, 0 indicates that there is no fault in Modbus Slave, 1 indicates that there is fault with Modbus Slave, the other 7 bits reserved.

Bit 0 of output-byte: Set 1 to hold the fault status of device, Set 0 to refresh the status of Slave in real time, the other 7 bits reserved.

Notes: this module is only valid on the mode of Modbus master!

4 Words Input, 4 Words Output

8 Words Input, 8 Words Output

16 Words Input, 16 Words Output

32 Words Input, 32 Words Output

64 Words Input, 64 Words Output

1 Byte Input

1 Word Input

8 Words Input

1 Byte Output

1 Word Output

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8 Words Output

2 Words Input Consistent

4 Words Input Consistent

8 Words Input Consistent

16 Words Input Consistent

2 Words Output Consistent

4 Words Output Consistent

8 Words Output Consistent

16 Words Output Consistent

When using "Status /Control (Optional)" Module when configuration in STEP7, putting it at the bottom of all data modules is a better choice.

The Module will occupy one input byte and one output byte of PM-125 memory mapping, if you put it at the top of the memory or in the middle of the memory, you should reserve one input and output byte when you configure Modbus parameters in PMA-123.

[8] Serial port is able to support 3 models of electrical interfaces: RS232, RS485 and RS422;

[9] Multiple formats of serial port communication parameters are supported. Baud rate: 300, 600, 1200, 2400, 9600, 19200, 38400, 57600, 115200bps can be selected. Parity check mode: None, Odd Even, Mark and space can be selected;

[10] Power supply: 24VDC (11V~30V), 80mA (24VDC);

[11] Working temperature: -4℉~140℉(-20℃~60℃), Humidity: 5%~95%;

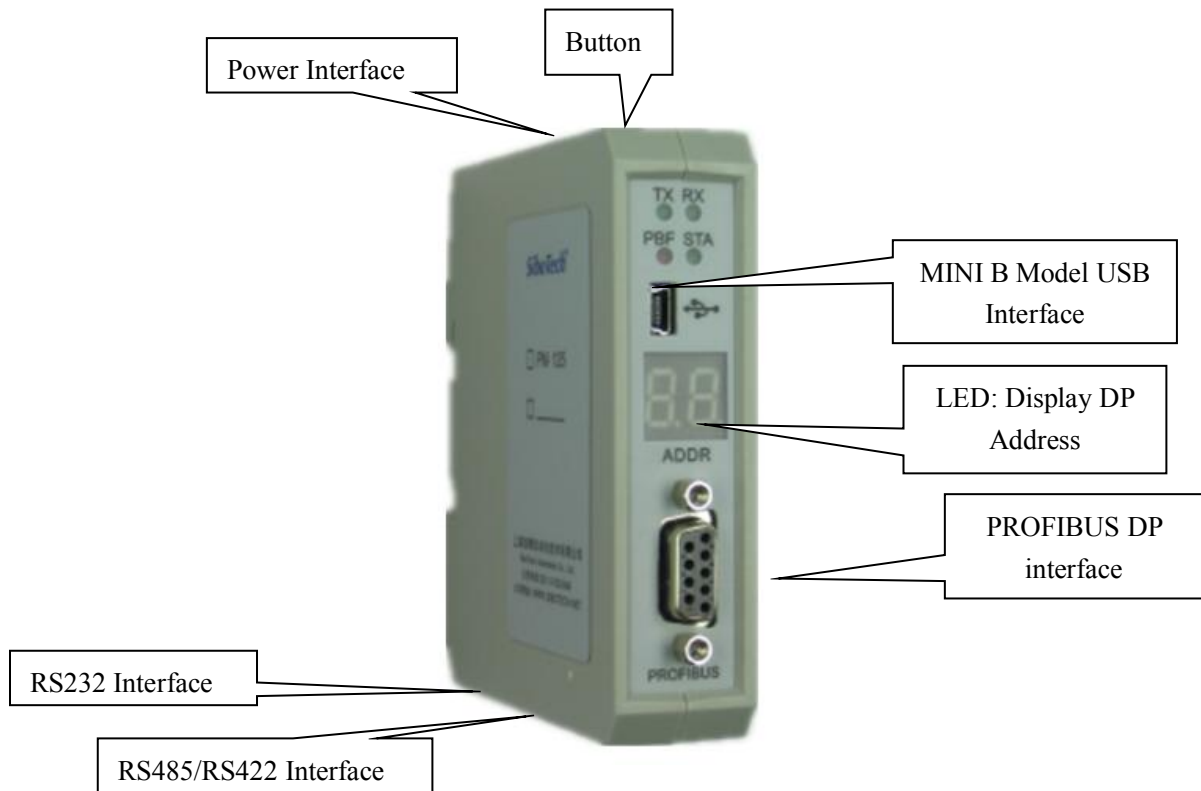[12] External dimensions (W*H*D): 0.98 in*3.94 in *3.54 in (25mm*100mm*90mm);

[13] Installation: 35mm DIN RAIL;

[14] Protection Level: IP20;

[15] CE marked.

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3 Hardware Descriptions

3.1 Product Appearance

3.2 Indicators

| Indicator	Status	Description
STA	Green Blinking	PROFIBUS DP is communicating
	Green Off	No data communication
PBF	Red On	PROFIBUS DP communication fails
	Red Off	Normal data communication
RX	Green Blinking	Serial port is receiving data
	Green Off	No data receiving
TX	Green Blinking	Serial port is sending data
	Green Off	No data sending

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3.3 Button and LED

● Configuration Button is used to modify the PROFIBUS DP address.

● LED: Display the current PROFIBUS DP address and the configuration state.

The default mode of PM-125 is normal communication mode after powering on, LED (always on) displays PROFIBUS address.

Double click the button to enter the PROFIBUS DP address modifying state, the high bit of DP address starts blinking and low bit is always on. Press button to make the number add one; long press button over 2.5 seconds to change to low bit setting state. When set the low bit state, LED high bit is always and low bit starts blinking. Press button to make the number add one; long press button over 2.5 seconds to save the new setting address and enter in normal communication state, the high bit and low bit of LED are always on.
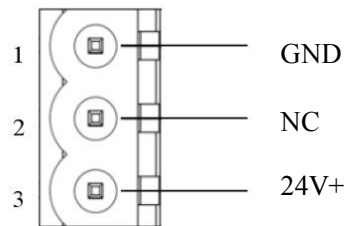
Cautions: while changing the DP address, LED will automatically recover to normal communication state without pressing button over 10 seconds, the previous operation is invalid.

LED display state block diagram is shown below:

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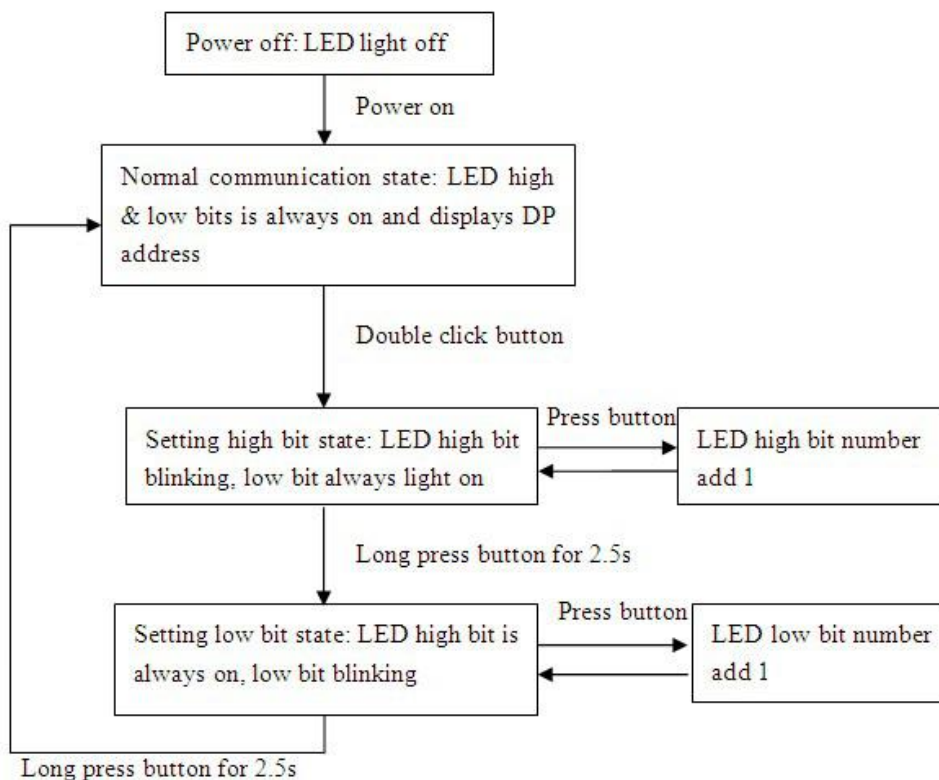
3.4 Communication Port

3.4.1 Power supply interface

Pin	Function
1	GND
2	NC, not connected
3	24V+, DC 24V power positive, range 9~30V

3.4.2 RS485/RS422 interface

The RS485 interface of PM-125 is a standard one. The RS485 characteristic of the product is described below:

◆ The basic characteristics of RS-485 transmission technology

①Network topology: Linear bus, there are active bus termination resistors at both sides;

②Baud rate: 1200 bps~115.2Kbps;

③Media: Shielded twisted-pair cable and also can cancel the shielding, depending on environmental conditions (EMC);

④Site number: 32 stations per subsection (without repeater), and can up to 127 stations (with RS485 repeater);

⑤Plug connection: 5-pin pluggable terminal;

◆ The main points on RS-485 transmission equipment installation

① All equipment are connected with RS-485 bus;

② The farthest two end of each bus has a termination resistor—120Ω 1/2W to ensure reliable operation of the network.
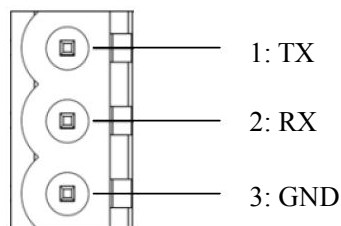
Serial interface uses 5-pin pluggable terminal and users can wire it according to the wiring instructions on
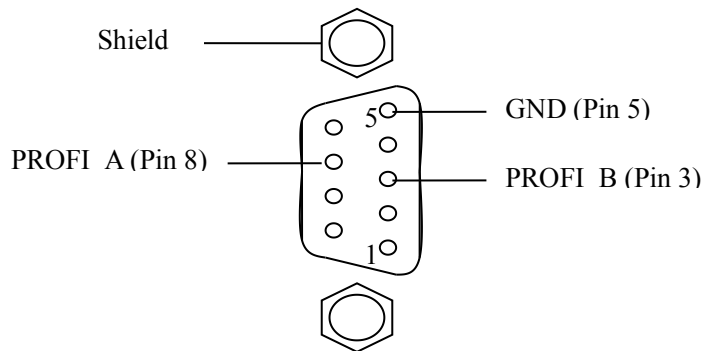
the panel.
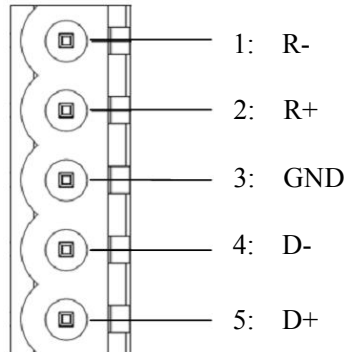
Pin	Function
1	R-,RS422 Receive Negative
2	R+,RS422 Receive Positive
3	GND
4	D-, RS485 Data Negative/RS422 Transmit Negative
5	D+, RS485 Data Positive/RS422 Transmit Positive

3.4.3 RS232 interface

| Pin	Function
1	TX, PM-125 serial port transmit, connect user device serial port receive
2	RX,PM-125 serial port receive, connect serial transmit TX of user device
3	GND

3.4.4 PROFIBUS DP interface

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Shield ——— ⬡

PROFI A (Pin 8) ——— 5 ○ ——— GND (Pin 5)

○ ○
PROFI A (Pin 8) ——— ○ ○
○ ○ ——— PROFI B (Pin 3)
○ ○
1 ○

PROFIBUS DP uses DB 9 hole pattern interface, the pin definition is shown as below:

Pin	Definition
3	PROFI_B, Data +(required)
4	RTS
5	GND
6	+5V Output
8	PROFI_A, Data-(required)
Bolt	SHIELD

PROFI_B (pin3), PROFI_A (pin8) and Shied must be connected; RTS (pin4) is able to be used to decide the

transmit direction by some devices; +5V (pin6) and GND (pin5) are used in bus termination or power supply for

Fiber Optical Transceiver (FOT). Maximum output current of pin5 and pin6 is 80mA.

3.4.5 MINIB model USB interface

5　4　3　2　1
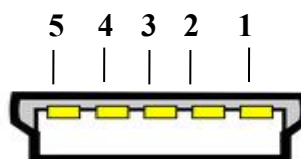
Pin	Definition	Description
1	VBUS	+5V
2	D-	Data Negative
3	D+	Data Positive
4	ID	No connection
5	GND	Signal Ground

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4 Quick Start Guide

Quick configure PM-125:

1. Connect PC and PM-125: Connect PM-125 USB interface to PC USB interface by using USB cable (USB standard A model to USB Mini B model).

