Haiwell 海为®

Haiwell TP300 User Manual

Text Display

TP300 Text Display User Manual

Contents

Chapter 1. General Introduction of TP300

1.1 Functions

TP300 is a Human-Machine Interface that is used with many kinds of PLC (or the other intelligent controllers with communication ports). With TP300, both the values of the PLC inner registers and the relays status of PLC can be monitored or changed through texts or LEDs. So the operation of the machines or the devices is more easy and convenient.

TP300 programmable text monitor has many features:

■ The windows are made with the editor TP300 on PC. Text including Chinese characters can be input and the PLC address can be set. The windows are downloaded with serial port

■ The PLC communication protocols are downloaded to the TP300 with the data of the windows, so the engineer needn't program of communication.

■ It can work with most popular PLC, including SIEMENS, Mitsubishi, OMRON, Schneider, FACON, LG, Delta, AB ,SAIA and etc. It supports some general protocols like Modbus RTU, Free communication and ECOSTEP protocol applied in KINCO servo motor driver.

■ Password protecting function.

■ Alarm List function. The current alarm information is displayed one by one.

■ Optional clock module is available. They can provide a real-time clock.

■ It has 19 keys, which can be defined as function keys,there is a keyboard for numeric input. The manipulation is simple. Some of the mechanic buttons on the controlling cabinet can be substituted with them.

■ Various communication modes can be selected. Any of RS232 and RS485   is OK.

■ STN LCD with background lights. 4 rows (24 English or 12 Chinese characters in every row) of characters can be displayed at the same time.

■ The front panel of the TP300 accords with IP65 standard. It is water-proof and oil-proof.

1.2 General Specification

Electric Specification

WARNING: The product may be damaged if the input voltage is out of range or the positive and negative poles are connected incorrectly.

Input Voltage	DC21V-DC28V
Power Consume	≤2W
Max.Power Cut Time	≤20ms
Max.Voltage	AC500V-10mA 1min.(between signal and GND)
Insulative Resistance	DC500V-about10MΩ (between signal and GND)

Ambient Requirement

Operation Temperature	0~50℃
Storage Temperature	–20~70℃
Ambient Humidity	20 ～ 90 % RH (Non-condensing)
Vibration Resistance	10~25Hz(Max.2G for 30 min. in any of the X,Y,Z axis)
Interference Resistance	Voltage Noise: 1500Vp-p, pulse period 1us, for 1s
Atmosphere	No corrosive gas
Protection Structure	Compliant with IP65 (front panel)

1.3 Name of Components

On the front panel of TP300, there is a LCD display and 19 thin film switches. The keys have a good touch feeling, and they are endurable and reliable. Besides being used for the basic functions, all the 19 keys can be set to execute specific functions, for example: jumping the windows directly or switch settings etc.and the ten numeric keys of 0~9 can be customized symbols.In addition,the ALM and +/- keys are One key dual-purpose.The front panel of TP300 programmable text monitor is shown as following picture:

All the 19 function keys can be defined to execute specific functions, for example,Bit setting,Bit resetting ,window jumping etc.. For the undefined keys can only execute basic functions including setting the registers, returning to the initial window and jumping from the current window to the previous/next window.

The basic functions of the function keys,as shown in the table below:

KEY	BASIC FUNCTION
[ESC]	When pressed, the TP300 will return to system initial window. The user can designate the system initial window during the window making procedure (default value is window no. 1, window no.0 is prohibited). Usually the Main Menu window or the most-frequently-used window is set to be the initial window.
[ALM]	When pressed, the TP300 will shift to the predefined alarm list information window. It can also be defined as a specific function key.
[←]	Left shift the digit being edited when changing the register data. When pressed, the digit twinkling will be shifted to the left one.
[→]	Right shifting the digit being edited when changing the register data.When pressed, the digit twinkling will be shifted to the right one.
[↑]	Jump to the previous window. The number of the previous window is designated in the Window Attribute option (default value is the result of subtracting 1 from the current window number). In the data setting mode, pressing it can add 1 to the digit being edited.The value will increase from 0 to 9, then return to 0……
[↓]	Jump to the next window. The number of the next window is designated in the Window Attribute option (default value is the result of adding 1 to the current window number) In the data setting mode, pressing it will subtract 1 from the digit being edited. The value will decrease from 9 to 0, then return to 9……
[SET]	Press it to enter the mode for editing the value of registers. The register being operated is displayed in reverse color. The digit being edited is blinking displayed. If the current window contains no register setting components, no operation will be executed. When [SET] is re-pressed before [ENT] is pressed, the edition done to the current register will be canceled. The user can continue to operate the next data register. **NOTE:** The function of register setting for [SET] has the highest priority and can not be masked by the user-defined function.
[ENT]	When password protection is enabled, pressing it will pop up a window for password setting. In register setting mode, pressing it means the edition on the current register is finished. The edited data will be saved. Then the edition will move to the next register. After the edition on the last register on the current window has been finished, it will quit from the register setting mode.

NOTE:

Except for the [SET] key, if there is a conflict between the basic function and the user-defined function for the same key, the basic function will be disabled. The basic function of register setting for [SET] has the highest priority. Although it can be defined to execute other functions, the register setting function will not be disabled. So if it is necessary to execute the function for setting register, please don't define [SET] for other functions.

There is a contrast adjustment potentiometer on the back of TP300.On the right side of TP300,there is a power supply port, a COM port.

On the right side of the product, there is a DC power supply port and a 9-pin D-shape male socket as the COM port. The RS232 and RS485 COM port are built in the 9-pin D-shape socket. To download the window data, connect the 9-pin port of TP300 and the 9-pin port of PC with dedicated communication cable. To communicate with PLC, select the proper connection mode in the configuration software according to the type of the PLC.

To adjust the contrast of the display, turn the contrast adjusting potentiometer on the right side of TP300 with a small screwdriver.

The display of TP300 is equipped with a LED background light. When any key is pressed,the light will turn on. In default conditions, the light will turn off automatically if there is no operation in 3 minutes(default set).

The back shell of the product is marked with the ports as shown below:
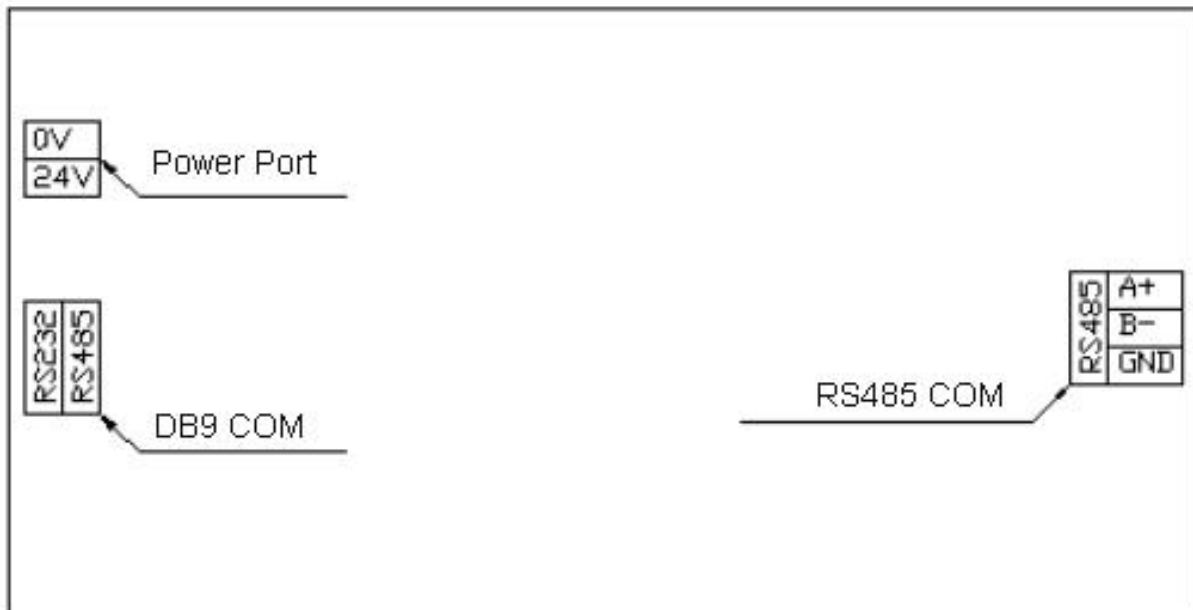
Power supply port: Power supply wiring port of product.
DB9 COM port: the programming port which connects with PC or the COM port of PLC and other external devices
RS485 COM port: used to connect with PLC or other external devices(such as controller)

Note: "DB9 communication port" and "RS485 communication port" belong to the same communication port, but we made two communication port in order to easy use, but at any time can only use one port. For example: "DB9 communication port" which has two communication wiring modes of RS232 and RS485 but can not access both of them   at the same time, beside, the RS485 in "RS485 communication port" can not access with RS232 OR RS485 in "DB9 communication port" at the same time.
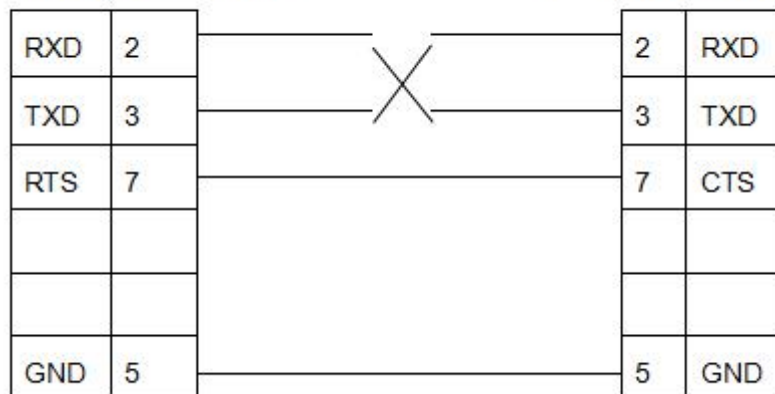
Pin Definition of DB9 COM Port of TP300：

Pin	Signal	Function
1	TD+	RS485 send
2	RxD	RS232receive data
3	TxD	RS232send data
4	Notused	
5	GND	Signal Ground
6	TD-	RS485send
7	RTS	Send ready
8	RD-	RS485receive
9	RD+	RS485receive

Dedicated communication cable connection diagram of TP300
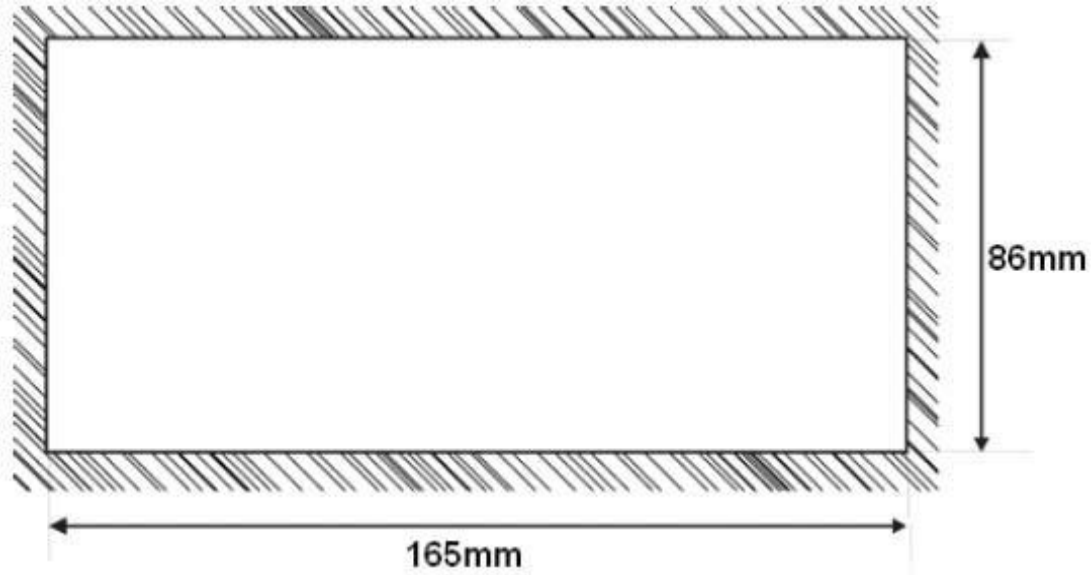
1.4 Dimension and Installation Guide

Dimension of TP300 (L*W*H): 172×95×30(mm).

Dimension of mounting holes 165x86(mm)

Four ferric installation screws are included in the accessory package of TP300. There are four rectangular holes for fixing the TP300 on the two sides of the TP300, two on the top and two on the bottom. Fix the TP300 in the hole on the controlling cabinet with the screws. The procedure is listed here:

- Make a rectangular hole on the front panel of the controlling cabinet according to the dimension in the figure above;
- Put the TP300 into the hole, with the front side facing to the out side;
- Insert the screws into the fixing hole on the flanks of the TP300 and fasten them;
- Connect TP300 and the COM port of PLC with a cable. The cable can be provided by the manufacturer of the TP300 or be made by the user according to the Connection Guide provided in this manual. Switch on the 24-V DC power supply to start the system.

Chapter 2. The Editing Software TP300

2.1 General Introduction of TP300

TP300 V1.0.0 is the specific configuration software for the programmable text monitor TP300V1 .It can run on the WINDOWS 98/2000/XP platforms. It is easy to study and convenient to use. The user can input English/Chinese characters directly.

2.1.1 About the Project and Window

The basic element of a project is the window. All the windows for one certain project are saved in a single project file. Every window is made to execute some certain functions. By arranging the windows,the user can jump from one window to another. The application project file is composed of all the windows.

2.1.2 Window Contents

After opening a project, the user can "new" or "open" a window. The user can put some elements such as characters (English or Chinese), LEDs, switches, data inputting boxes and jump keys on every window.Jumping between different windows is allowed. The operator can carry on the operations such as data monitoring, parameter setting, switch controlling and alarm list monitoring.
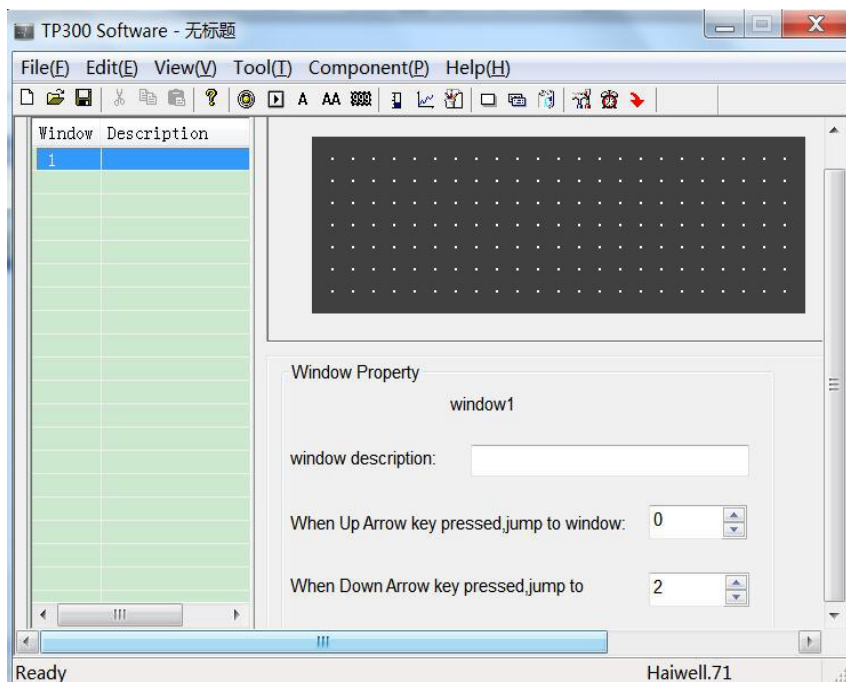
2.1.3 Flowchart of Using

The basic flowchart of using TP300 is shown in the following figure:
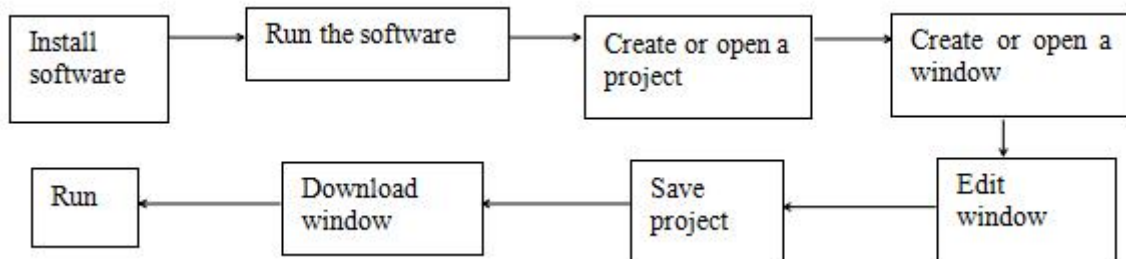
2.2 Editing the User's Window

2.2.1 Create a New Project

Run the software TP300 and create a project, after which a window editor will be showed on the screen:

On the top of the editor, there is the menu and the toolbar. The window numbers and window descriptions are listed in the table on the left of the editor.

- Window: List the serial number of all the windows included in the project. It is helpful for finding the window quickly;
- Description：A simple description of the window function.

The window-editing region is on the center of the editor. There is a grid of white dots in the display region. The distance between every two rows and two columns is 8 points. The whole region is a matrix of 192*64 points. The user can refer to the dots nearby to align the components when laying or moving them. If the user move a component by dragging it with the cursor, each time the component will move across the distance which is a multiple of 4 (for example, 4,8,16······). When necessary, change X and Y positions of the components to locate them in arbitrary positions.

The table below is the description of all the buttons in the toolbar:

Button	Function
	Create a new project
	Open project
	Save project
	Cut the text in the textbox, also can be used to delete components
	Copy the text in the textbox
	Paste the text to the toolbox
	New window, pressing the key "New" in the window indicator will also new a window.
	Change a window with the copy of another one
	Delete the current window

![icon]	Designate the initial window. When the TP300 is running, the system will return to the initial window directly if [ESC] is pressed. Usually the main menu or the window most-frequently used is set to be the initial window; Set the system password;Set the definition number of the interactive controlling register.
![icon]	Download the project to TP300 through the RS232 port on PC.

Press ![icon] or activate [File]->[New Project] command in the menu to pop up a dialog box for PLC selection:
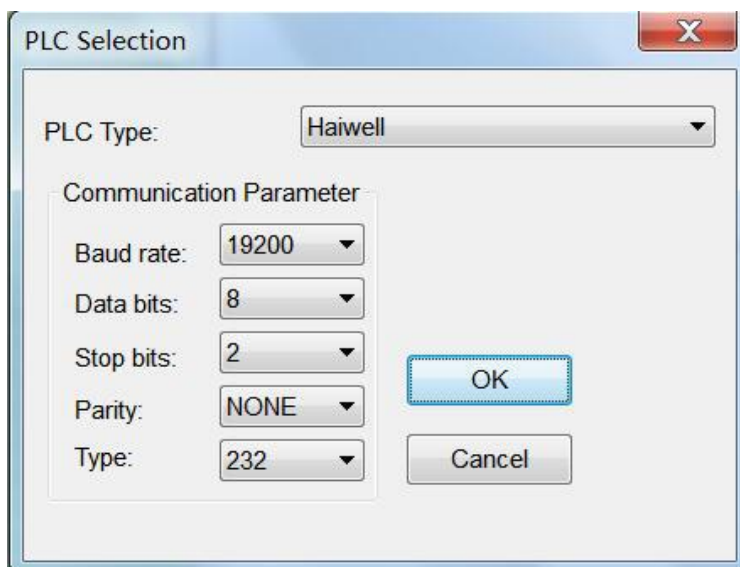
Select the proper PLC type, baud rate, data bits, stop bits and parity in the dialog box.

Select the PLC type according to the object that is connected with TP300. The window data and the protocol corresponding to the selected PLC will be downloaded to TP300 monitor when execute the window downloading function of TP300. TP300 will communicate with PLC after the protocol loaded.

2.2.2 Making basic window

In the example given below,PLC type is from Haiwell.The example will   give you a general description of window making.
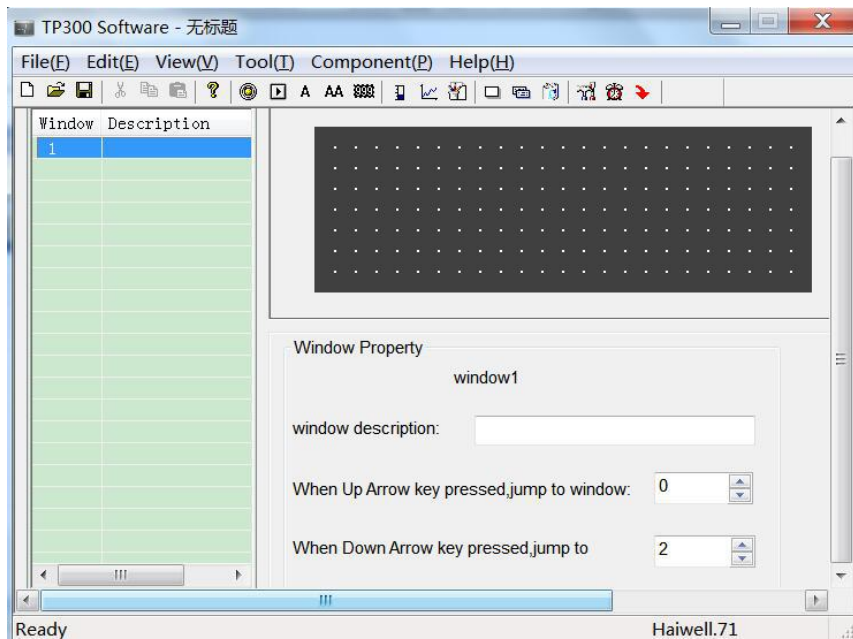
Firstly,enter system initial window(default value is window No.1) editing mode.The properties of the current window(window No.1) are shown at the right and bottom edge of the interface.Every window has its own properties,which include three items:

■ **Window Description：**

Describe use of window.It helps designer to note use of all windows(can be omitted),for example: "main menu".

■ **When Up Arrow key ([▲]) pressed,jump to window:**

The number of window that it will jump to when Up Arrow key pressed.

■ **When Down Arrow key ([▼]) pressed,jump to window:**

The number of window that it will jump to when Down Arrow Key pressed.

The most convenient way for window jumping is to press [ESC],[▲] and [▼] when TP300 is running.The user can also jump from one window to another by pressing user-defined function keys.

Note:

If the [▲] and [▼] in the current window are defined for other functions,the window jumping parameters of the window properties are invalid.

If the window designated by the [▲] key doesn't exist,the system will search up until the existing window is found and jump to it.It will stop at window 1 if no window is found.The situation of the [▼] key is similar,that meas the system will search down for window if designated one doesn't exist.

If there are some data setting components in window,[▲] and [▼] key will execute function of value increase and decrease in the data setting mode.After quitting data setting mode,[▲] and [▼] key will execute basic function for window jumping.

2.2.3 Configuration of TP300

Press ⬚ or activate [Tools]->[TP300 config] command to pop up a dialog box for configuring the system parameters of TP300:
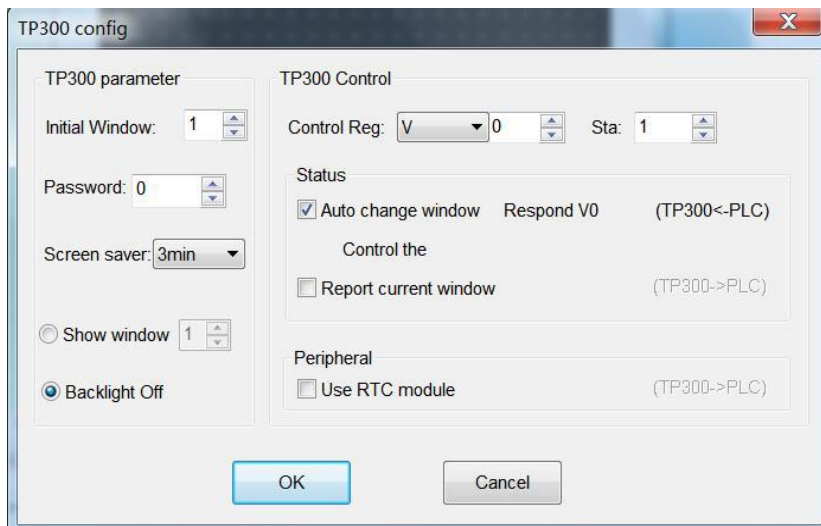
■　**Initial Window**

The first window will be displayed after power on.Usually this window is set to be the main menu window or the most-frequently-used window.Press ［ESC］ when the TP300 is running,the system will jump to this window directly.

■　**Password**

All the windows of a project share a common password.When the"password"attribute of the components such as data setting window,function keys and etc is enabled.The components can only carry out their functions when the system password is entered.With this function,user can hide windows and secure data.The password operation is discussed in following text.

Note: Password is valid only when there is a component whose password attribute is enabled in all windows of project.The password can be an arbitrary integer between 0 and 9999.

■　**Screen Saver**

Under default conditions,back light will hold for 3 minutes.The time can be set by user.If it is set to be "never",back light will keep on.Also,window can be set to jump to a screen saver window when no key is pressed in 3 minutes.

Note: If window has jumped to a screen saver window,pressing of any key will not carry out any function.Any operation will awake screen saver to return to original window .Only text or picture component can be used as screen saver.Dynamic components such as register and bar graph can't be used as screen saver.

■　**TP300 control**

Usually the window changing is executed by pressing the keys. Besides, the PLC can change window by changing the data in register.As shown below:

If this property is selected, the number 'n' will be written into the V300(for example) controlling register at the beginning of running, then TP300 will jump to window No.n. After jumping to that window, the data in V300 controlling register will be cleared.V300 high byte control buzzer. Note: V300 high byte assigned to value must be greater or equal to 128 can control buzzer.