2. Configuring PM-125: Power on PM-125, user can use configuring software PMA-123 to configure serial port parameters (subnet) and Modbus read/write command (see **7 Instructions of configuration software** for details). After configuration, PMA-123 will give hints whether using new configuration to switch to normal communication state, click "Yes".

3. Modifying PM-125 PROFIBUS DP address: Method 1: Modifying by software (see **7.4.1 Filed Bus Configuration** for details). Method 2: Modifying by button. Double click the button to enter PROFIBUS DP address setting state (LED high bit blinking, low bit is on), click button to make number add 1, long press button over 2.5s to switch to low bit address setting state, single press button to make number add 1, long press button over 2.5s to save and make new address take effect.

4. Installing GSD file: Import GSD file to PROFIBUS DP master configuration software.

5. Hardware configuration: In PROFIBUS configuration software, map the input/output of PM-125 to the memory of PLC or other devices according to your requirements.

6. Connecting PM-125 with serial port devices: According to the instructions of RS485/RS422/RS232 interface in chapter 3, turn off the power and correctly connect the terminals.

7. Connecting PM-125 with PROFIBUS DP master station: According to the instructions of PROFIBUS DP interface in chapter 3, connect at least pin 3 and pin 8 correctly.

8. Power on PM-125, enter the normal communication state.

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5 Working Principle of Modbus Master

The data conversion between Modbus and PROFIBUS of PM-125 is established by mapping. PM-125 has two data buffers, one is PROFIBUS network input buffer with address of 0x00-0xA7; the other is PROFIBUS network output buffer with address of 0x4000-0x40A7. Command ID 1, 2, 3 and 4 of Modbus write the data read from Modbus slave station into network input buffer for reading by PROFIBUS network; command ID 5, 6, 15 and 16 of Modbus write the data from network output buffer into Modbus slave station, the data saved in network output buffer is the data PROFIBUS master station write to the PM-125.
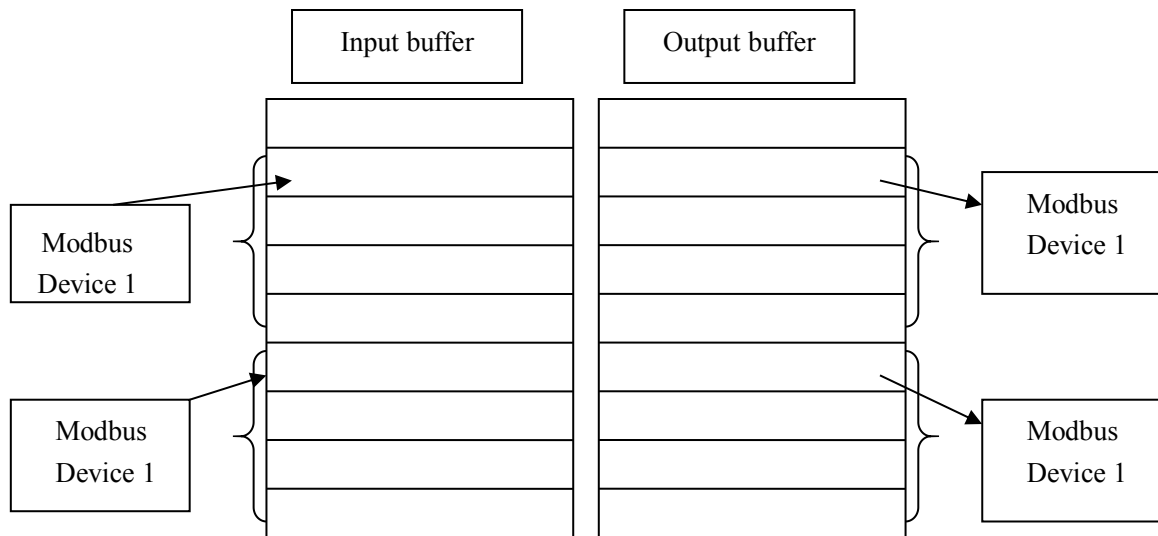

Users can configure 48 commands. Every command can read a set of continuous Modbus registers.

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6 Universal Mode

6.1 Data Conversion

The adapter implements data conversion between PROFIBUS DP fieldbus protocol and serial port devices with RS232/RS485/RS422 interface. The conversion and transmission between PPROFIBUS DP data and serial port data is bidirectional. Data conversion block diagram is shown below:
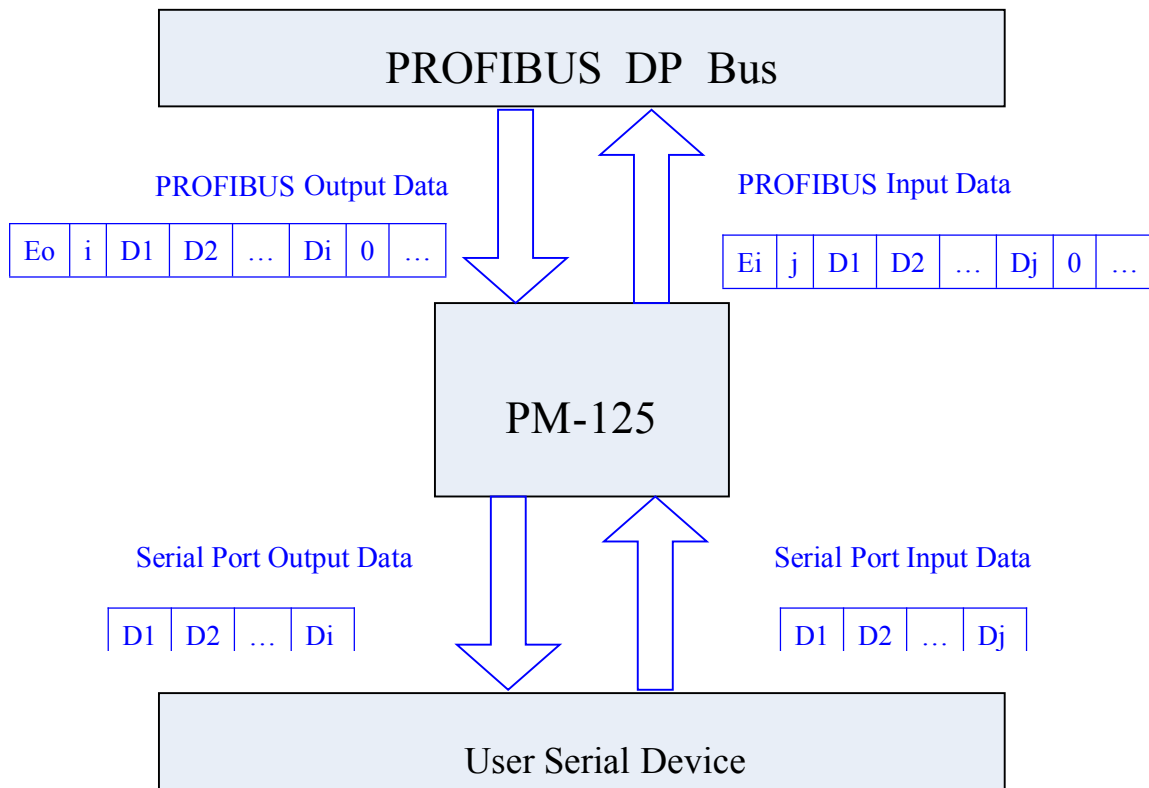
In the block diagram above, E_o is transaction number of PROFIBUS output data; i is number of serial port data which needs to be sent of output data; $D1\sim Di$ is the data that PM-125 adapter send to user serial port; E_i is transaction number of PROFIBUS input data; j is the number of serial port data of input data; $D1\sim Di$ is the data PM-125 adapter receive from user serial device.

As shown above, no matter what control mode serial port side use, when PM-125 adapter receives a frame correct data from user serial device, the data is packaged as shown above" PROFIBUS Input Data" and transmitted to PROFIBUS DP master station (normally PLC). If the data length received from serial port is shorter than DP conversion data, PM-125 adapter will set other bytes to 0. For example, the data length of every

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conversion by DP is 10 bytes, user serial device transmit 3 bytes data, except 2 frame header, PM-125adapter set other 5 bytes data to 0 and saved DP data into buffer.

Caution: control mode under universal mode is only valid on the data transmitted from user serial device to PM-125. PM-125 only send raw data to user serial device without limited by control mode [1].
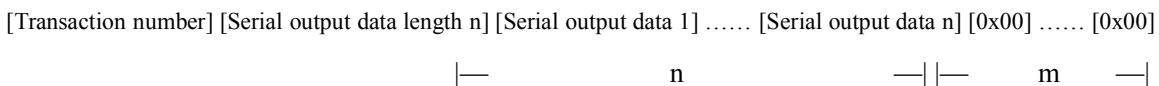
After PROFIBUS DP master station sent data to PM-125adapter, according to format of "PROFIBUS output data", the first byte of DP output buffer is output transaction number and the second byte is output data length, marked as N. If any change happened to transaction number [3], PM-125 adapter will transmit the N bytes data from the third byte of DP output buffer [2] to user serial device regardless of what control mode user serial device use to transmit data to PM-125 adapter. For example, suppose the data length of DP master station output buffer is 6 bytes and the data sent from DP to PM-125 adapter is (HEX)10 02 11 22 00 00, output data transaction number is 16. The real valid data length is 2 bytes, PM-125 adapter only sent (HEX) 11 22 to user serial device regardless of the control mode is time interval between characters or delimiter.

Note:

[1] Control method including: time interval between characters, frame length and delimiter.

[2] The data saved in DP input buffer is the data which is sent from PM-125 adapter to DP master station, the data saved in DP output buffer is the data which is sent from DP master station to PM-125 adapter.

[3] Serial port has two methods to send data. The default method is transaction number detection, data is sent out from serial port when transaction number changed; the other method is automatic sending, data is sent out according to sending period.

6.2 Universal Mode

6.2.1 PROFIBUS output data format

[Transaction number] [Serial output data length n] [Serial output data 1] …… [Serial output data n] [0x00] …… [0x00]

|— n —||— m —|

Notes:

PROFIBUS output bytes number should be selected as equal to or more than n+ 2;

m numbers of [0x00] is padding data, n+m+2 equals to the number of PROFIBUS output bytes.

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Transaction number: transaction number adding 1 means a new frame of data.

Case:

If PROFIBUS input/output byte users select is 8 bytes input, 8 bytes output, serial output data length is 3, data is 01 02 03, and the current transaction number is 0.

Output data format: [01] [03] [01] [02] [03] [00] [00] [00]

6.2.2 PROFIBUS input data format

[Transaction number] [Serial input data length n] [Serial input data 1] …… [Serial input data n] [0x00] …… [0x00]

|—   n   —||—   m   —|

Note:

PROFIBUS output bytes number should be selected as equal to or more than n+ 2;

m numbers of [0x00] is padding data, n+m+2 equals to the number of PROFIBUS input bytes.

Transaction number: transaction number adding 1 means a new frame of data.

Case:

If PROFIBUS input byte users select is 8 bytes input, 8 bytes output, serial output data length is 3, data is 04 05 06, and the current transaction number is 00.

Output data format: [01] [03] [04] [05] [06] [00] [00] [00]

6.2.3 Control Mode

What is control mode? Control mode is used for PM-125 adapter judging the end of data frame sent from user serial device.

Control mode includes time interval between characters, frame length and delimiter.

➢ Time interval between characters

When user serial device sends data to the PM-125 adapter, the adapter will start timing of every byte that user serial sends out. If the next byte's arrival time exceeds the set time interval (timeout time), then PM-125 adapter will consider the previous receiving N continuous bytes as a data frame. Then, it will combine this N or N-2 bytes into one "PROFIBUS input data frame" and send it to the PROFIBUS master. If users select "use CRC check", PM-125 will execute CRC check of the former N-2 bytes: right, send to the PROFIBUS master, otherwise discard

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the data frame.

For example, time interval between characters is set 10ms, no CRC check, input and output bytes length of PROFIBUS master is 8 bytes. The user serial device will first send out one byte 0x11, after PM-125 receives 0x11, it will start characters interval timer. If PM-125 receives next byte within 10ms, it will restart the characters interval timer. Otherwise, it will consider receiving one complete data frame. The data word is all HEX.

User serial device sends to PM-125: 11 22 33 44 55 66

   PM-125 sends to PROFIBUS master: 01 06 11 22 33 44 55 66

   User serial device sends to PM-125: F1 F2 F1

   PM-125 sends to PROFIBUS master: 02 03 F0 F2 F1 00 00 00

   When PROFIBUS master sends to PM-125: 09 05 00 02 08 45 96 00

   When PM-125 detects that transaction number changed, then it will send to serial device: 00 02 08 45 96

   Note: The data length that PM-125 sends to the user serial device depends on the data value in the frame that PROFIBUS sends to PM-125.