TP300 write the current window no. into V301, so PLC can know the status of TP300.
Note: The user can define the address of the interactive controlling register.

■ **TP300 peripheral control**

If necessary, the user can contact to the manufacturer to get an optional clock module(need to customizing product). When a clock module being used with TP300, the system will transmit the data of the clock to the controlling register defined by the user.For details, see Appendix III: Clock Function Introduction.

Note: The user can define the address of the interactive controlling register.

2.2.4 Text

The table below describes the functions of the 8 components on the top of the window editing box:

Component	Function
A	Input text, including Chinese characters and English letters.
AA	Dynamic text list. The content of the text can be changed under the control of PLC register.
999	Register components.User can dispose some data setting/monitoring components with it.(The related address are PLC registers)
◉	LED indicator.Indicate on/off status of inner delays in PLC.

▣	Function key. The 8 keys at the lower part of TP300 and the other 12 keys for number input can be defined to be function keys. They can execute the functions such as window jumping and switch control.
⊞	Bar graph. Monitor the data change in PLC in the form of bar graphs.
⊠	Trend line. Monitor the data change in PLC in the form of trend lines.
⊞	Paste pictures. Paste a monochrome BMP picture (Max. 192×64 pixels) onto the window.

The example below shows how to design a main menu window as the window no.1.

Firstly, lay the text "Main Menu". Press A and click the left button on the editing region to affirm the operation (right click will cancel it). After left click, the default text "text" will be displayed in the editing region. The properties of the text are displayed below the editing region. The text string will move as the user moves the cursor. The distance across is a multiple of 4 points. To locate the text in an arbitrary position, edit the X and Y coordinates.
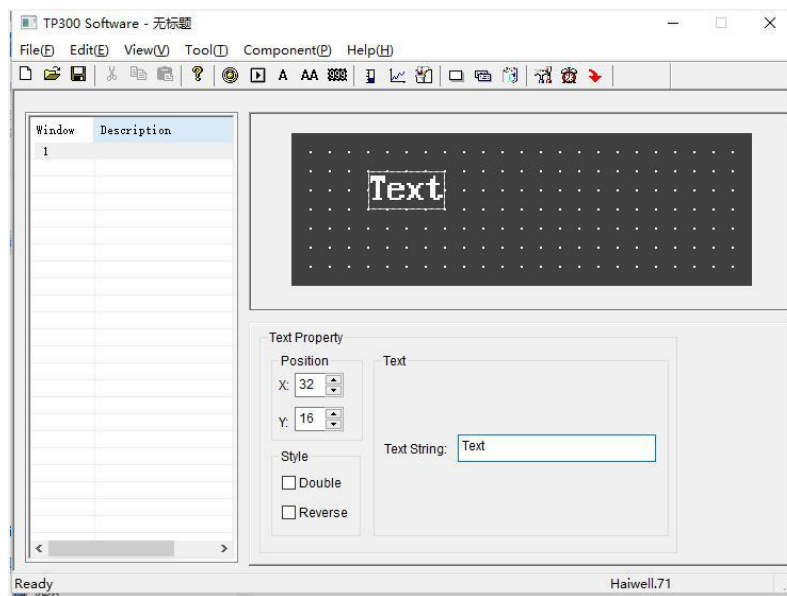
Position

X value represents the horizontal position of the text string.

Y value represents the vertical position of the text string.

The origin of the position is the up-left corner of the window.

Style

Double: The text will be displayed in double size, both horizontally and vertically.

Reverse: The text and the background will be displayed in reversed color.

Text Strings

The content that will be actually displayed is input here.The user can input English letters or Chinese characters with various kinds of Chinese input methods in this text box.The content in it can be copied or pasted.

Example: Display the text "Main Menu" in reverse color. Input "Main Menu" in the text string box and select the "Reverse" checkbox.
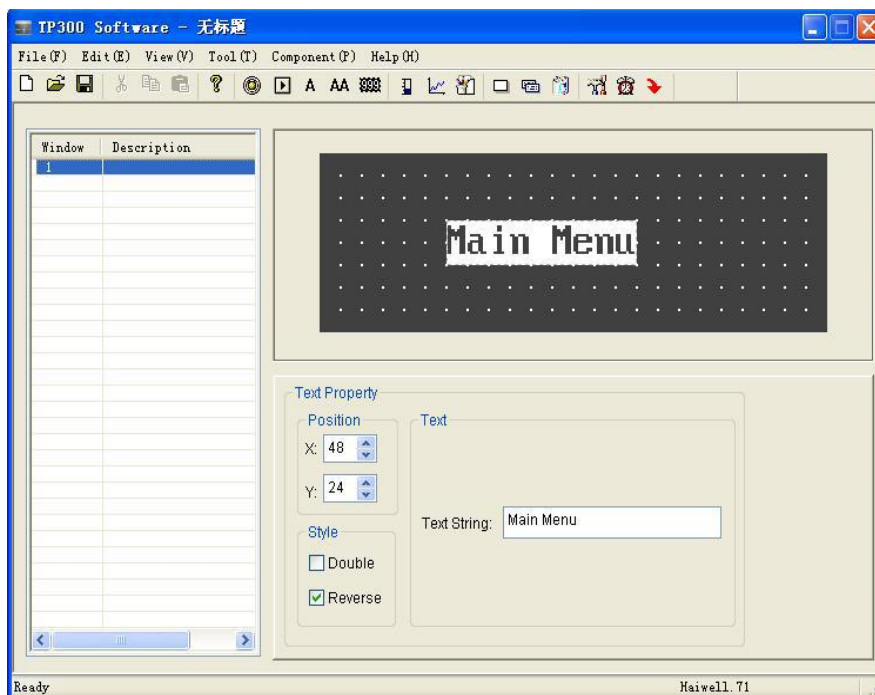
2.2.5 Dynamic Text

Press [AA] and click the left button on the editing region to affirm the operation (right click will cancel it). After left click, the default text "Dynamic Text" will be displayed on the editing region. The properties of the dynamic text are displayed below the editing region. The text string will move as the user moves the cursor. The distance across each time is a multiple of 4 points. To locate the dynamic text in an arbitrary position, edit the X and Y coordinates.
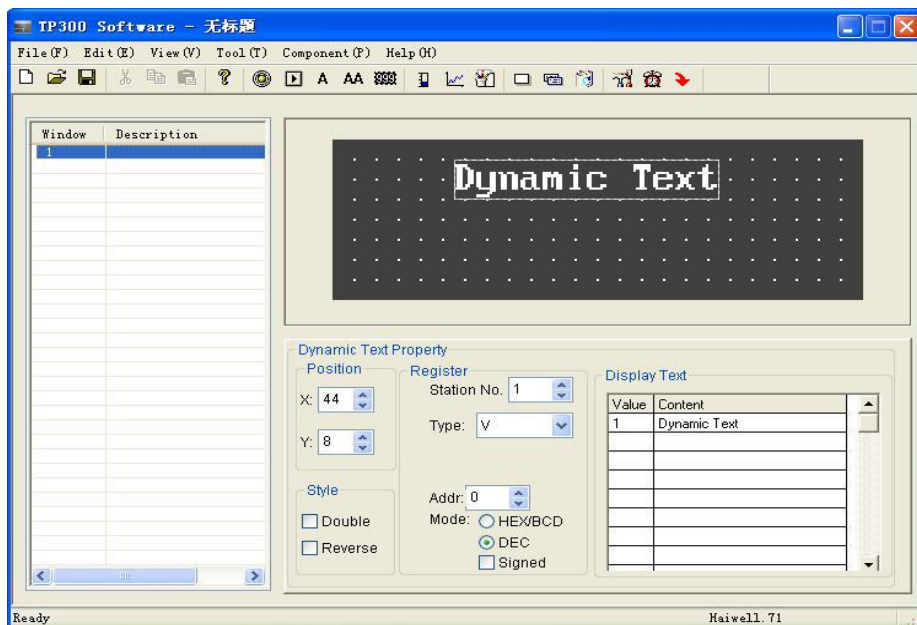
Position

X value represents the horizontal position of the text string.

Y value represents the vertical position of the text string.

The origin of the position is the up-left corner of the window.

Style

Double: The text will be displayed in double size, both horizontally and vertically.

Reverse: The text and the background will be displayed in reversed color.

Register

The PLC data register for controlling the status change of the dynamic text.

Mode

Determine the data form of the data register. The form will affect the display form of the numeric items in the dynamic text.

Display Text

Log the different text content corresponding to different values of the data register. It can keep the texts corresponding to as many as 32 different statuses.

Example: Display the dynamic text controlled by register V10. The dynamic text to be displayed has three statuses: "In gear", "Temp. Lower" and "Position arrived". The three texts correspond to the V10 register value 2a, 30e and d43f (HEX form) respectively. Input "2a" in the "Value" space of the first row and"In gear" in the "Content" space on the right. Input the other two statuses in the same way. If the value of register V10 is 2a, the dynamic text be displayed is "In gear". If it is 30e, "Temp Lower" will be displayed.

Other conditions can be inferred from the two examples above.The example is shown in the figure below:
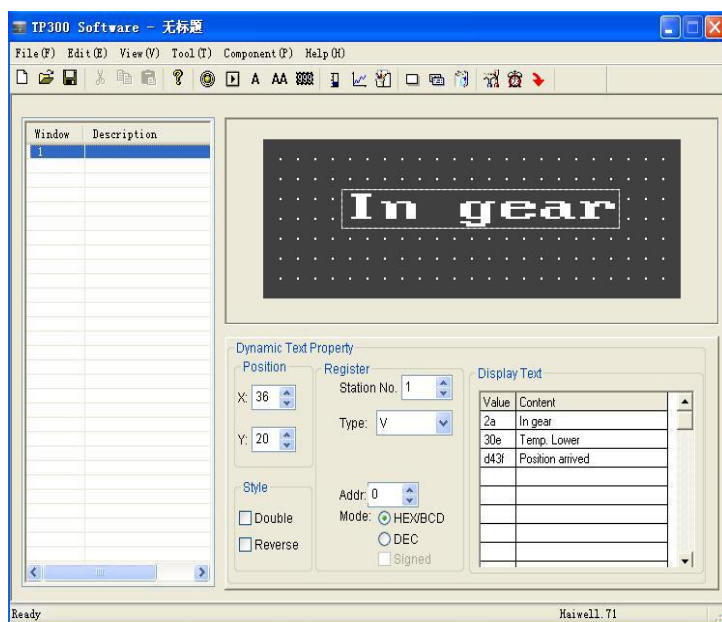
2.2.6 Function Keys (for window jumping)

Next, configure the function keys in the main menu window to execute the function of window jumping (for example, press [<] to jump to the parameter setting window; press [>] to jump to the mode setting window). The procedure of defining the function keys is:

Press ▣ to activate a dotted rectangular box. The box moves as the cursor moves. Click the left button to determine the position of the function key. A hand shape and the function key to be defined(default key is [>]) are displayed in the editing region. The properties of the function key are displayed below the editing region. The meanings of position and style are the same as those in the text property.They indicate the position, the size and the color of the graph.
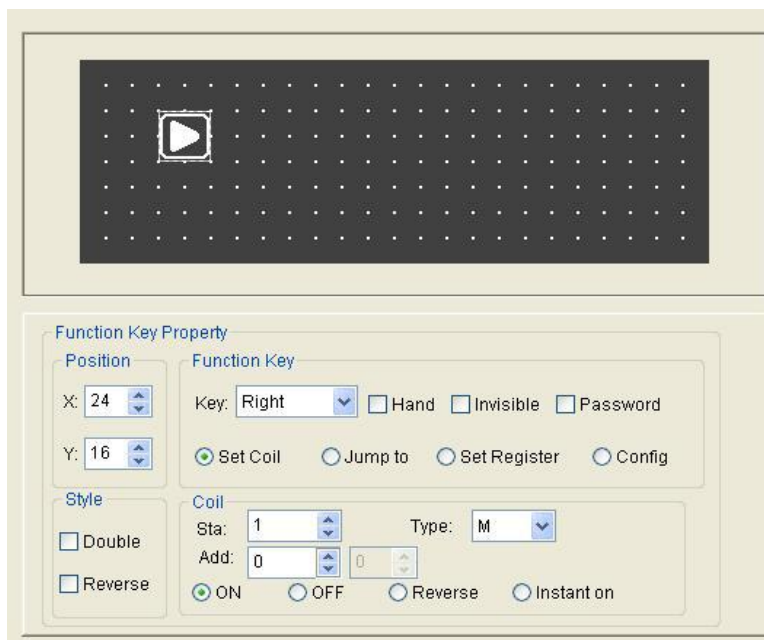
The function key setting window is shown in the figure below:

Key

Select a proper key from the 20 keys.

Hand

For the convenience of use, add a hand shape symbol before the key symbol. The hand indicates that pressing the key will carry out an operation. The user can remove the handshape to save the space.

Invisible

The user can make the symbols of some keys invisible in the window. But the functions of those keys are still valid.

Password

Only when the system password is entered correctly, the function key can execute its function.

Set Coil

The function key is defined to set a switch.

Jump to

The key is defined to execute the window jumping function.

Set Register

The key is defined to set the register parameters.

Station No.

The station number of PLC.

Type

When the key is defined to set a switch, the definition number of the PLC relay corresponding to the switch is determined by the type here.

Addr

Set the address of the relay.
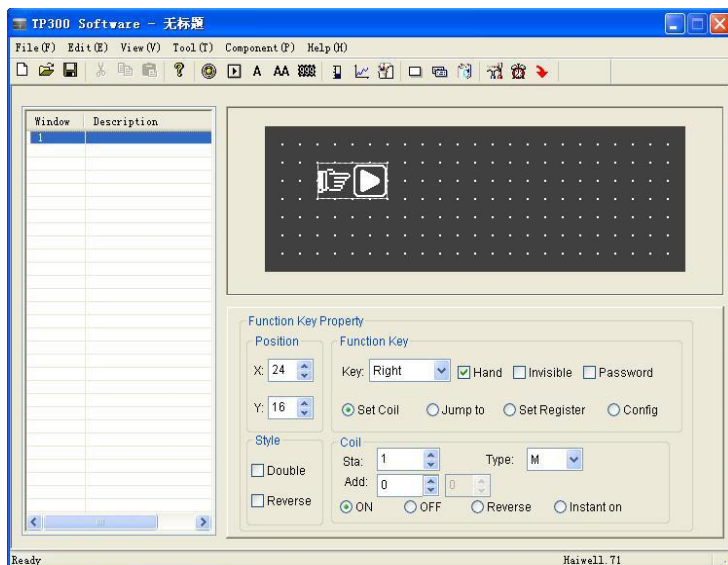
ON

Set the designated relay on.

OFF

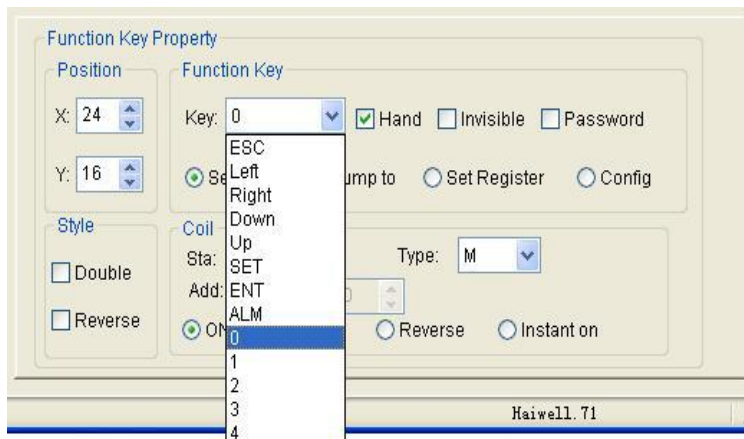Set the designated relay off.

Reverse

Set the designated relay to be of negative logic.

Instant on

The designated relay will be set on when the key is pressed down. When the key is released,the relay will be set off.


Click the down arrow on the right of the list to show the names of the 20 keys. Select the proper key to be defined.

To make the window simple, the hand shape can be removed by not selecting the checkbox "Hand". So only the keys are shown on the screen. Select the option button "Jump to"to define the key as a window jumping function key. Designate the target window number below the key. If the number is 10, it means window no.10 is the parameter setting window.

To hide the parameter setting window, select the checkbox "Password" to enable the password property. Thus the system will jump to window no.10 only when the system password is entered correctly.

After setting the function key, put the text"set parameter" beside the key symbol to inform the operator that it will jump to the window for parameter setting when [>] is pressed.
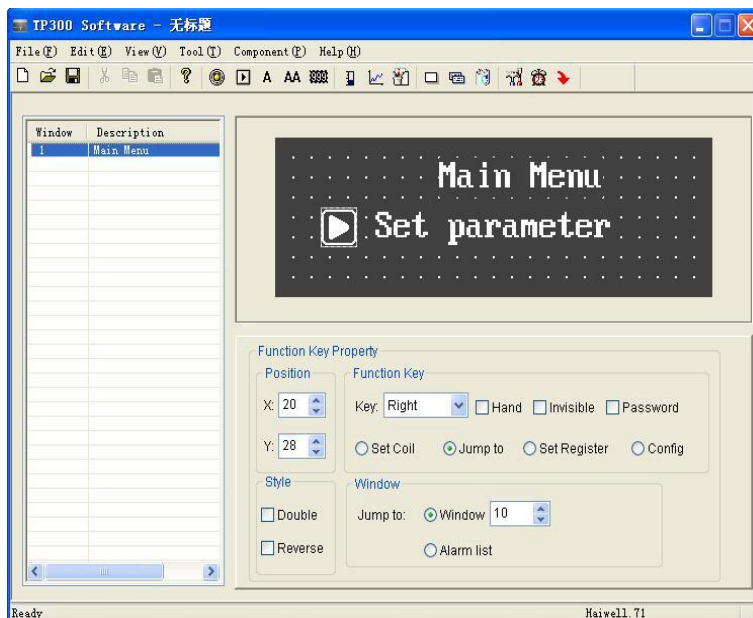
Put the symbol of [<] and the text "Set status" in the editing region to indicate that it will jump to the window for status setting when [<] is pressed.

The user can set window no.20 to be the parameter-setting window.

Note: To leave some margin for inserting new windows, the number of different kinds of windows should be non-continuous. For example, if it is necessary to insert another parameter-setting window,it can be set to window no.11, just after the original parameter-setting window.
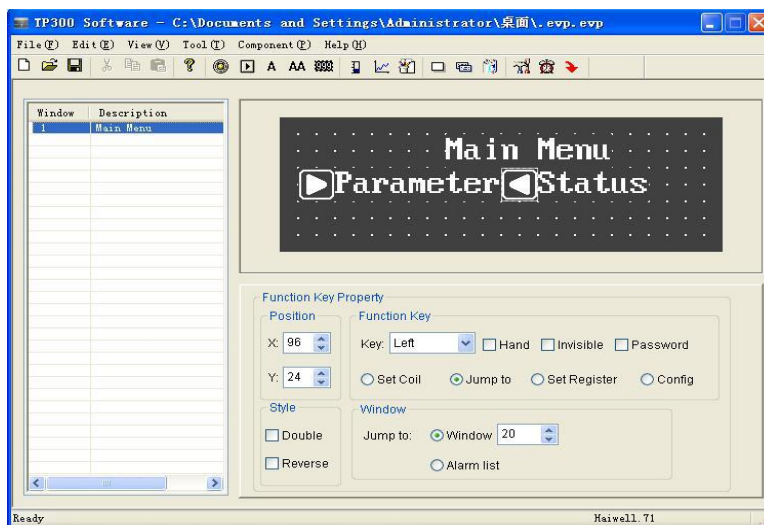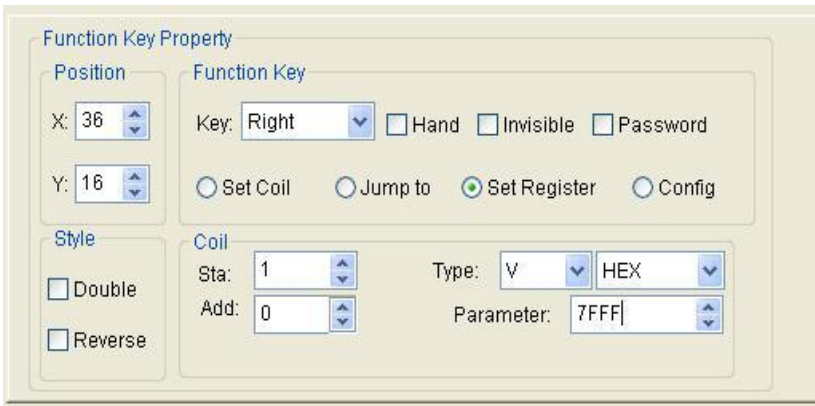
Add a key for jumping to the alarm window on the main menu. So it will jump to the alarm list window when that key is pressed.
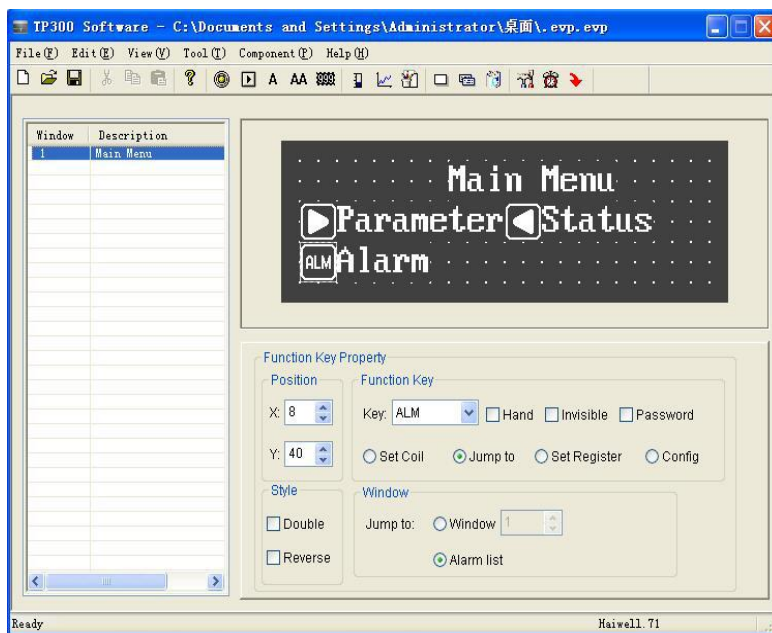
For logging alarm information,see 2.2.13.

Setting register parameter with a single function key:

To write a parameter (constant) to a designated register, select a function key from the key list and select the option button "Set parameter". The constant parameter will be written to the designated register when that key is pressed during running. Setting as the following figure will write the hexadecimal number 7FFF to the V register at address 0 of PLC.

2.2.7 Data display
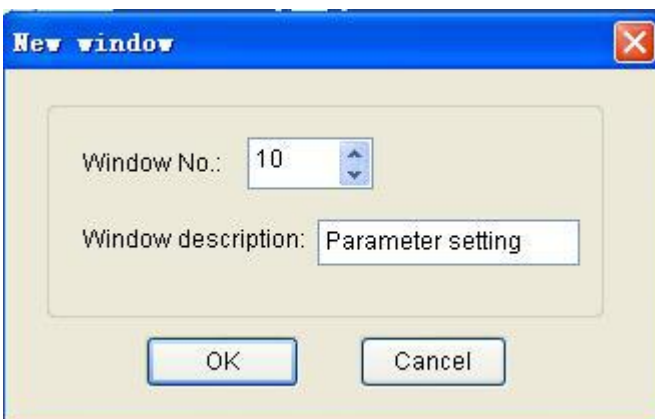
This section will introduce how to make a Set parameter window. The methods of setting the components such as parameter display, parameter setting and password setting are discussed in detail.

Example: The window no.10 sets and monitors three couples of parameters, which are corresponding to the output of group A, B and C respectively. The current values are in the left column,while the target values in the right one. The current values can be used to monitor the data only, while the target values can be used for both monitoring and changing the data. The relation between the parameters and the PLC data registers are given in the table below:

	Addr. of the current values	Addr. of the target values
Output of Grp.A	V100	V110
Output of Grp.B	V101	V111
Output of Grp.C	V102	V112

The procedure of making the window:
Click [New] to pop up a dialog box for setting the window number and the window description.

· **Window No.**
The serial number of the new window.number

·   **Window Description**

Describe the character of the new window.

Set the window number to be "10" and input the window description "Set parameter".