➢   Frame length

This control mode is suitable for receiving serial data frame of specific length. When receiving bytes from user serial device, PM-125 will automatically launch the time interval between characters function. Under the following two conditions, PM-125 will consider that it has received one frame data:

   1.   The adjacent bytes received from user serial device don't happen to timeout; the receiving bytes number is equal to "frame length". Or,

   2.   The bytes received from user serial device happens characters timeout.

When PM-125 has received one frame data, it will dispose of this frame if data numbers equals to the set frame length. Otherwise, directly discard. If selecting "use CRC check", then do the CRC check first and discard those who didn't pass the CRC check.

For example, set control mode to "frame length", the length of frame is 4 bytes, interval timeout of character is 10ms, no CRC check, input and output bytes length of PROFIBUS master is 8 bytes. If receiving 4 bytes continuously with no characters timeout happening, then PM-125 will package this frame data into one "PROFIBUS input data" frame and send it to PROFIBUS master. If it happens to characters timeout, it will

directly discard the data less than 4 bytes. The data are HEX.

User serial device sends to PM-125: 11 22 33 44

PM-125 sends to PROFIBUS master: 10 04 11 22 33 44 00 00

When PROFIBUS master sends to PM-125:

02 06 66 55 44 33 22 11 (the data length is limited to PROFIBUS input and output bytes exchange length)

When PM-125 detects that transaction number changed, then it will send to serial device:

66 55 44 33 22 11

Note: The data length that PM-125 sends to the user serial device depends on the data value in the frame that PROFIBUS sends to PM-125.

➢ Delimiter

This control mode is suitable for receiving the data frame with fixed frame header and end, it requires user serial device first to send one "start byte" to indicate: user serial device start to send one frame and continue to send one "end byte" when user serial device considers one frame data is over. Users select this control mode; PM-125 will automatically launch the characters timeout function.

Under the following conditions, PM-125 will consider that it has received one frame data:

1. No characters timeout happens in the process of receiving bytes; And,

2. Receiving one correct "start byte"; And

3. Receiving one correct "end byte".

Under other conditions, PM-125 will directly discard the incomplete data frame.

For example, set control mode to "delimiter", "start character" is 0xff, "end character" is 0xfe, "time interval between characters" is 10ms, input and output bytes length of PROFIBUS master is 8 bytes. User serial device should send FF xx xx xx FE under no timeout condition, and then PM-125 will receive correctly. The data are all HEX.

User serial device sends: FF 11 22 33 44 55 FE

PM-125 sends to PROFIBUS master: 02 05 11 22 33 44 55 00

When PROFIBUS master sends to PM-125: 01 02 61 96 00 00 00 00

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When PM-125 detects that transaction number changed, then it will send to serial device: 6196

Note: The data length that PM-125 sends to the user serial device depends on the data value in the frame that PROFIBUS sends to PM-125.

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7 Instructions of Configuration Software

7.1 Notes before Configuring

PMA-123 is a product based on Windows platform, and used to configure a variety of fieldbus gateway devices, including PM-125, MPC-125 and PM-126A. It can set the related parameters and commands of Modbus and other bus.

The document mainly introduces the using method of PM-125.

Double click the icon to enter the interface of "Select Device Type":
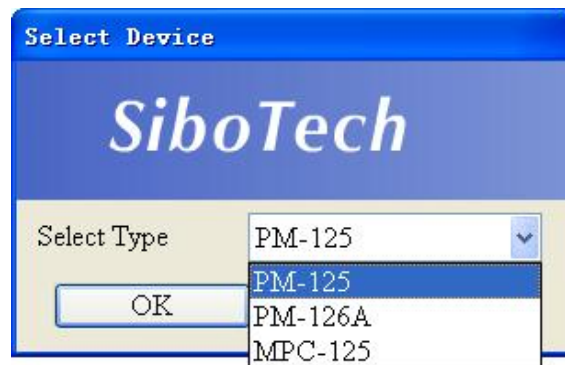
Choose "PM-125" to enter configuration interface:

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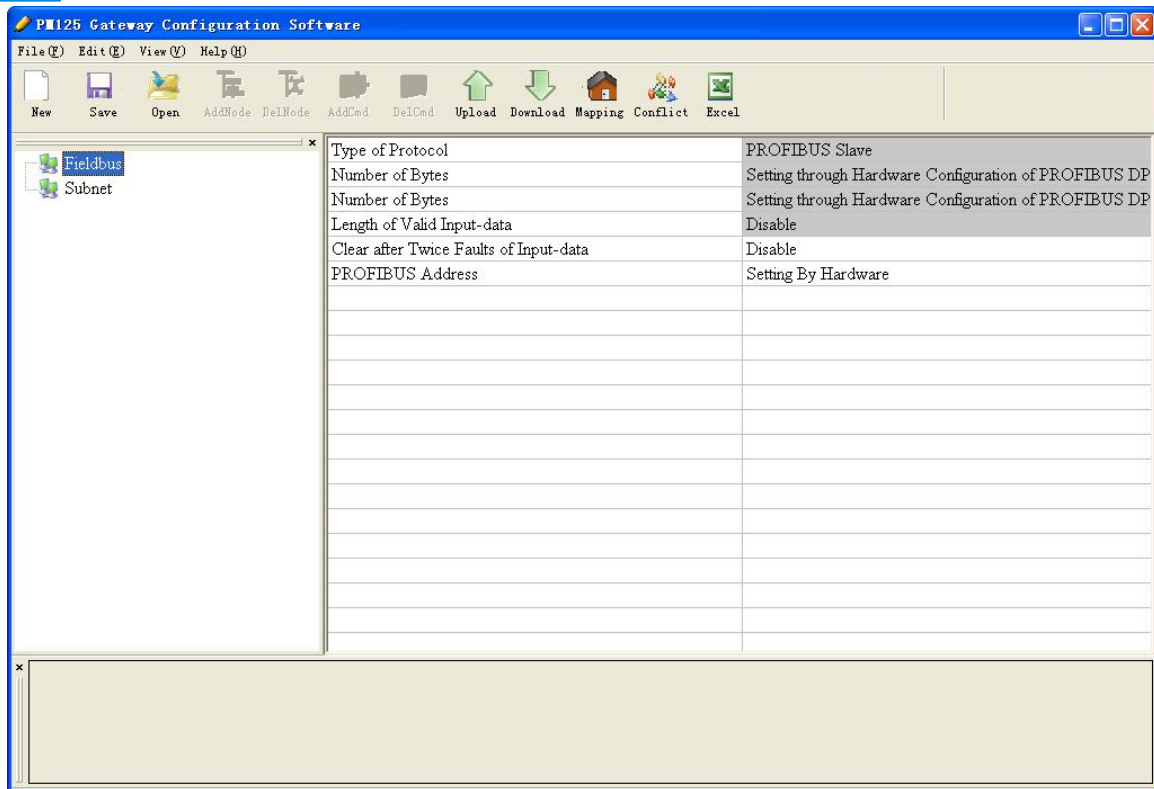
7.2 User Interface

PMA-123 interface include: title bar, menu bar, toolbar, status bar, equipment section, configuration section and notes section.

Note: All the gray part in the software cannot be changed.
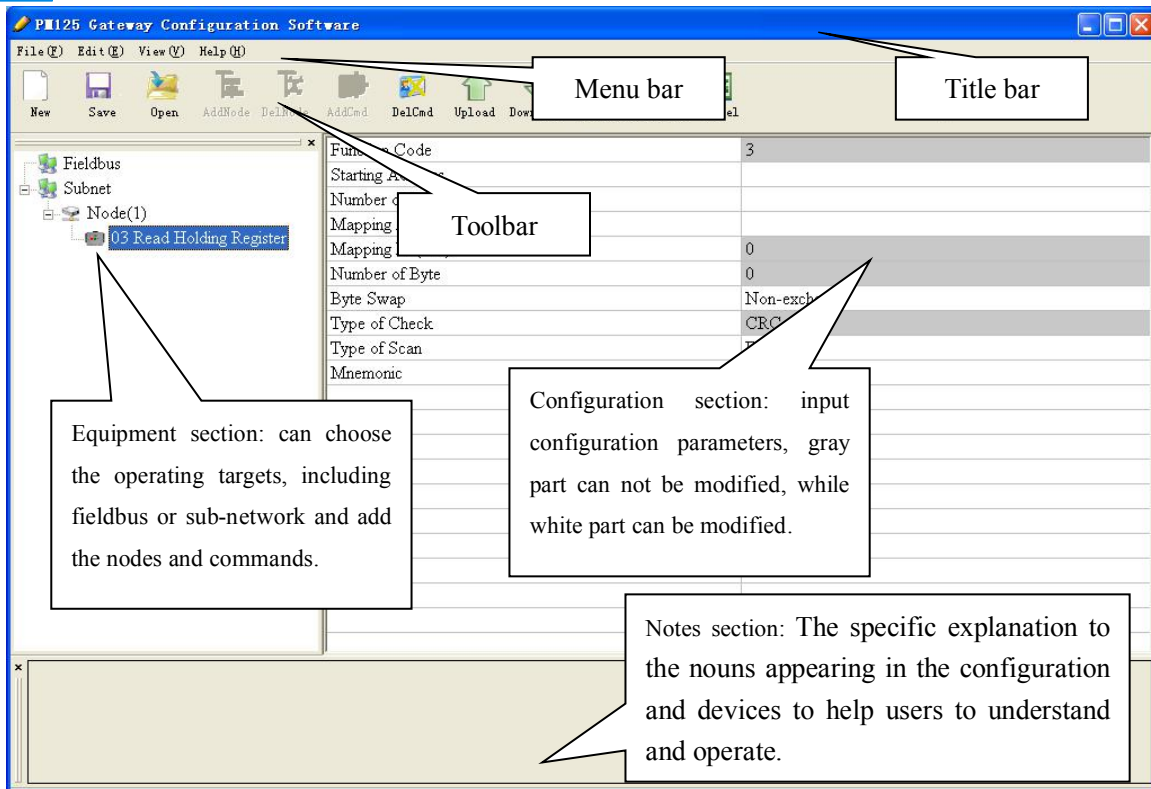
Toolbar is shown as below:

Functions separately from left to right are: new, open, save, add nodes, delete nodes, add commands, delete commands, upload configuration, download configuration, auto mapping, conflict detect and output Excel. Among them,

New: Create a new configuration project

Open: Open a configuration project

Save: Save the current configuration

Add nodes: Add a Modbus slave node

Delete nodes: Delete a Modbus slave node

Add commands: Add a Modbus command

Delete commands: Delete a Modbus command

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⬆ Upload configuration: Read the configuration from the module and show it in the software

⬇ Download configuration: Download the configuration from the software to the module

🏠 Mapping: Used to automatically calculate the mapped memory address without confliction by each command

Conflict Detect: Detect whether there is conflict in memory data buffer of the gateway

Output Excel document: Output the current configuration to local hard disk and save it as .xls file

7.3 The operation of Equipment View

7.3.1 Equipment view interface
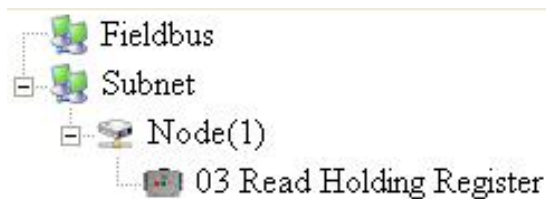
7.3.2 Operation mode of equipment view

The equipment view supports three types of operation: Edit Menu, Edit Toolbar and Right click edit Menu.

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7.3.3 Operation types of equipment view

1) Add nodes: Left click on subnet or existing nodes, and perform the operation of adding a new node. Then there is a new node named "Node (0)" under subnet. **Note: PM-125 only supports configuring one Modbus node**.

2) Delete nodes: select the node to be deleted, and then perform the operation of deleting node. The node and its all commands will be deleted.

3) Add commands: Left click on the node, and then perform the operation of adding command to add a command for the node. The dialog box will be shown as follow:

Currently, it supports the command IDs: 01, 02, 03, 04, 05, 06, 15 and 16.

Select the command: Double click the command
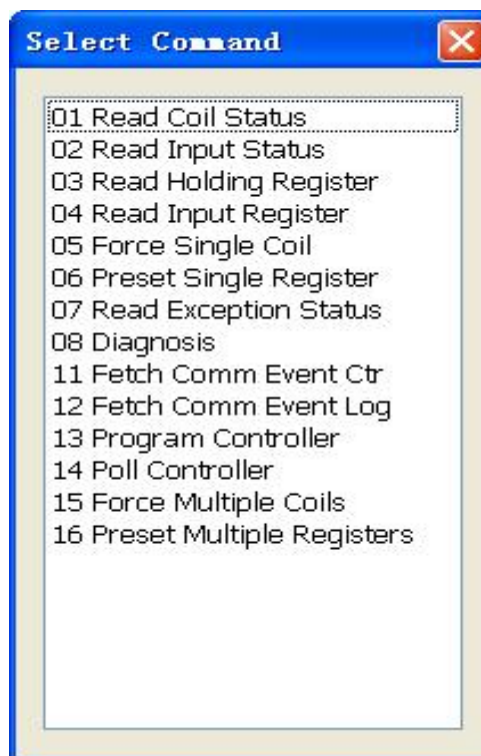
4) Delete commands: Left-click on the command and perform the operation of deleting command.