Click [Ok]. The window properties are displayed at the right and bottom edge of the interface. Set the destination window number of [▲] to be 1 and that of [▼] to be 20. So when it is not in the data setting mode, it will jump to Main Menu if [▲] is pressed and to Set parameter if [▼] is pressed.
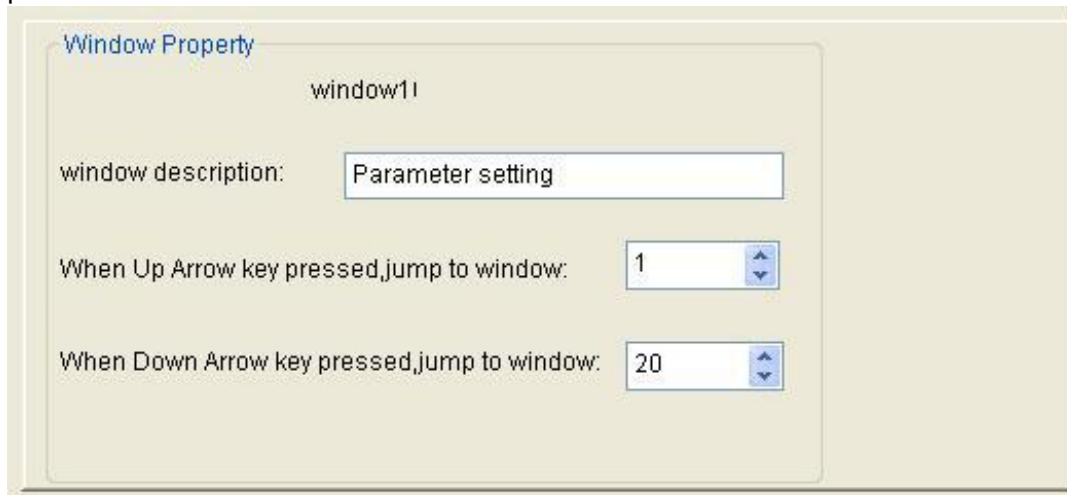
Put the text "Current", "Target",   "A Output=", "B Output=" and "C Output=" in proper positions in the editing region.
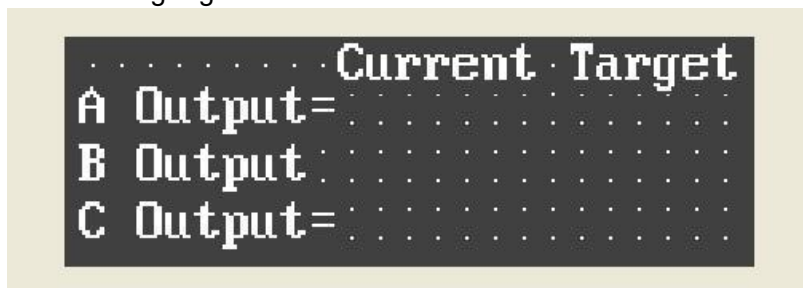
Put the data display boxes. Press to show a rectangular dotted box moving with the cursor.

Click the left button in the proper position.
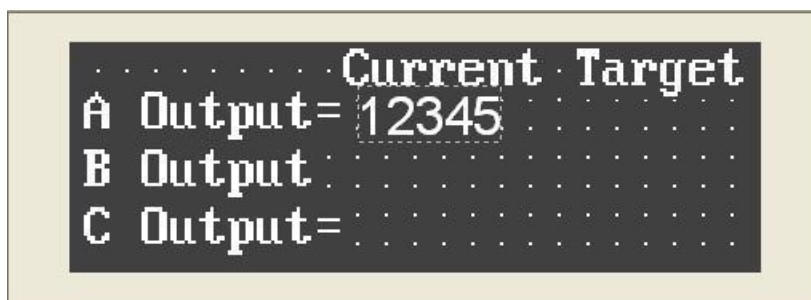
The number "12345" in the dotted box indicates that this component is a five-digit register displaying/setting box. The properties in the dialog box are:

· **Station**

The definition number of the PLC register corresponding to the display component.

· **Registers**

Continuously display or set the number of registers, the minimum is 1, the maximum is 2.

· **Password**

If selected, the data can be changed only when the correct system password is entered. The command for setting the password is in the menu "Tools (T)".

· **Digits**

  The maximum number of digits of the data being displayed or set

· **Decimal**

  The length of the significant digits behind the decimal point

· **Dec.**

The data in the register will be displayed in decimal form. (Recommended for Mitsubishi and OMRON PLC)

· **Signed**

Only valid when the "Dec." mode is selected. If the highest digit of the register is 1, the data will be displayed as a negative number. For example, the hexadecimal number FFFEH represents －2.

· **HEX/BCD**

The data is displayed in hexadecimal form. (Recommended for KOYO(S) PLC)

· **Set**

The component can be used for setting data if it is selected. So the component can be used for both monitoring and setting the data. The register set box has some special properties: maximum, minimum and password.

In this example, the settings are listed below:

Register type=V; Addr=100; Register=1; Digits=4; Decimal=0; Mode=Dec.; the negative number will not be displayed.

Set the display boxes of the current output of group B and C in the same way. The register addresses are V101 and V102. The other properties are the same as those of group A.

2.2.8 Data settings

Continue the configuration of the parameter-setting window. Press [999] to show a dotted box moving with the cursor. Move the cursor until the proper position is reached, then click the left button to confirm the position. Select the"Set"checkbox.So the component has the function of monitoring and setting data.
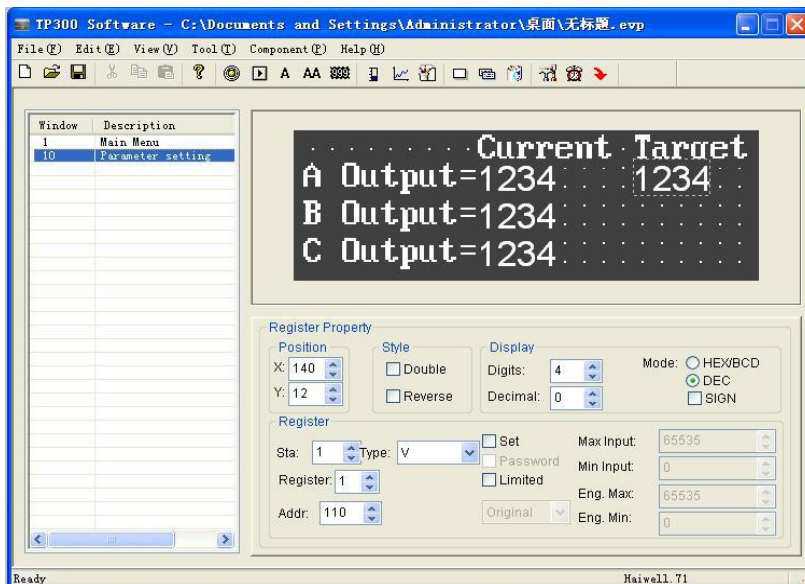
If the "Set" checkbox is selected, two additional options, "Password" and "Limited", are enabled.

· **Password：**

In order to improve the safety and reliability of device, all parameters settings operation can be protected by password.

The password is set and modified as follows：

Activate the"Tools"-> "TP300 config"command , pop-up password settings dialog box:
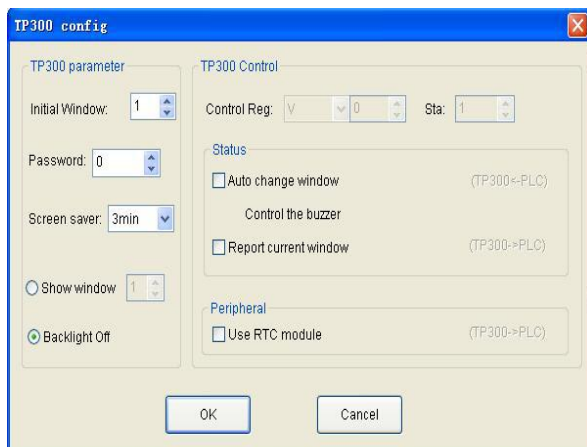
Enter a new password or change the original password,for example, input "5678" and click "OK". When the operator press the key [ENT], the TP300 will pop up a password enter window.The data can be changed only when the operator enter the correct password. All the windows of one

project share a common password.

· **Limited**

The designer can set limits to the data to make the data out of limits invalid. Thus the possible damage done by inputting data too great or tiny is avoided. For example, let the maximum input be 9000 and the minimum be 0. The setting value will be written into the register only when it is between 0 and 9000, or the system will halt until a correct value is entered.

· **Original and Project data:**

After selecting the "Limited" checkbox, the designer can select the original data or the project data from the list.

· **Original data**

The original data option means that the data in the register will be displayed without any operation.The position of the decimal point is determined by the value of the "Decimal" property. For example, if "Decimal" =2 and the register value is 14561, it will be displayed as 145.61.

· **Project data**

This option means that the data read from the register will be converted to project data before being displayed. The conversion is done following the formula below:

The Converted Data= Eng. Min + (original register data – Min Input) * (Eng. Max – Eng. Min) /(Max Input – Min Input)

For instance,the data stored in the register is the binary output of a 12-digit A/D, while the data being actually displayed is a voltage between –10000mV and 10000 mV.Do the setting like this:

Max Input: 4095 Min Input: 0

　　　　Eng. Max: 10000　　　Eng. Min: -10000

In this way, the result of A/D conversion in the register is displayed as the voltage value.

Note: Because of the limited accuracy of floating point operation, there may be some errors in the conversion result.

· **Engineering Limits**

The maximum and minimum of the project data

Set the display boxes of the target value of group B and C in the same way. The register addresses are V111 and V112. The other properties are the same as those of group A.Done as shown below:
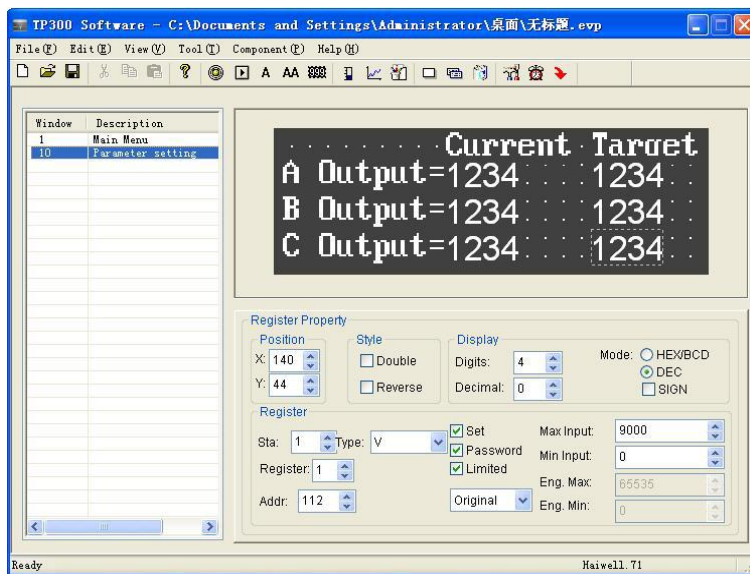
2.2.9 LED

The procedure for making the Set status window and the method of setting LED and function keys are introduced in detail in this section.

Example: the window no.20 is the window for setting the working mode of the machine: manual or automatic.In manual mode, the direction of the movement of the machine (forward or backward) is controlled by pressing the keys on the front panel. The LED indicates the direction of rolling. The relation between the relay statuses and the actions is listed in the following table:

Relay status	Action
M10=1	Manual mode
M10=0	Automatic mode
M20=1	Move forward
M21=1	Move backward
M20=0 M21=0	Stop

The procedure of window is given below:
Press [New window] to pop up the dialog box of window number and window description. Set the window number to be 20 and input the window description Set status.

Click [OK] to confirm. The window properties are displayed in the bottom right corner of interface. Set the destination window number of [▲] to be 0 and that of [▼] to be 10. So when it is running, it will jump to Main Menu if [▲] is pressed and to Set status if [▼] is pressed.
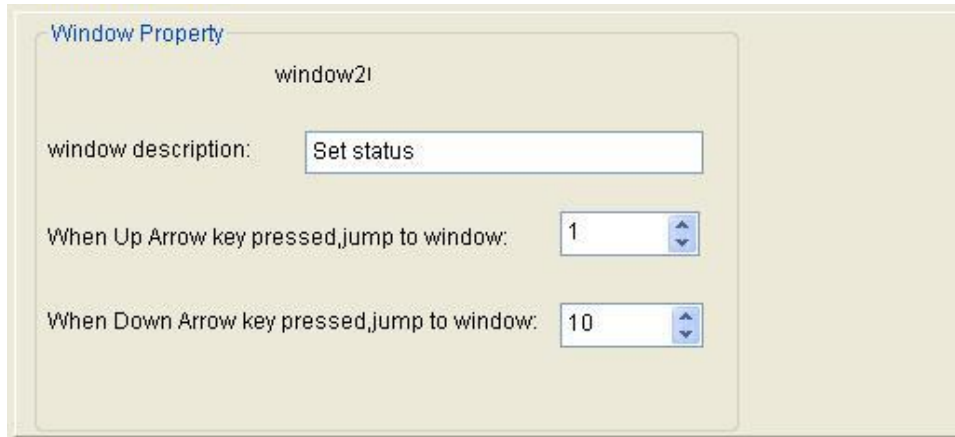
Press ⬤ to put a LED. There is a dotted box moving with the cursor in the editing region. Click the left button in the proper position to locate the LED.
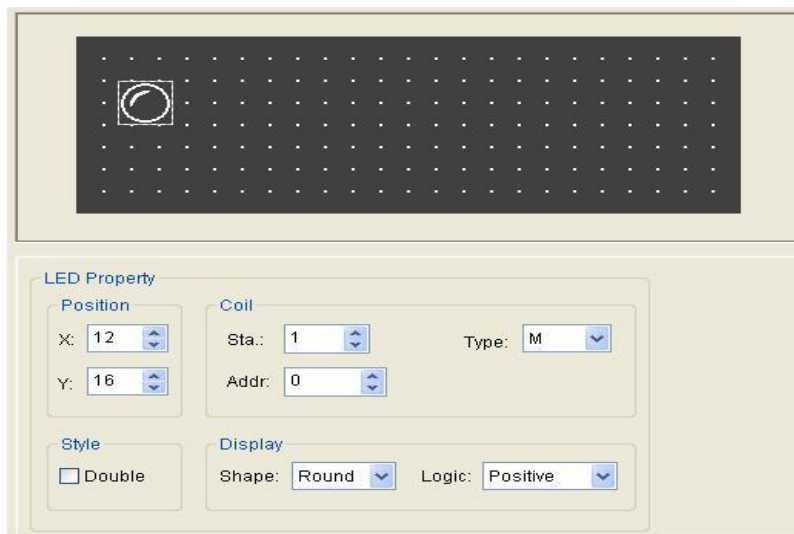
· **Coil Station No.**
The definition of the PLC intermediate relay that is corresponding to the LED.For example: Address 0 Type M indicate M0 of PLC.
· **Shape**
The shape of the LED, round and square.
· **Positive Logic**
The LED is filled when the corresponding intermediate relay is ON.   Unfilled when the corresponding intermediate relay is OFF.
· **Negative Logic**
The LED is unfilled when the corresponding relay is ON. Filled when is OFF.
Set the coil station No.to be M10; select square shape; select positive logic. There is an unfilled

square LED in the editing region.
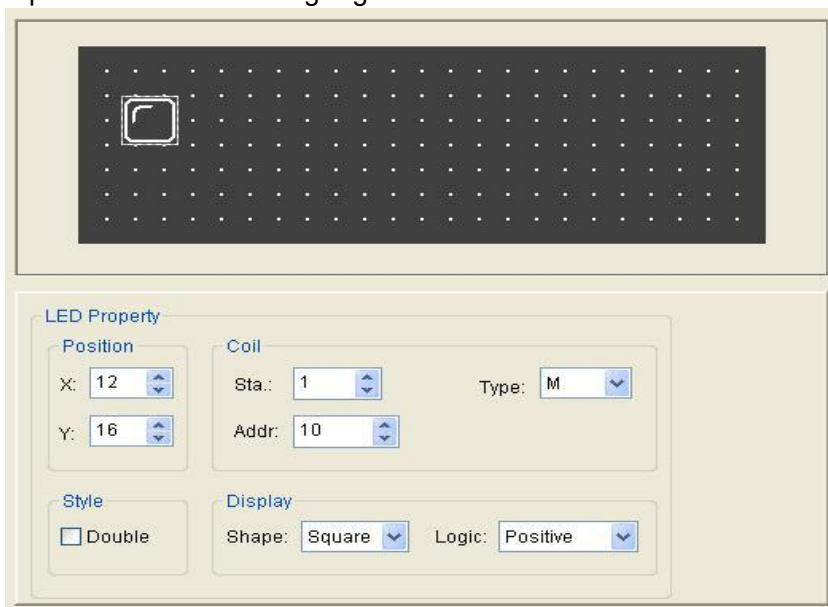
Press [▶] to put the function key. There is a dotted box that moves with the cursor in the editing region. Move the cursor and click the left button in the proper position to locate the key.
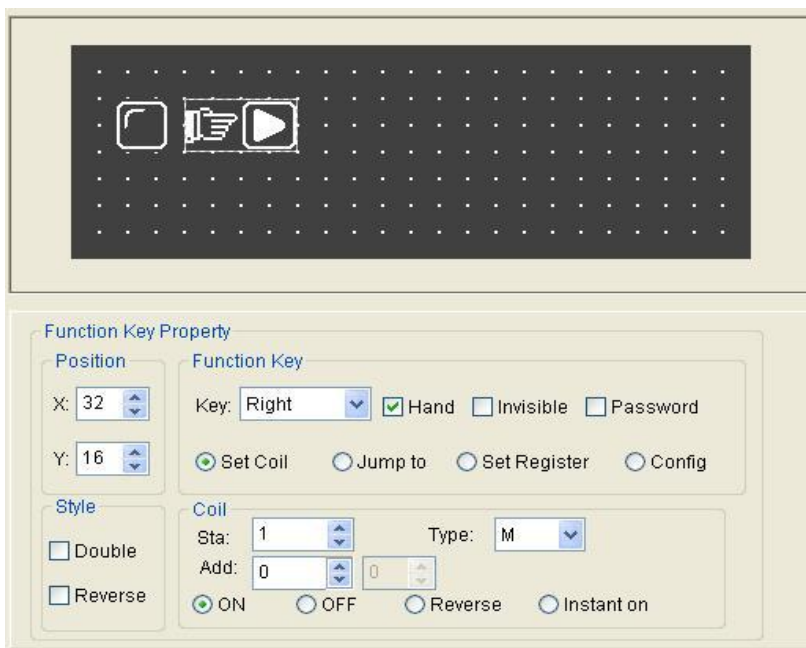
Select [SET] to be the key for setting the Auto Mode. Set the type and station No.to be M10; select"ON" as the type of key action; remove the hand shape to make the window simple.

Put the text "Auto" to the right of the key to indicate that the function for this key is to select the auto mode.

Set the Manual key and the Manual mode LED in the same way. The corresponding address of the LED is still M10; select negative logic in the display column. The designated key is [ENT], whose function is to set the relay M10 OFF.

Add two round LEDs of positive logic to monitor the moving status of the machine. The addresses of the two LEDs are M20 and M21. The left one is on when the machine is moving forward, while the right one is on when it is moving backward.

2.2.10 Function Keys (for controlling the status switches)

Press ▶ to put the function key. Select [◄], whose corresponding address is M20. the function of the key [◄] is to set the relay M20 ON instantly. Retain the hand shape on the window. When [◄] is pressed, the M20 relay of the PLC will be set ON, and the machine begins to move forward (program

the PLC to designate M20 relay as the trigger of Y0); when [◄] is released, the M20 relay of PLC will return to OFF, and the machine stop the forward movement.
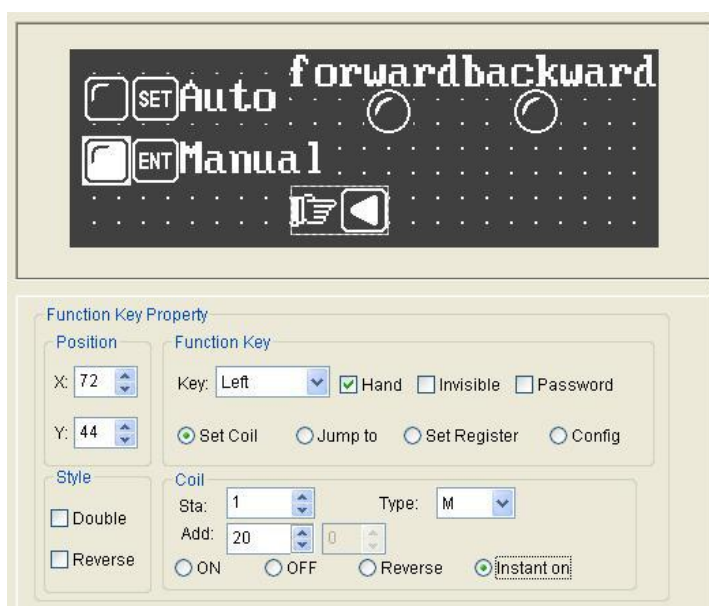
Press ⬛ Select [►], whose corresponding address is M21.The function of[►] is to set the relay M21 OFF instantly. Retain the hand shape on the screen. When [►] is pressed, the relay M21 of PLC is set ON, and the machine will begin to move backward (program PLC to designate the relay M21 as the trigger of Y1); when [►] is released, the relay M21 returns to OFF, and the machine will stop its backward movement.
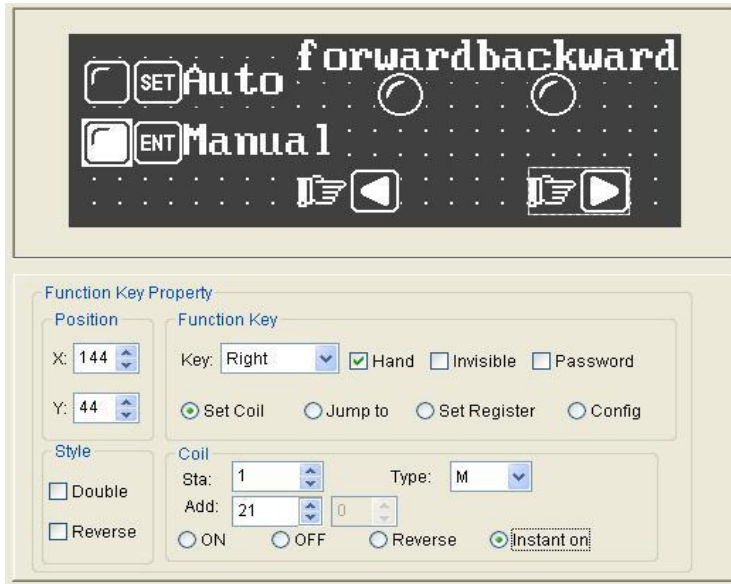
2.2.11 Bar Graph

The bar graph can give a direct view of some analog parameters such as flow rate, pressure and level. The user can set the height, width and the direction of it arbitrarily.

Press ⬛ to show a dotted box that moves with the cursor. Move the cursor to the proper position and click the left button to locate the bar graph there.
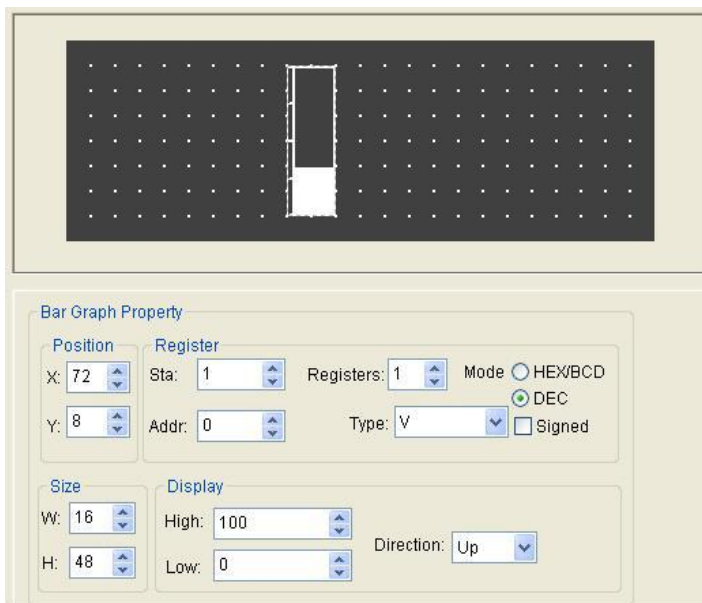
- · **Register Address**   The address of the register corresponding to the bar graph
- · **High**   The register value corresponding to the full bar graph
- · **Low**   The register value corresponding to the empty bar graph
- · **Direction**   The direction of the bar graph, including four options: up, down, left and right.
- · **Size**   The height and width of the bar graph
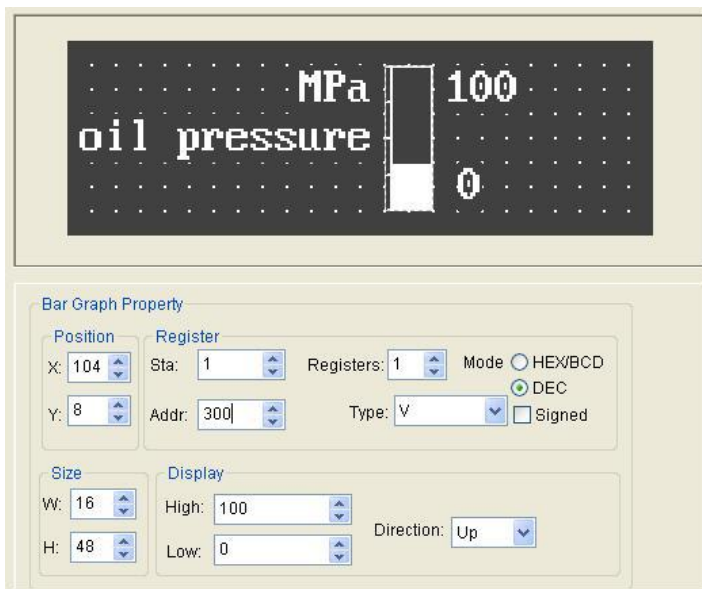
This bar graph can be used to monitor the data in register V300.The bar graph is full when the value of V300 is 100.When the bar is filled 50%, the value of V300 is 50.

2.2.12 Trend Line

Some parameters in industrial control applications vary at a slow rate. Often, the operators want to know the variations of these parameters in a certain of time. Trend line should be the best choice.