7.4 The Operation of Configuration View

7.4.1 Interface of fieldbus configuration view

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In the device view interface, click fieldbus, and then the configuration view interface are shown as follows:

Configurable items including: input valid data length, PROFIBUS slave station address.

"Input valid data length": only valid when subnet protocol type is "User Config". Open: The first byte of PROFIBUS input data is used to indicate the length of serial port received data; close: No byte of the PROFIBUS input data indicates the length of serial port received data.

"PROFIBUS address": two options of "Setting By Hardware" and "Customized" can be selected. "Setting by Hardware" means changing the PROFIBUS DP slave address through the top button of PM-125; "Customized" means DP address can be input in the textbox of "PROFIBUS Address". Notes: the textbox on the right of "PROFIBUS Address" is editable.
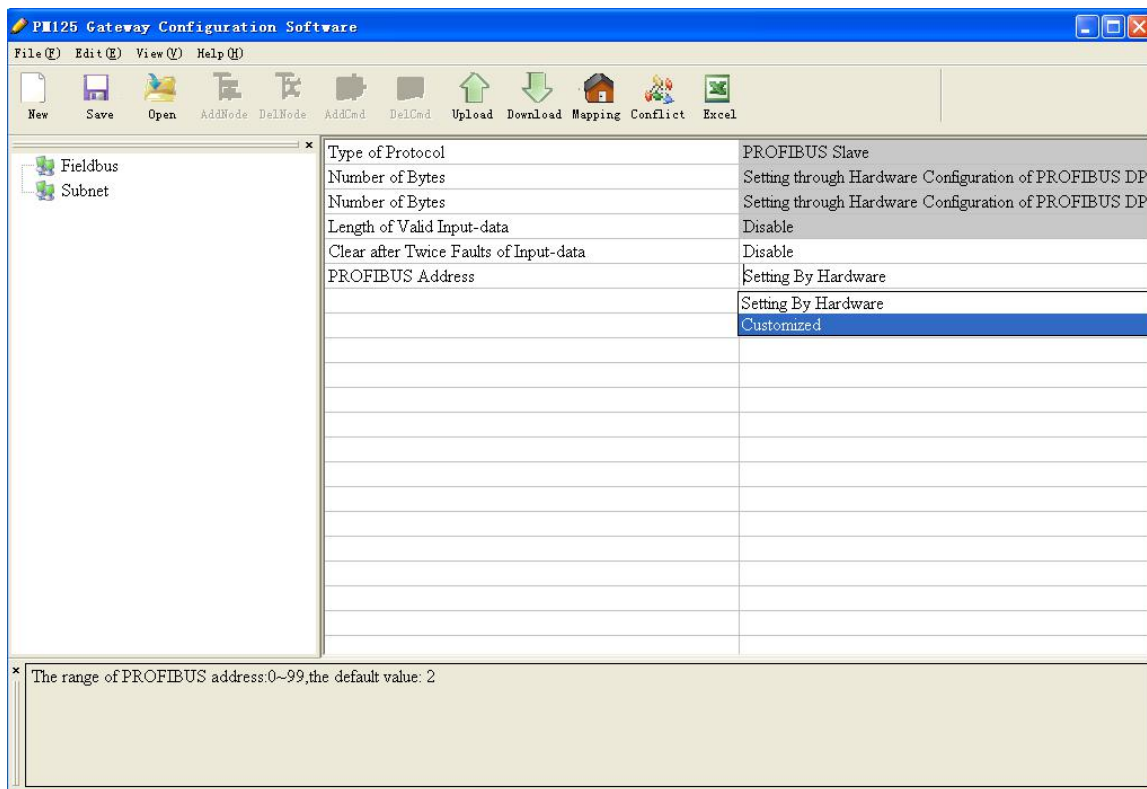
7.4.2 Interface of subnet configuration view

1) Protocol type is Modbus Master

Configurable parameters include:

Modbus communication baud rate, Data bits, Parity check bit, Stop bits, Transmission mode, Response timeout, Delay between polls, Polling mode of outputting commands, Scan rate.

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Interface of configuration view is shown as follow:
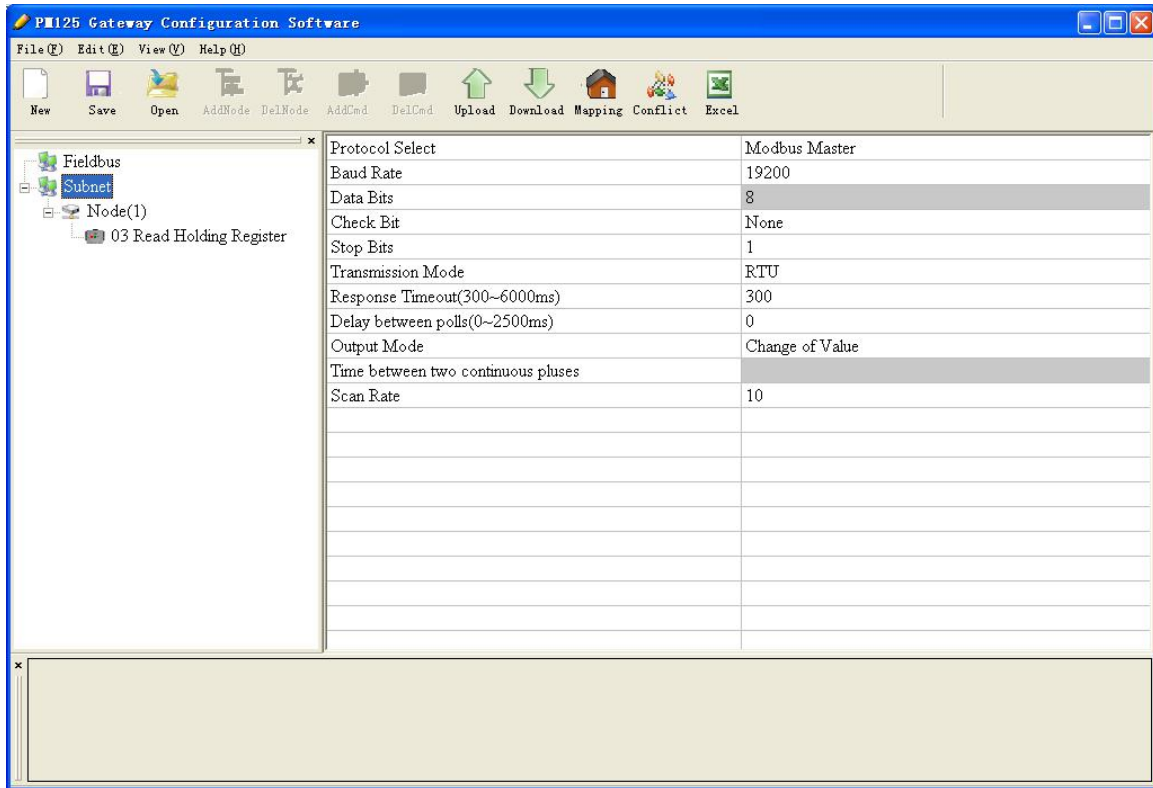
Modbus communication baud rate: 300, 600, 1200, 2400, 9600, 19200, 38400, 57600 and 115200bps to be selected.

Data bits: 8 bits.

Parity check mode: There are none, odd, even, mark and space to be selected.

Stop bits: 1, 2 optional.

Transmission mode: There are RTU and ASCII to be selected.

Response timeout: When the Modbus master send commands, the time waiting for response from the slave, the range is 300~60000ms.

Delay between polls: After one Modbus command has been sent and has received correct response, the delay time before next command being sent, the range is: 0 ~ 2500ms.

Polling mode of outputting command:

Modbus writing command (output command) has 3 kinds of outputting modes: Cycle, Forbidden and Change of Value output.

Cycle: The same with Modbus read command, and output according to the scanning ratio.

Forbidden: Prohibit outputting Modbus write command.

Change of Value: When the output data has changed, it outputs the write command and stop outputting after receiving correct response.

Scan ratio: Ratio of slow scan cycle to fast scan cycle. If the quick scan command sends 10 times, slow scan command sends 1 time.

2) Protocol type is User Config

Configurable parameters include:

Modbus communication baud rate, Data bits, Parity check bit, stop bits, Frame type, Time interval between characters, Frame length, Start delimiter, End delimiter, Enable auto sending, Period of auto sending, Enable CRC check.

Interface of configuration view is shown as follow:
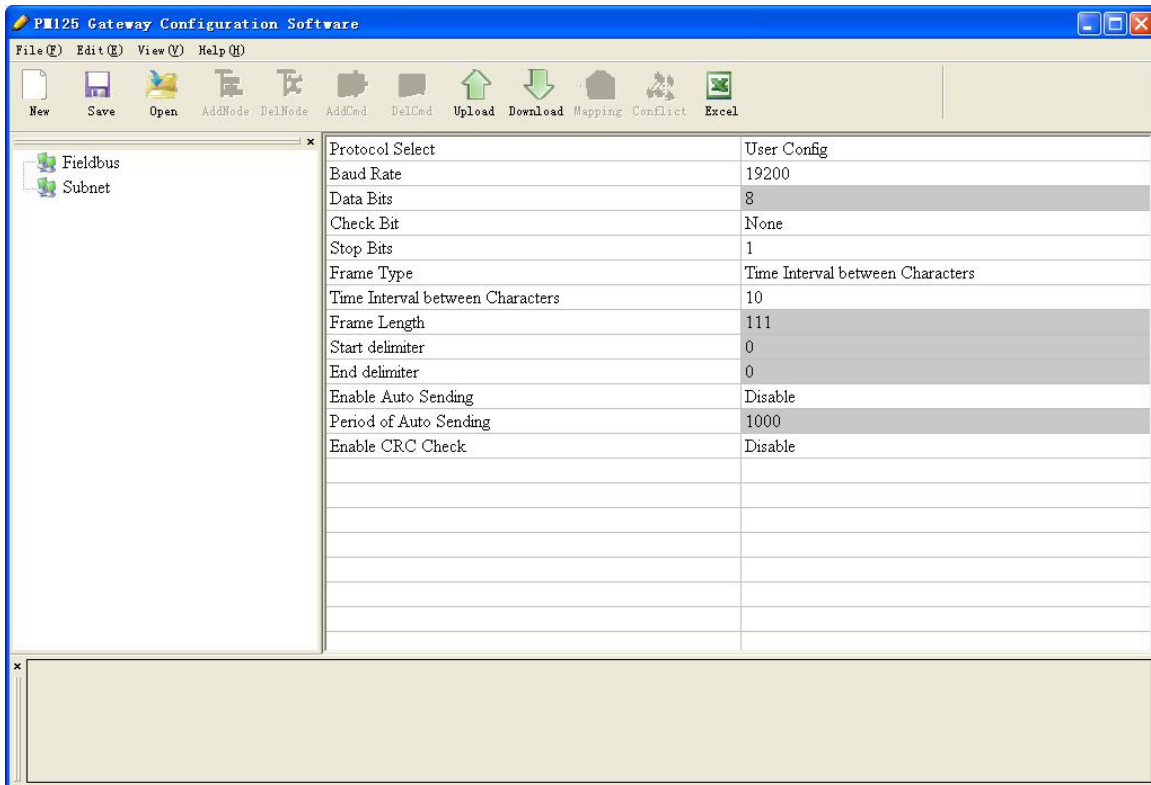
Modbus communication baud rate: 300, 600, 1200, 2400, 9600, 19200, 38400, 57600 and 115200bps to be selected.

Data bits: 8 bits.

Parity check mode: There are none, odd, even, mark and space to be selected.

Stop bits: 1 and 2 optional.

Control mode: it means the method of PM-125 serial port receiving data frame from user serial devices. Character timeout, frame length, delimiter are available to be selected. For more detail, see chapter 6.2.3.

Time interval between characters: the interval time among characters while transmitting data. Default value is 10, users can input the time with a range of 10~60000ms.

Frame length: only valid when the control mode is frame length. Users can input the time with a range of 1~166.

Start delimiter: valid when control mode is delimiter, range: 0~255.

End delimiter: valid when control mode is delimiter, range: 0~255.

Enable auto sending: the mode of PM-125 serial port sending data to user serial devices. Open and close can be selected.

Period auto sending: Default value is 1000, users can input the time with a range of 10~60000ms. Valid when auto sending is opened.

CRC check: Valid when control mode is "time interval between characters" and "frame length". Open and close can be selected.

7.4.3 Interface of node configuration view

Under "Modbus master" mode, in the interface of device view, left click a node, and then configuration interface is shown as follow:

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7.4.4 Interface of command configuration view

Under "Modbus master" mode, left click a command and then configuration interface is shown as follow:

The starting address of Modbus register: The starting address of register/switching value/loop and so on in Modbus slave and the range is 0~65535 (decimal). For example, PM-125 needs to collect the flow of certain flow meter, the flow corresponding Modbus register address is 40035, and it should be set to 34. The address provided by corresponding table of data address of user device may be PLC address or protocol address. It should be filled protocol address in PMA-123. Following table shows the PLC address and corresponding protocol address examples:

Command	PLC address examples	Corresponding protocol address
Coil state	00001～00010	00000～00009
Input state	10001～10010	00000～00009
Holding register	40001～40010	00000～00009
Input register	30001～30010	00000～00009

Data number: number of register/switching value/coil in Modbus slave device. **Note**: The maximum number of write registers is 45 under ASCII mode.

The starting address of memory mapping: The starting address of data read from devices or written to the devices in memory buffer of the module. The devices mean the client devices connected at the serial side.

The address range of data mapping in the module memory:

Read command: 0x0000 ~ 0x00A7

Write command: 0x4000 ~ 0x40A7

Users can complete the function of mapping address without conflict by software through "calculate mapping address automatically". Note: When using "auto mapping function", users need to configure corresponding Modbus register address and data numbers firstly.

Bit offset of memory mapping (0 ~ 7): For the bit operation commands, the position range of start-bit located in byte is 0 ~ 7.

Byte swap: There are three kinds of types: Non-exchange, Double-byte-exchange and four-byte-exchange. Modbus, PROFIBUS DP byte order is the most significant bit (MSB) first. DeviceNet byte order is the least significant bit (LSB) first. Users may need to exchange byte order to get the correct value.

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Scanning mode: There are two kinds of scanning mode: quick-scan and slow-scan. It is fit for requests of users about quick-scan or slow-scan of different commands. Slow-scan is equal to quick-scan being multiplied by scan ratio. (Configure it in the subnet configuration interface)

7.4.5 Notes view

Notes view displays the explanation of configuration. The notes that show how to configure the starting address is shown as follow:
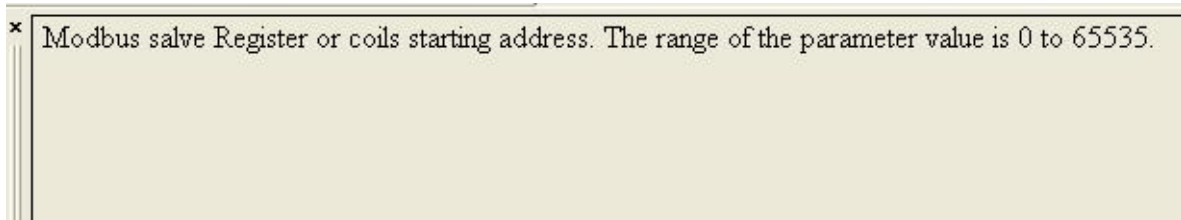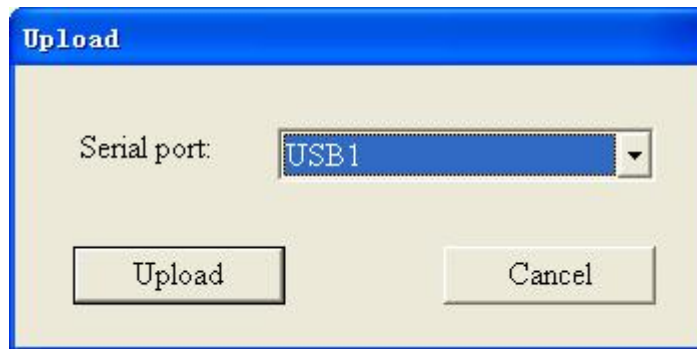

7.5 Upload and Download Data

Notes: PM-125 V3.0 only supports USB interface configuration, not supports serial port configuration. PMA-123 software still can upload and download configuration data of PM-125 V3.0 or earlier version via serial port.

Under default, PMA-123 select USB mode to configure data for PM-125, serial port configuration also can be selected, "Edit">"Update config port">"serial port". The figure following shows the details:
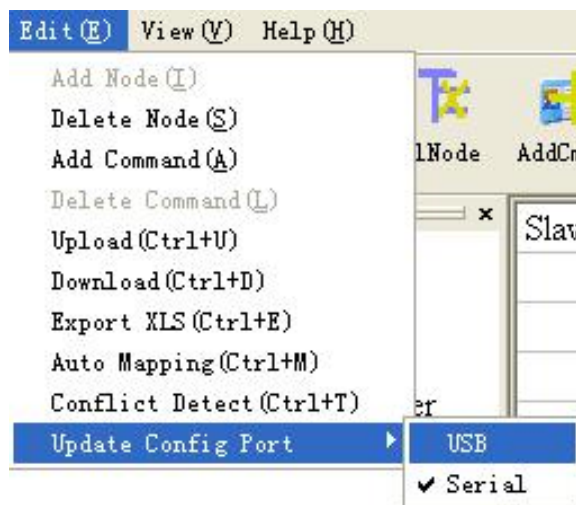
7.5.1 Upload data

Select upload data, transmit gateway configure information to software from devices,

PM-125 V3.0 can only be configured by USB mode, as the figure below:

If using serial port configuration, as the figure below:
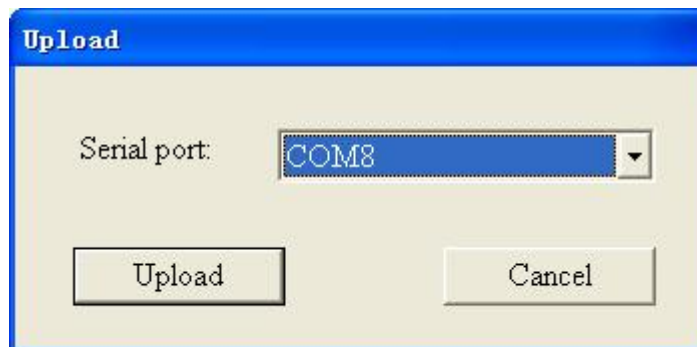
Click "upload data", if the upload is done, view interface is as shown below:

7.5.2 Download data

Select download data, download the software configure information to gateway devices,
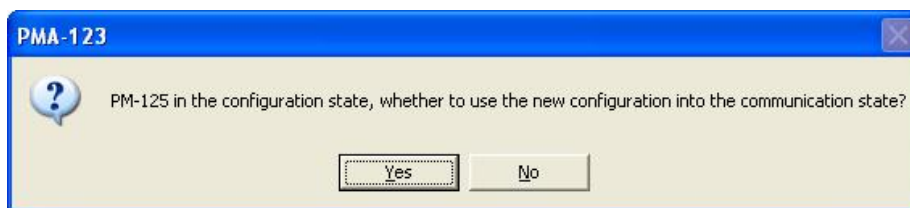
If configuring by using USB method, the process is:

1.   Select USB interface.

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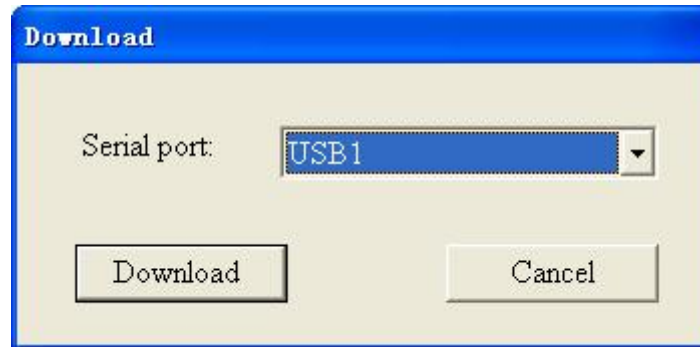
2. Click "Download" button in the dialog box, appearing the hint below:
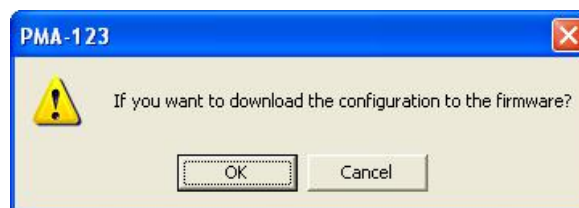
3. Click "YES", configuration software start downloading, after downloading, appearing the hint below:

4. Click "YES", configure software prompts download successfully.

For configuring by using serial port method, as the figure below:

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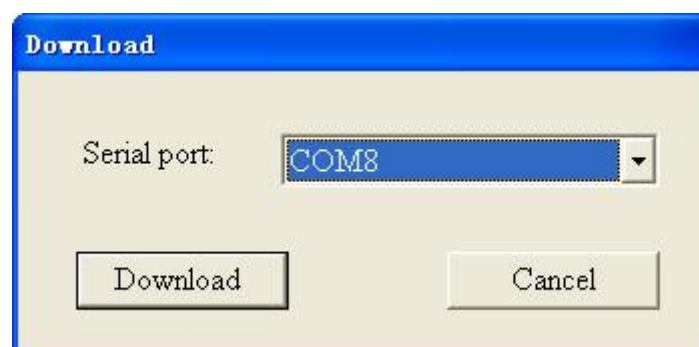
Click "Download", if download is successful, the view interface is as shown below:

Notes: before downloading, please make sure all the configurations are completed.

7.6 Open and Save Configuration

7.6.1 Save configuration project

Select "Save", or directly click "Save" in the tool bar the configuration project can be saved as .xml document.
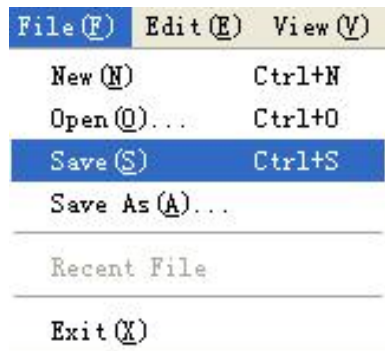
7.6.2 Open configuration project

Select "Open", or directly click "Open" in the tool bar the configuration project can be saved as .xml document.

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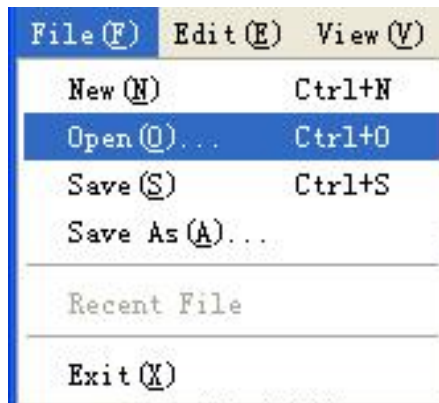
7.7 Output Excel Document

Excel document helps users to examine the configuration related.

Choose the icon , save the configuration as excel document and choose the right path.
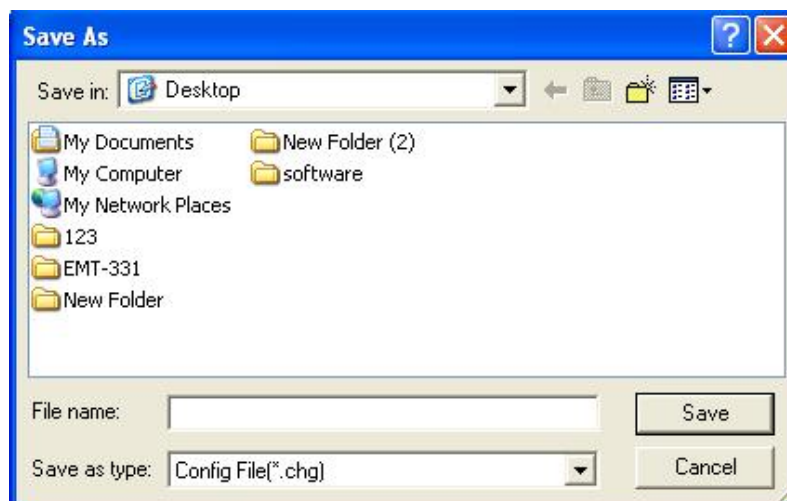
Double click the .xls document and open it: "Command List", "Fieldbus" and "Subnet".