Press ![icon] to show a dotted box that moves with the cursor. Move the cursor to the proper position and click the left button to locate the trend line there.
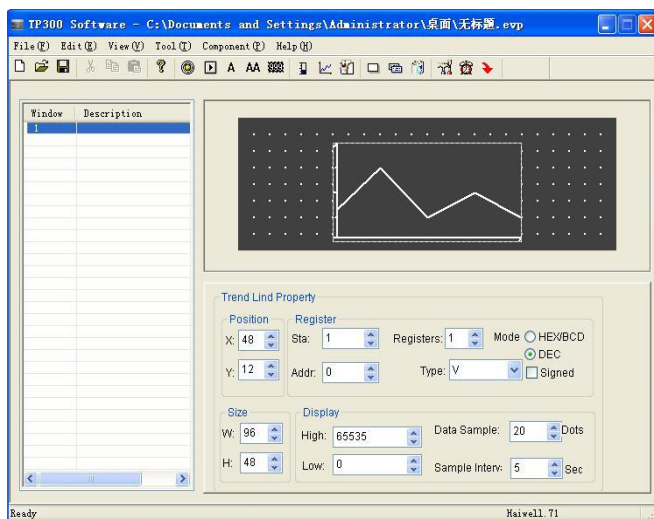
·   **Register Address**

The address of the register corresponding to the trend line

·   **High**

The register value when the trend line reaches the 100% of the scale

·   **Low**

The register value when the trend line reaches the 0% of the scale

·   **Data Sample (number of dots)**

The total of the sample points in the whole trend line. The more sample   dots does the trend line has, the more detail it can provide. Certainly more sample dots make the time period longer.

·   **Sample Interval**

The interval between two sample points

·   **Size**

The length and width of the trend line
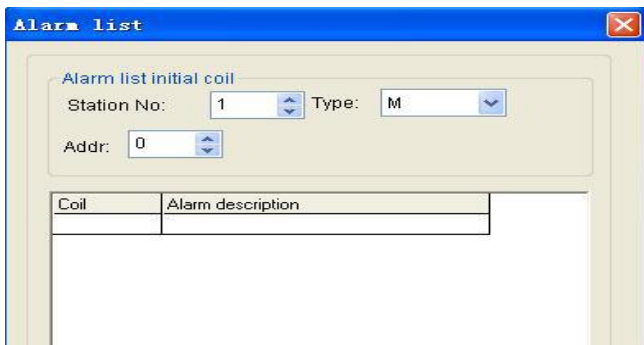
Note: A trend line component can display only one line.

2.2.13 Alarm List

In industrial auto-control applications, alarming is a very important function. It can be used in many cases. Alarm list is the most direct and simple method.

Every project of TP300 can have a cluster of alarm list information. Every piece of information corresponds to a relay. The addresses of all the relays are continuous. The user can designate the initial address of the relays. When any of the relays jumps from OFF to ON, the corresponding alarm information is activated. TP300 will pop up the alarm window, where the alarm information is displayed in the first row. If another relay jumps to ON, the new information will be displayed in the second row. When some alarm relay jumps to OFF, the corresponding alarm information will disappear automatically.

To log the alarm information, press 🔔 to pop up the alarm list dialog box:

The list is blank for no information has been logged. Move the cursor to the "Alarm description" column and enter the information "Temp. over high". Press "Enter" to show the screen as the following figure:

Input other information in the same way.

After entering all the information, set the coil type and address to M100 (for example) to indicate that the relays M100-M106 correspond to seven pieces of alarm information.

When TP300 is in gear, if M101, M102, M105 are set ON, it will pop up an alarm window and display as the figure below shows:
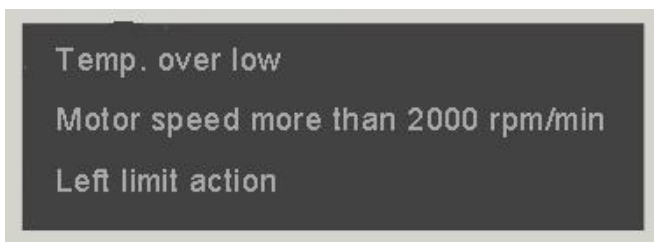
Seeing this alarm window, the operator can take some measures to solute the breakdowns.To return to the monitoring window, press [ESC].

2.3 Save Project

After the window editing is finished, the project files can be saved and downloaded to TP300 for shakedown test.

Press to show the save dialog box:

Select the proper path and filename to save the file. The system defines "evp" as the default external filename.
Enter the filename and select the proper path, then click "Save".

2.4 Download Window

Connect 9-pin RS232 serial port of PC with 9-pin serial port of TP300 by window downloading cable. Make sure that TP300 is connected with a 24V DC power supply.Press to begin the download process. A dialog box will be displayed to indicate the progress of downloading:
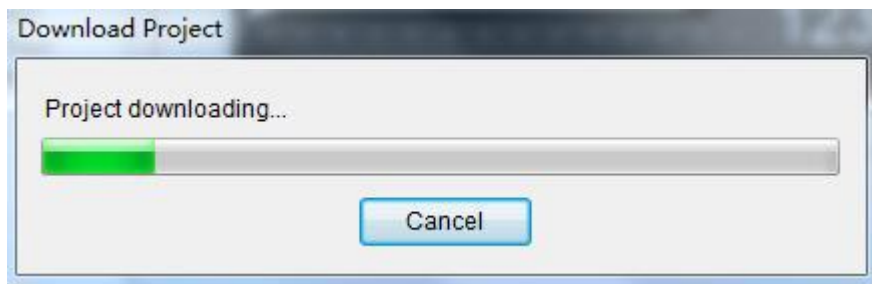
After all the transmission has been done, a dialog box will pop up to indicate that all the project windows have been downloaded to TP300.

Cut off the power of TP300 and remove the window downloading cable.Connect TP300 and PLC with the PLC communication cable.

Turn on the TP300 and PLC. If the communication is successfully established,the system can be used for data monitoring and other functions. If there are some communication failures due to the incorrect communication parameters or some errors in cable connection, the TP300 will show the text "communicating" at the bottom of the right edge,to indicate that TP300 is trying to establish the connection with PLC.

If the TP300 can't communicate with PLC, please check the items in the list below:
■ Is the PLC type selected in the project the same as that of the PLC being actually connected to?
■ Are the addresses of the PLC register or coil visited in the project out of range?
■ Is the station number of PLC correct?
■ Are they connected with a communication cable?
■ Is the connection of the cable correctly done?
■ Are the PLC communication parameters configured correctly?
■ Are the power supplies for PLC and the TP300 OK? Are they power on?
■ Contact the seller if the problem can't be solved.

Chapter 3. Manipulation

3.1 Communication

When the window downloading has finished, cut off the power supply and remove the downloading cable TP300-PC. Connect TP300 and PLC with a communication cable and check the setting of the PLC communication parameters. Turn on the power supply (24V DC for TP300), the TP300 then start to work.

Note: TP300 can work whether the PLC is running or being programmed.

3.2 Shifting the Windows

Take the project windows edited in chapter 2 as an example to introduce the manipulation of TP300. TP300 displays window No.1 at first. (Because the initial window is window No.1.)

Window No.1 is a main menu window. Pressing the function keys can jump to sub-windows. Press [◄] to jump to parameter-setting window (window No. 10).
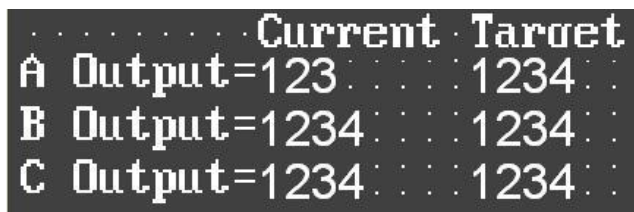
The data in the left column are the outputs of the three groups, corresponding to PLC addresses V100, V101 and V102 respectively.

3.3 Password

Password must be entered before changing the data. Press [ENT] to show the window below:

Select 1 with the [▲],[▼] and [ENT] keys to log in; select 2 to log out; press [ESC] to return to the monitoring mode.

Select 1, the window will be like the figure below:

Input the password with the number keys, the number input will be displayed as"*".Press [ENT] when the password has been input.

If the password is correct, it will show the window below:
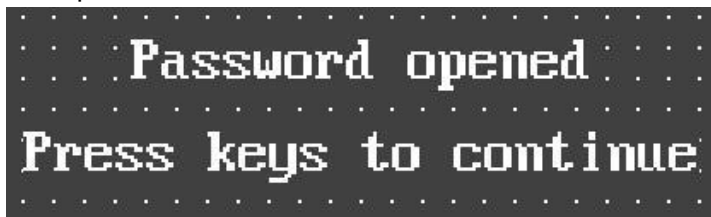
If the password is incorrect, it will show the window below:
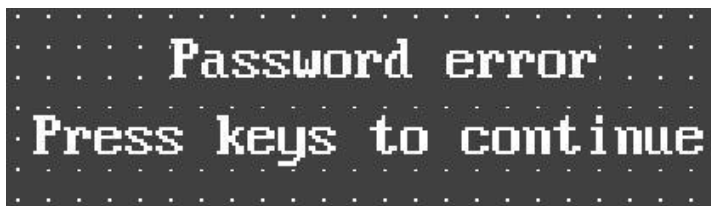
Select 2 to log out, it will show the window below:
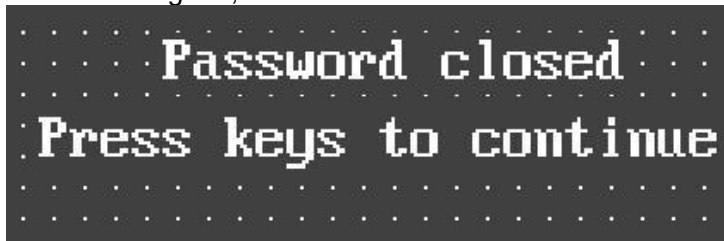
3.4 Changing the data

Log in and press [SET], the target output of group A is flickering. So the data that will be changed first is the target output of group A. Press [CLR] to clear current value and input the new value with the number keys. If it is necessary to input a signed number, press [+/-] to change the sign. To input the hexadecimal number A-F, press [◄] and [►] to change the digit being edited. Press [▲] and [▼] to change the value of that digit. The value will vary in the sequence 9-A-F-0.

Press [ENT] to confirm the entered data. The data been changed is written into the PLC register V110. The target output of group A will stop flickering, while that of group B starts to flicker. That means the setting for group A has been done and the setting for group B begins.

To quit or skip the setting for group A, continue to press [SET]. The output of group A will remain the original value and stop flickering, and the output of group B starts to flicker to indicate that the data being changed is B output.

When the C output has been set, all data will be normally displayed, none of them flickering. To enter the setting mode again, press [SET].

3.5 Controlling the Switches

After changing the parameters, press [ESC] to return to the initial window (window No. 1) as the figure below shows:

Press [▶] to jump to the status-setting window.

The device is in manual mode at this time. Press [SET] to change to auto mode. The relay M10 of PLC is set ON.

Press [◀] and hold, the machine will continue moving forward; press [▶] and hold, the machine will move backward continuously.

Chapter 4. Connection with PLC

4.1 Haiwell Series

TP300 can communicate with all Haiwell series PLC. The communication is done through the programming port RS232 or RS485 of PLC.

Item	Content
TP300 COM port	9-pin COM port or RS485 COM port
PLC COM port	Programming port or external COM
Default parameters	19200bps, 8bits, 2stop, None
Station No.	Range: 1－254, default value: 1
Distance (Max.)	15 m(RS232)1000 m(RS485)
Comm. mode	RS232 or RS485
Cable type	TP300-Haiwell
Inner relay address	M0-M12287
Register parameter address	V0-V14487

Connection guidance of TP300-Haiwell-RS232 cable

```
2 RXD ──────────── 2 TXD
3 TXD ──────────── 1 RXD

5 GND ──────────── 3 GND

      TP300 side              PLC side
(9-pin D-shape female plug)  (4-pin S-terminal male plug)
```

```
4-pin S-terminal male plug

        2 ───────── 1
        4 ───────── 3
```
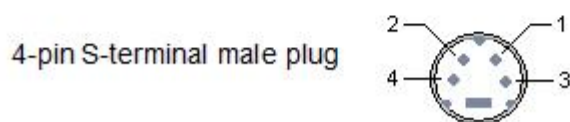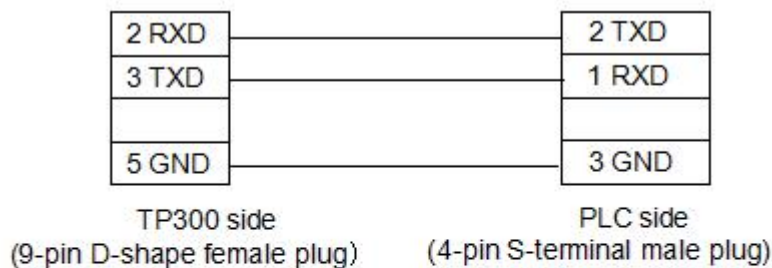
Connection guidance of TP300-Haiwell-RS485-DB9 cable

```
1 TD+

9 RD+ ──────────── A

6 TD- ──────────── B

8 RD-

      TP300 side
(9-pin D-shape female plug)      PC side
                                (RS-485)
```
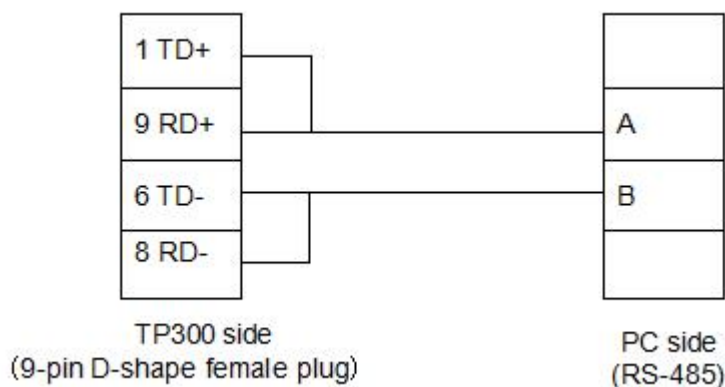
Connection guidance of TP300-Haiwell-RS485 cable
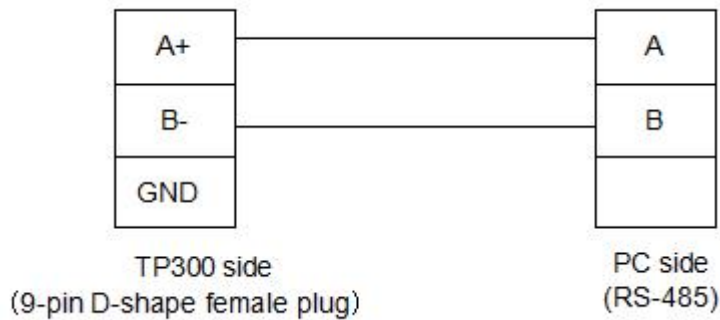
4.2 Mitsubishi FX Series

TP300 can communicate with all types of Mitsubishi FX series PLC. The communication is done through the programming port of PLC or the FX2N-422BD module of the FX2N series.