Subnet: Modbus subnet parameters, as follow:

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Serial number	Protocol type	Baud rate	Data bits	Parity check	Stop bit	Slave address	Transmission mode	Response timeout	Delay between polls	Polling mode of outputting order	Pulse ratio	Scan ratio
2	1	Modbus Master	19200	8	None	1		RTU	300	0	Change-of-state output		10
3													
4													
5													
6													

Fieldbus: Bus type and relevant parameters, as follow:

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	A	B	C	D	E	F
1	Bus type	Address	Communication baud	Input byte	Output byte	Clear after twice faults of input/output data
2	Profibus			Setting through Step 7 configuration	Setting through Step 7 configuration	Turn on
3						
4						

\\ Subnet \ Fieldbus / Order List /

Command List: Modbus commands list, as follow:

	A	B	C	D	E	F	G	H	I	J
1	Number	Slave address	Order number	Starting address	Data number	Byte number	Mapping address	Bit offset	Scan ratio	
2	1	1	3	0	10		0H		Fast scanning	
3	2	1	16	0	10	20	4000H			
4										
5										

\\ Subnet / Fieldbus / Order List /

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8 How Step7 Read and Write Gateway Data

The data modules of length integrity supported by PM-125 are shown below:

2 Words Input Consistent

4 Words Input Consistent

8 Words Input Consistent

16 Words Input Consistent

2 Words Output Consistent

4 Words Output Consistent

8 Words Output Consistent

16 Words Output Consistent

Packing method is used in data sending and receiving in step7 programming. The packing method mainly use SFC15 (pack sending) and SFC14 (pack receiving).
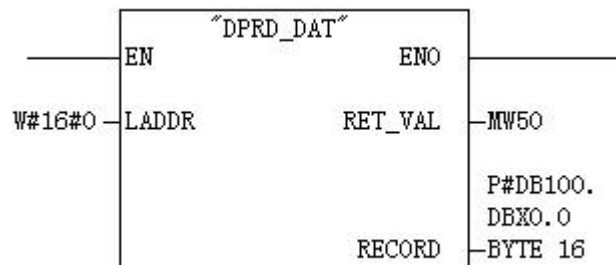
SFC14
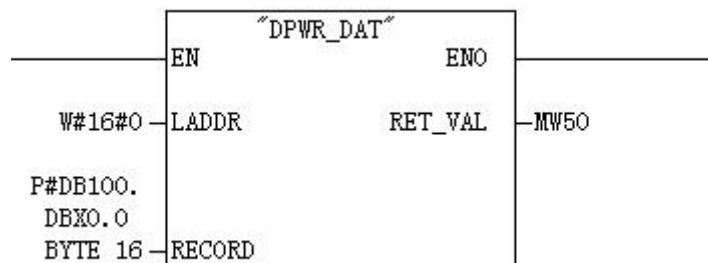
SFC15

Caution: It is strongly recommended that using data module length integrity to ensure the integrity of serial port frame while using universal mode of serial port protocol.

The data modules of word integrity supported by PM-125 are shown below:

4 Words Input, 4 Words Output

8 Words Input, 8 Words Output

16 Words Input, 16 Words Output

32 Words Input, 32 Words Output

64 Words Input, 64 Words Output

1 Word Input

8 Words Input

1 Word Output

8 Words Output

Users can apply "MOVE" command to read and write data in Step7 programming.

The data modules of byte integrity supported by PM-125 are shown below:

Status/ Control (Optional)

1 Byte Input

1 Byte Output

Users can apply "MOVE" command to read and write data in Step7 programming.

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9 Installations

9.1 Machine Dimension

Size: 0.98 in (width)*3.94 in (height)*3.54 in (depth)
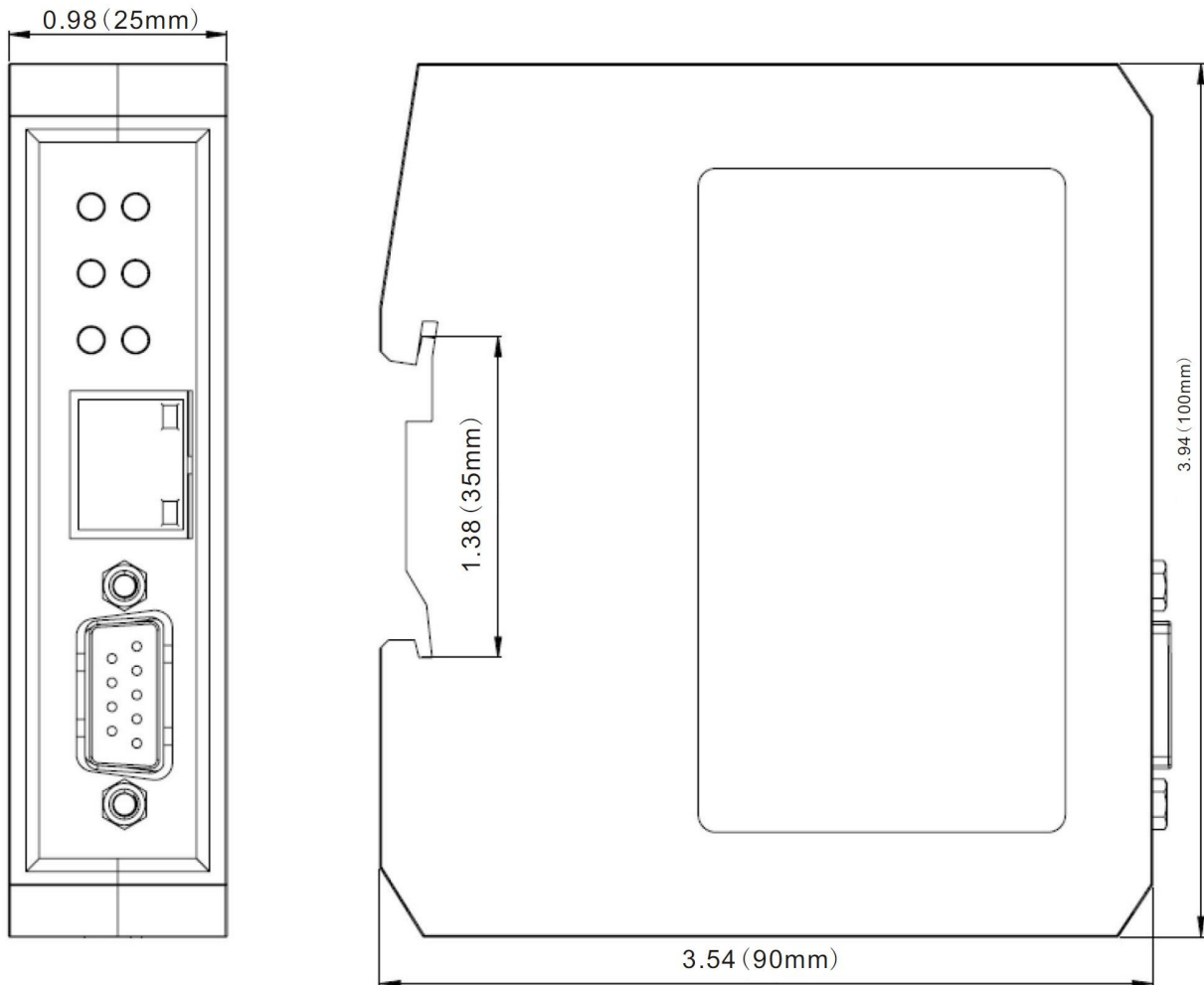
9.2 Installation Method

35mm DIN RALL mounting

Install the gateway
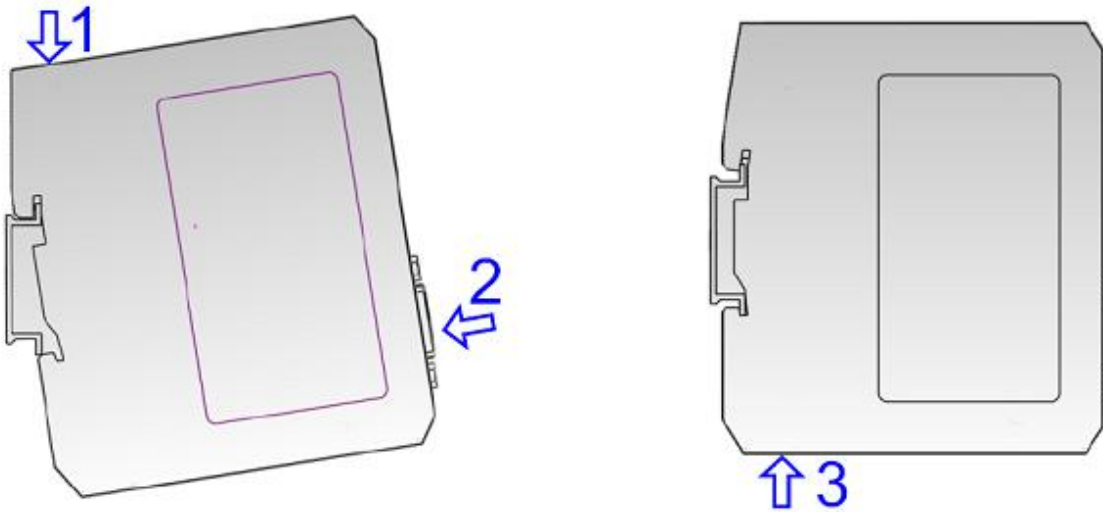
Unload the gateway
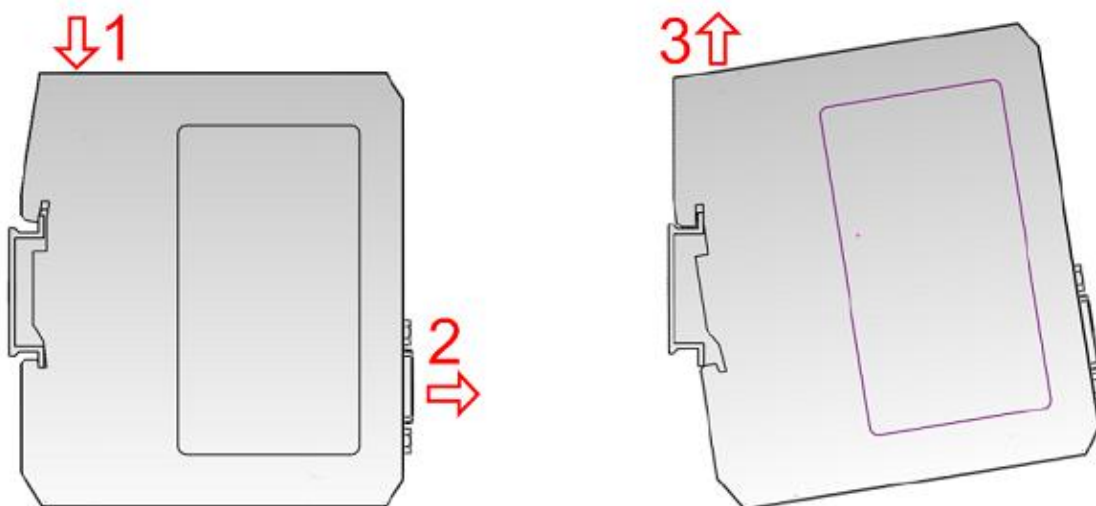
10 Maintenance & Cautions

➢ No heavy stress to avoid damaging the panels.

➢ No collision to avoid damaging the internal components.

➢ The voltage of power supply should be in the voltage range given by user manual to avoid burning the module.

➢ Prevent the module from water

➢ Make sure the connection is correct before power on.

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11 Optional Device

RS25——RS232/RS485 Isolation Converter

RS25 is an RS232/485 isolation converter produced by SiboTech.

Function: RS-25 achieve the converter between RS232 and RS485,it can establish the communication between them.

Feature: 3KV photoelectric isolation and suitable to the industry field with variable environment.

More information: www.sibotech.net/en

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Appendix A: Using STEP 7 to Set PROFIBUS- DP

The following shows how to use STEP7 to configure PM-125:

First of all, copy *. gsd file to the following path: *Step7\S7data\gsd*

1. Open SIMATIC Manager ：
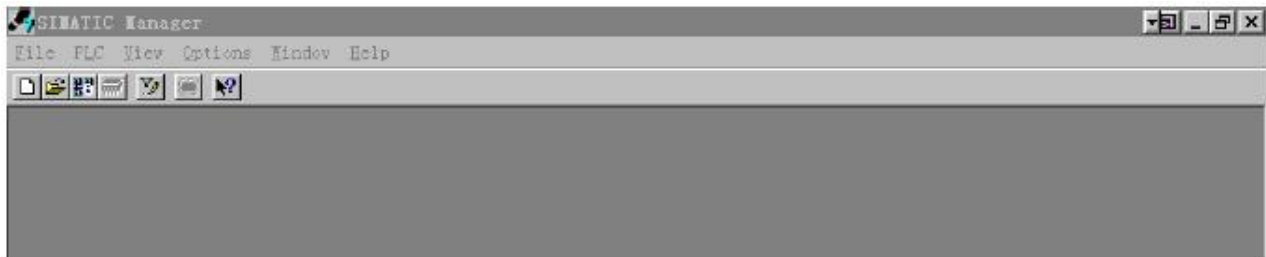
Figure 1

2. File->New, create a new file:

Figure 2

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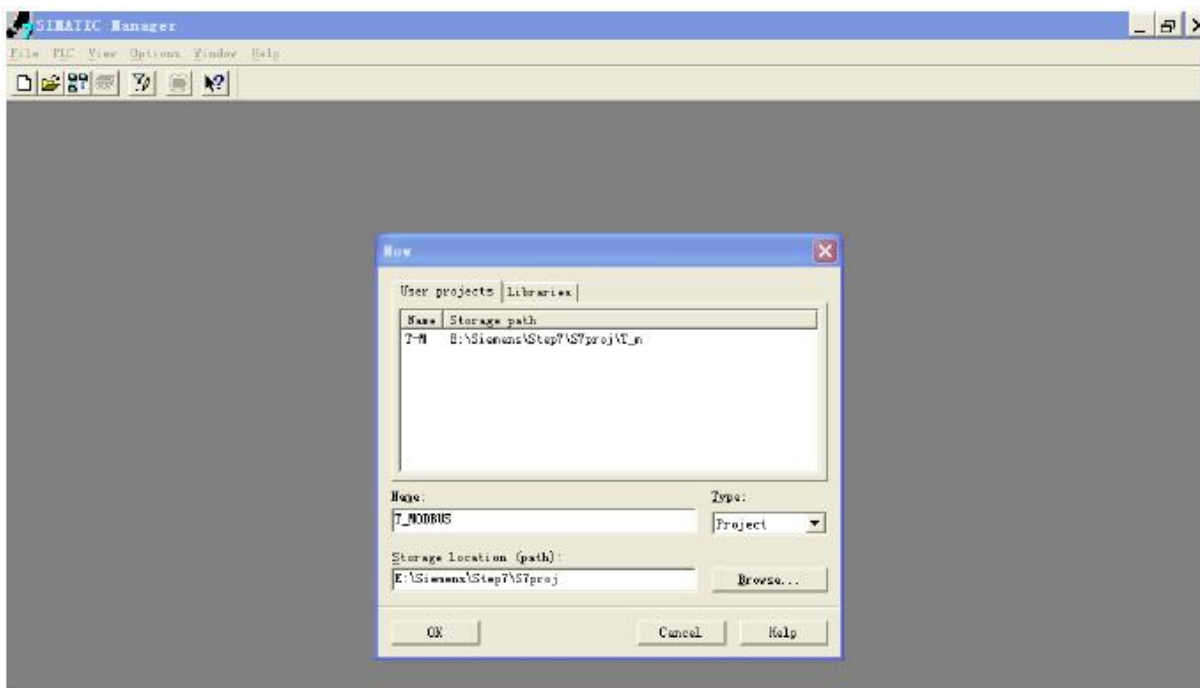
3.　Insert->Station-> SIMATIC 300 Station:
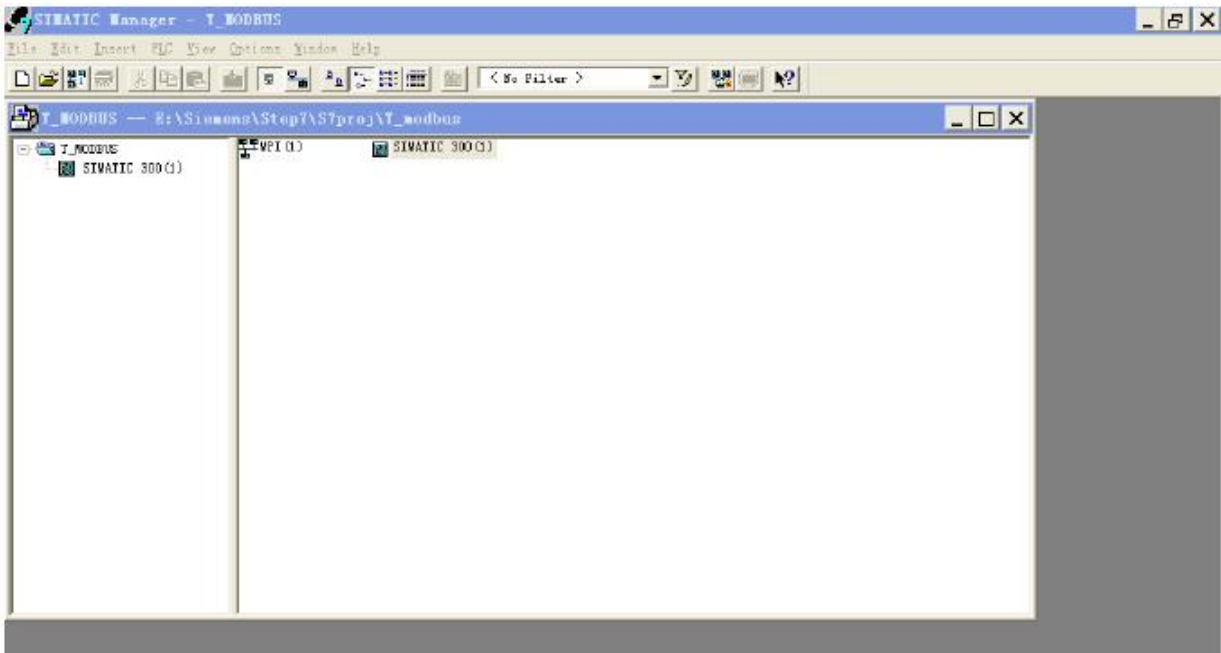
Figure 3

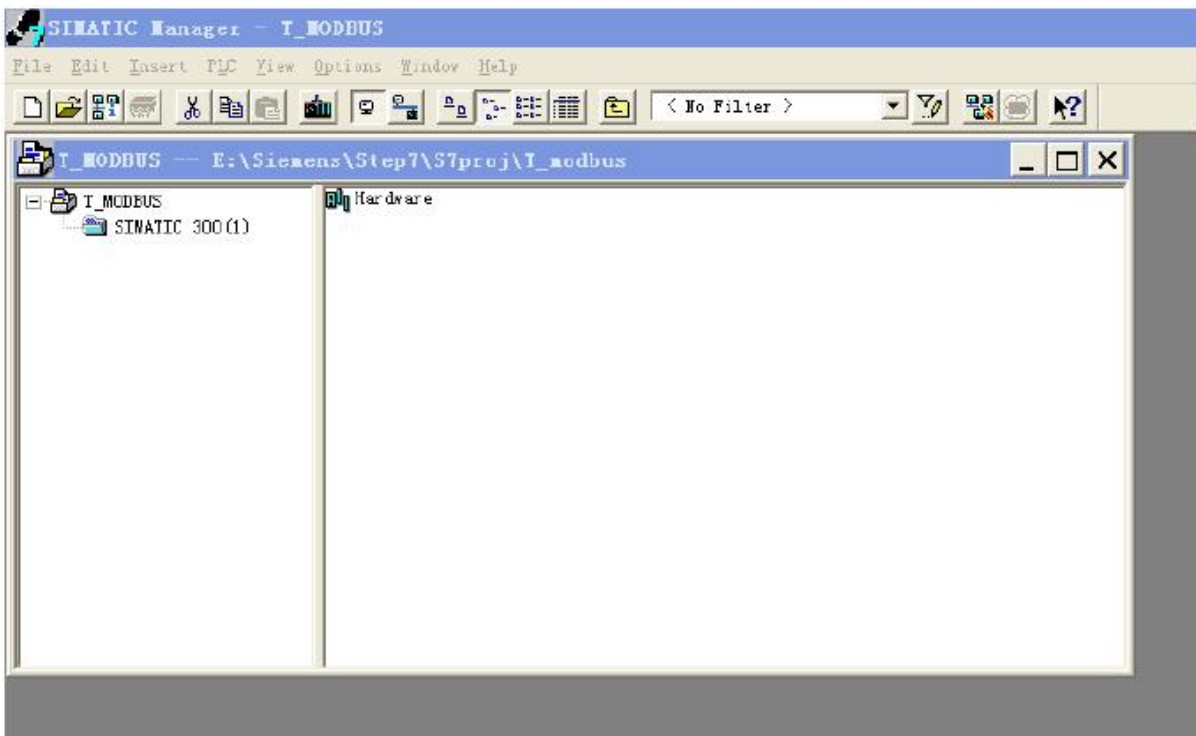4.　Open S7 PLC hardware configuration: SIMATIC 300(1) ->Hardware, and double-click:

Figure 4

5.　Choose Option->Update Catalog in the menu, update GSD in Device catalog

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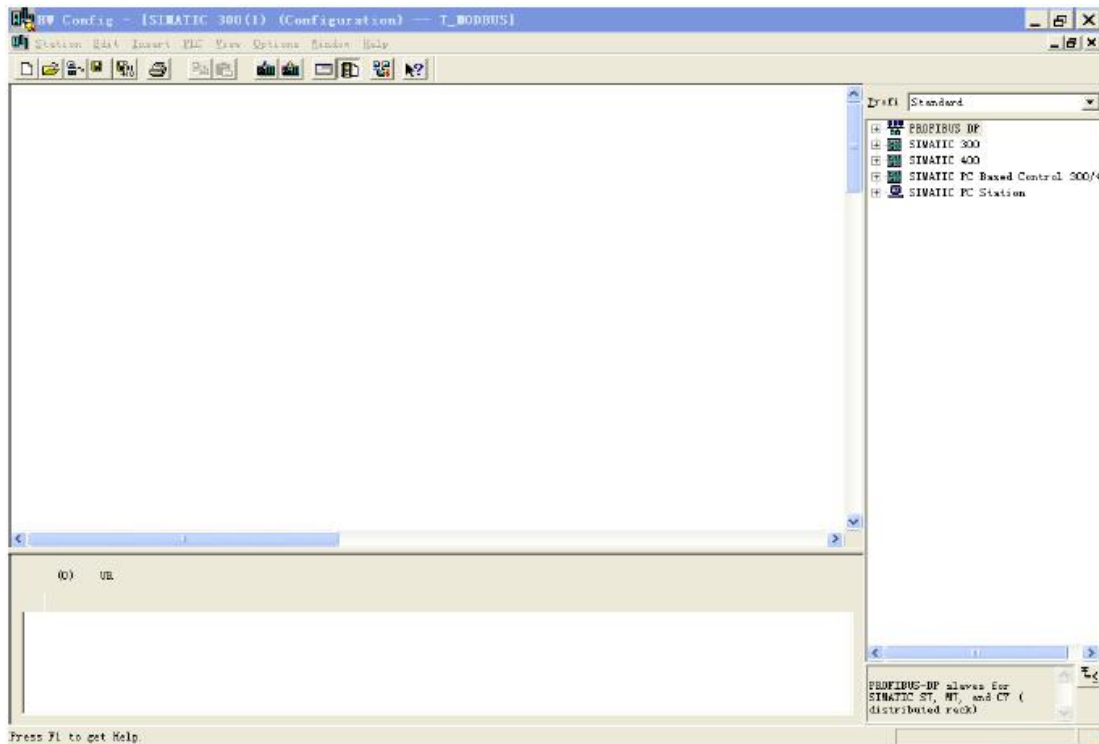
Figure 5

6. Here you can find your equipment in the right side of the window /PROFIBUS DP/Additional Field Devices/Converter/PM125/, Figure 6:

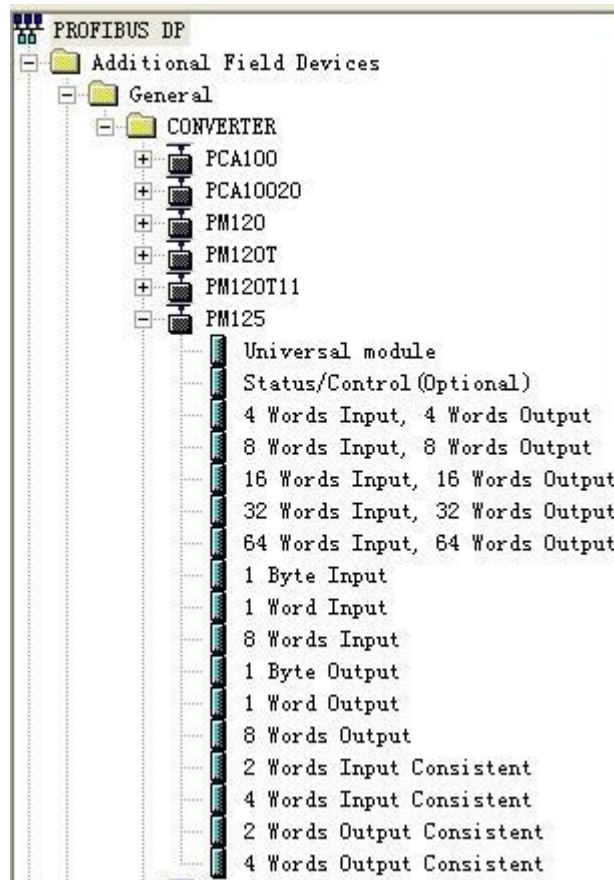**SiboTech**®

Figure 6

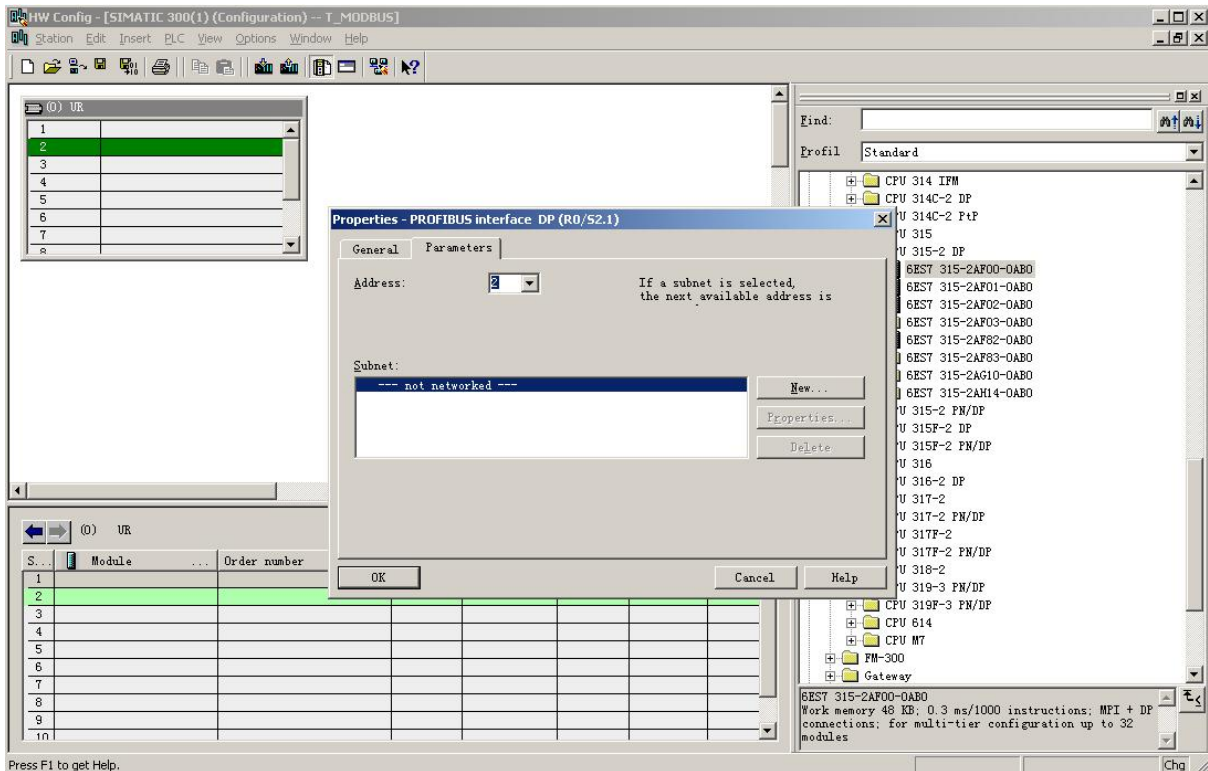7.   Set PLC rack, double click the "Hardware Catalog\SIMATIC 300\RACK-300\Rail", Figure 7:

Figure 7

8. Set CPU module and select the corresponding device type and the occupied slots.

9. Create PROFIBUS DP network and set PROFIBUS DP: Click New and then Network settings, select DP; select a baud rate such as 187.5Kbps, then "OK". Double-click it; Figure 8:
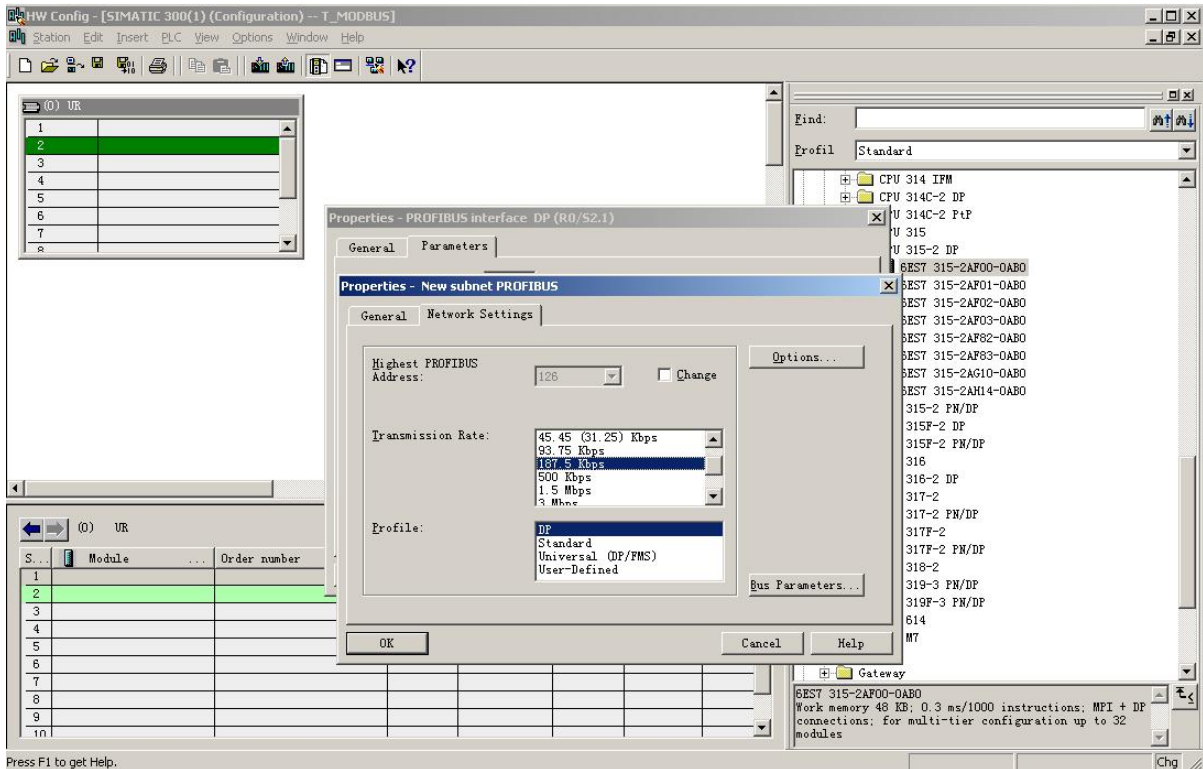
Figure 8

10. Select PROFIBUS DP Master address; Figure 9:
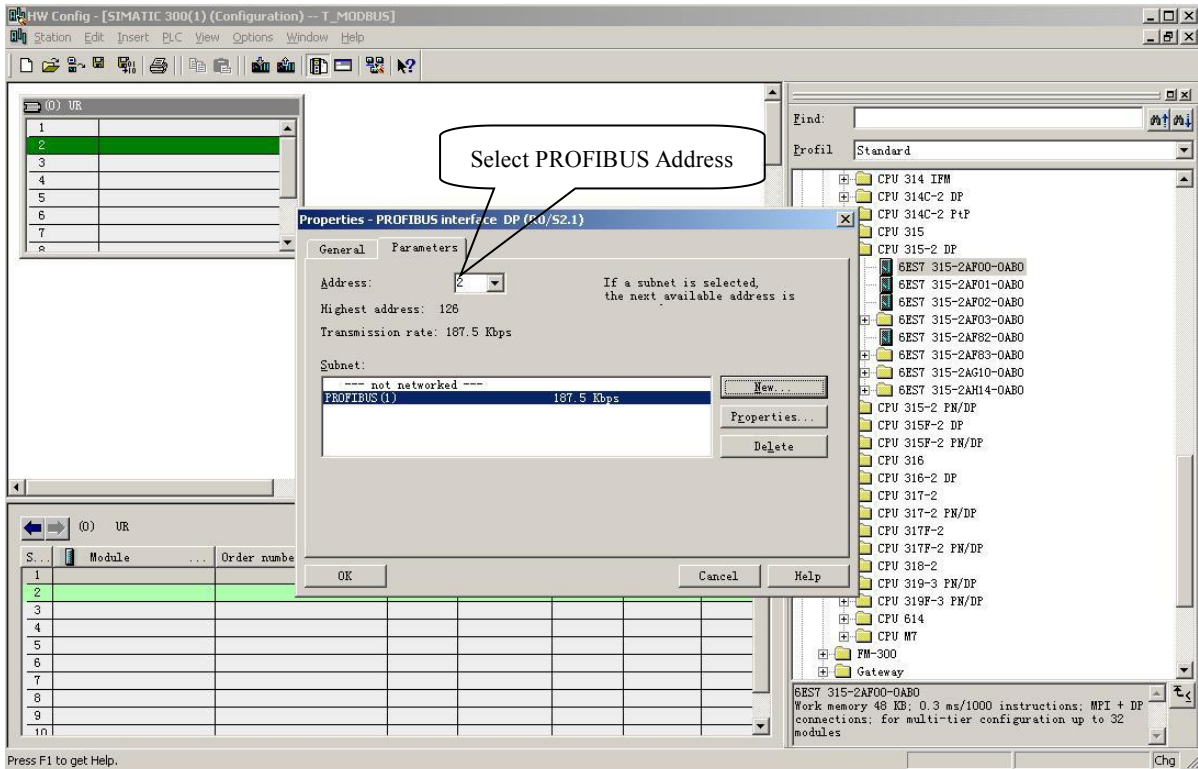
Figure 9

11. Configure PM-125 slave station into PROFIBUS DP network, and map the input and output data block to S7-300 or other controller's memory, Figure 10:
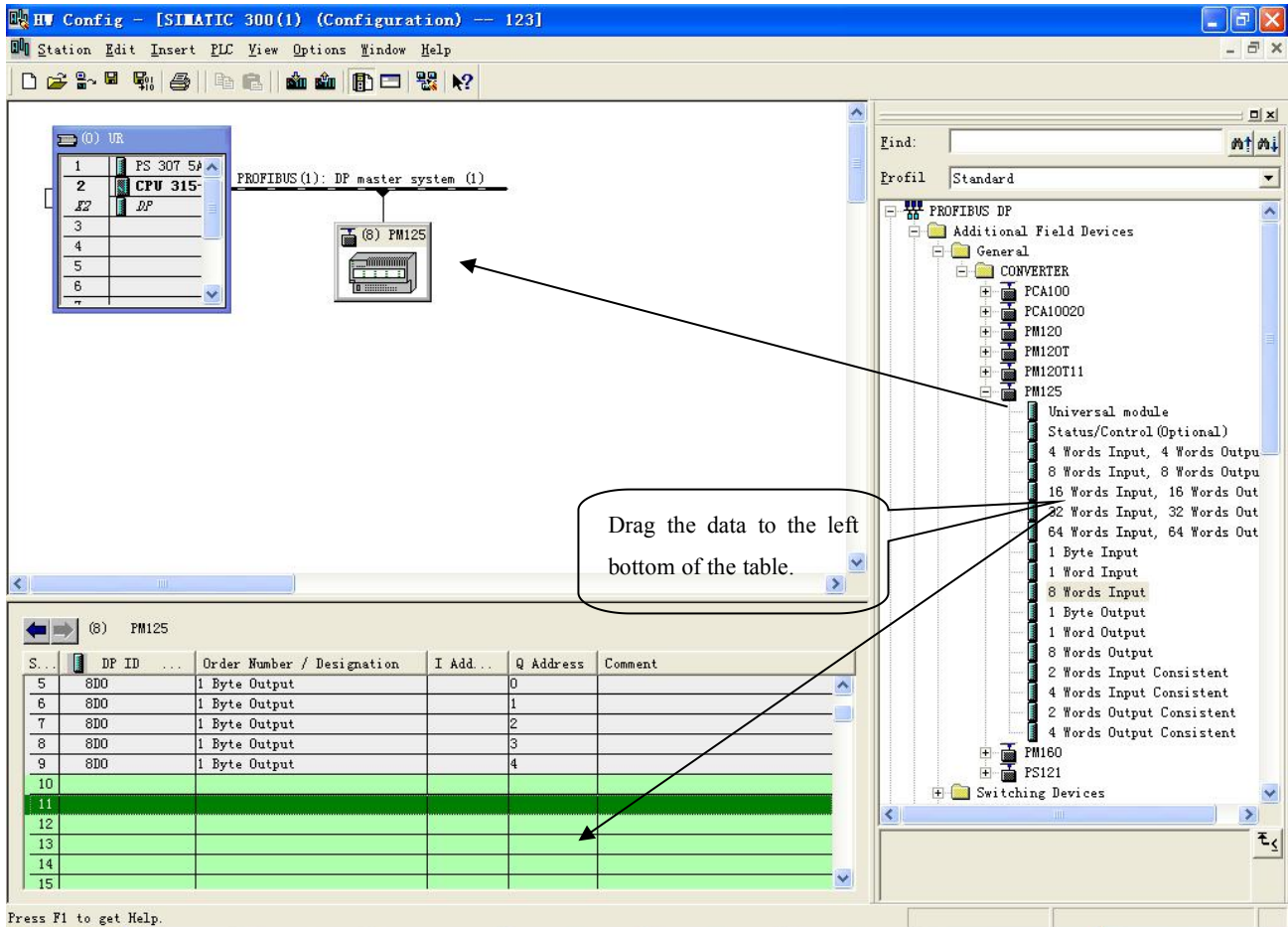

Figure 10

Operation is divided into two steps, the first step is dragging PM-125 into the network configuration on the upper left, dragging on the PROFIBUS DP bus, the mouse will change shape, and that is to say it can be placed. The second step is dragging data block into the data mapping table at the bottom left, the table will change to green, and that is to say it can be placed, mapping to the PLC memory.

Note1: When require full word, drag data block to the left bottom of table where requires the full word data block, the location must to corresponding to gateway memory area where need full word in PMA-123 configured software.

Note2: The setting of PROFIBUS DP slave station address must be consistent with the settings of configured button!

12. Compile and download into PLC.

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