Item	Content		
TP300 COM port	9-pin COM port		
PLC COM port	Programming port or FX2N-422BD		
Default parameters	9600bps, 7bits, 1stop, Even		
Station No.	1		
Distance(max)	70 m		
Comm. mode	RS422 / programming port		
Cable type	TP300-FX2N(dedicated cable)		
PLC type	FX0S	FX0N	FX2N
Inner relay address	M000-M511	M000-M511	M000-M511
Register parameter address	D00-D31	D000-D255	D000-D511

Note: Must use special cable "TP300-FX2N" (also for FX0S, FX0N, FX1S and FX1N PLC Series)

Connection guidance of TP300-FX-CAB0 cable

Pin map of 8-pin round male plug
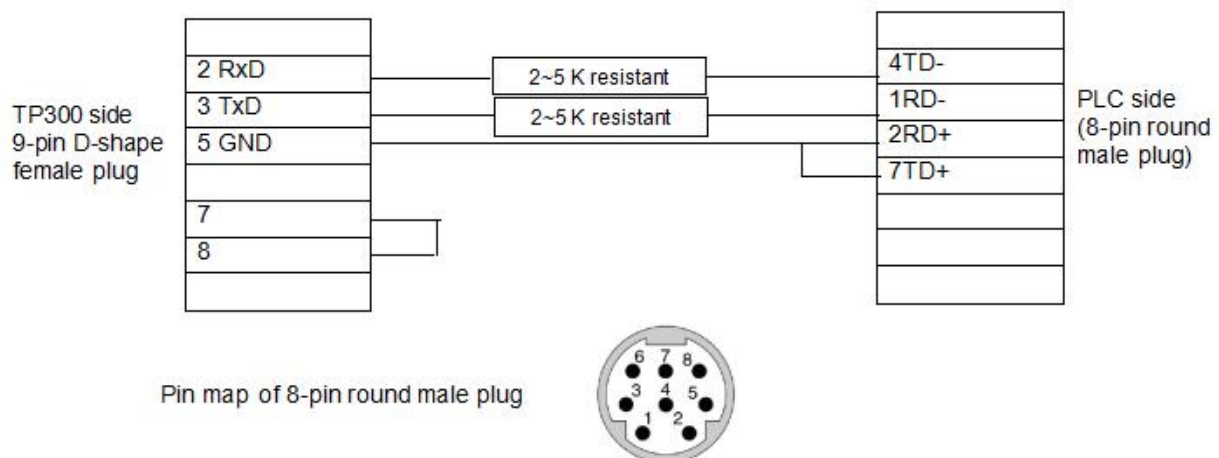
Note: Because the communication port of the Mitsubishi FX2N series PLC has been upgraded, the client has to use the TP300-FX2N cable provided by us or the SC09 programming cable provided by Mitsubishi to ensure the communication between TP300 and FX2N PLC successful.

4.3 SIEMENS S7-200 Series

TP300 can communicate with the programming port or external communication port of S7-200 PLC through the PPI protocol.

Item	Content
TP300 COM port	RS485 COM port
PLC COM port	Programming port or external COM port
Default parameters	9600bps, 8bits, 1stop, Even
Station No.	Range 2－126, default value 2
Distance (Max.)	100 M (twisted pair wire)
Comm. mode	RS485
Cable type	TP300-S7-200
Inner relay address	M000-M317
Register parameter address	VW000-VW4096

Connection guidance of TP300-S7-200 cable
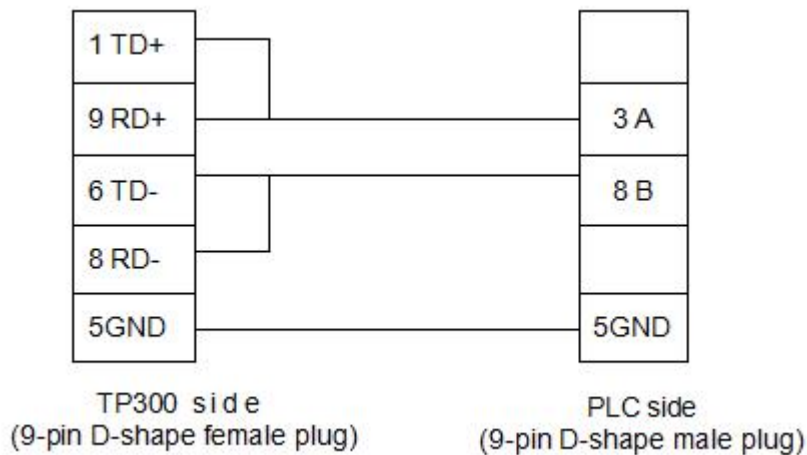
4.4 OMRON C Series

TP300 could communicate with Omron CPM/CQM PLCs through HOST-Link

Item	Content
TP300 COM port	9 pin communication terminal
PLC COM port	program port or extension COM port
Default parameters	9600bps, 7bits, 2stop, Even
Station No.	0-99，Default 0
communication distance	15 m (max)
Communication mode	RS232
Cable type	TP300-CQM
Inner relay address	IR20000-22715
Register parameter address	DM000-DM1024

Note: CPM1A and CQM1-CPU11 has only one COM port, so the signal of the programming port must be converted to RS232 signal with the connection cable or communication module provided by OMRON (CIF01-CAB) when connecting with the TP300.

Connection guidance of TP300-CQM cable

TP300 side
（9-pin D-shape female plug）

PLC side
（9-pin D-shape male plug）
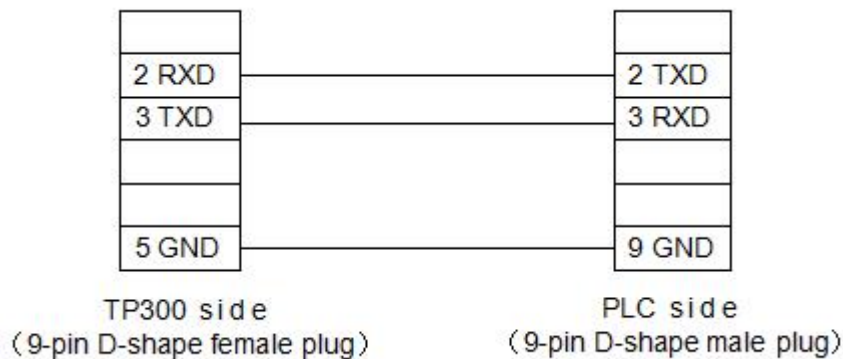
Note: THE CPU MUST WORK ON "MONITOR MODE"

4.5 Schneider NEZA/TWIDO Series

TP300 can communicate to the programming port of NEZA/TWIDO PLC through MODBUS RTU protocol.

Item	Content
TP300 COM port	RS485 port
PLC COM port	Programming port
Protocol	Modbus RTU
Default parameters	19200bps, 8bit, 1stop, NONE
Station No.	1-147,default:1
Distance (Max.)	100 m(twisted pair wire)
Comm. mode	RS485
Cable type	TP300-TWIDO
Inner relay address	%M000-%M127
Register parameter address	%MW000-%MW511

Connection guidance of TP300-TWIDO cable

TP300 side
(9-pin D-shape female plug)

PLC side
(8-pin round male plug)

Pin map of 8-pin round female socket
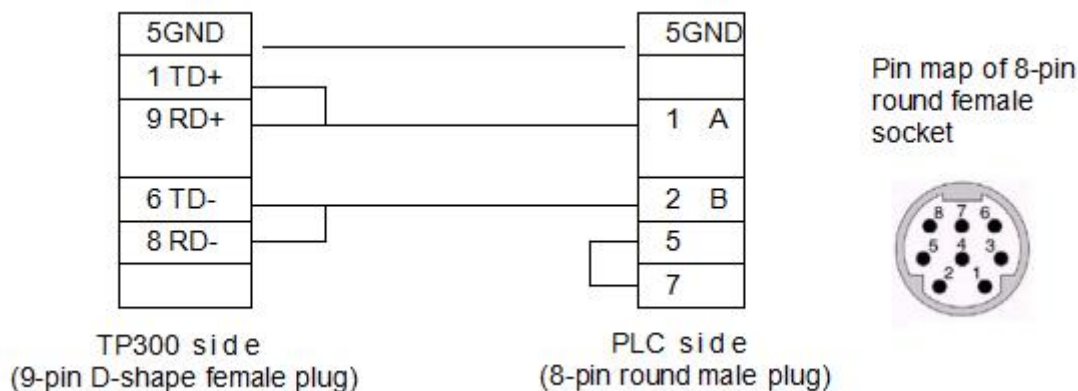
NOTE: the relation between HMI and PLC

0X/1～M0,0X/2～M1

4X/1～MW0,4X/2～MW1

4.6 Delta DVP Series

TP300 can communicate with the delta DVP series PLC. The programming port of PLC is used as the communication port.

Item	Content
TP300 COM port	9-pin COM port
PLC COM port	Programming port
Default parameters	9600bps, 7bits, 1stop, Even
Station No.	Range: 1-254,default: 1
Distance (Max.)	15 m
Comm. mode	RS232
Cable type	TP300-DVP
Inner relay address	M0-M999
Register parameter address	D0-D599

Connection guidance of TP300-DVP cable
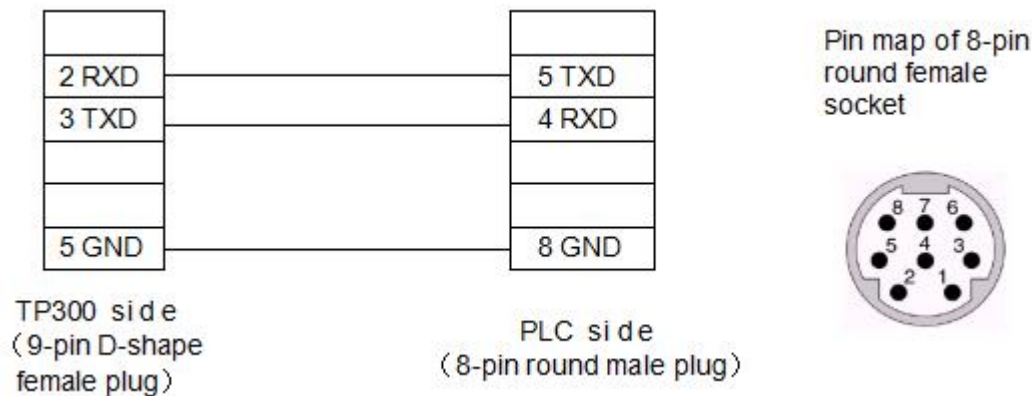
4.7 Panasonic FP Series

TP-300 can communicate with Panasonic FP PLC. The communication port is the programming port of PLC or external communication port.

Item	Content
TP300 COM port	9-pin COM port
PLC COM port	Programming port or external COM port
Default parameters	9600bps, 8bits, 1stop, Odd
Station No.	Range: 1-32,default: 1
Distance (Max.)	15 m
Comm. mode	RS232
Cable type	TP300-FP1, TP300-FP
Inner relay address	R0000-R875F
Register parameter address	DT0000-D9999

Connection guidance of TP300-FP1 cable
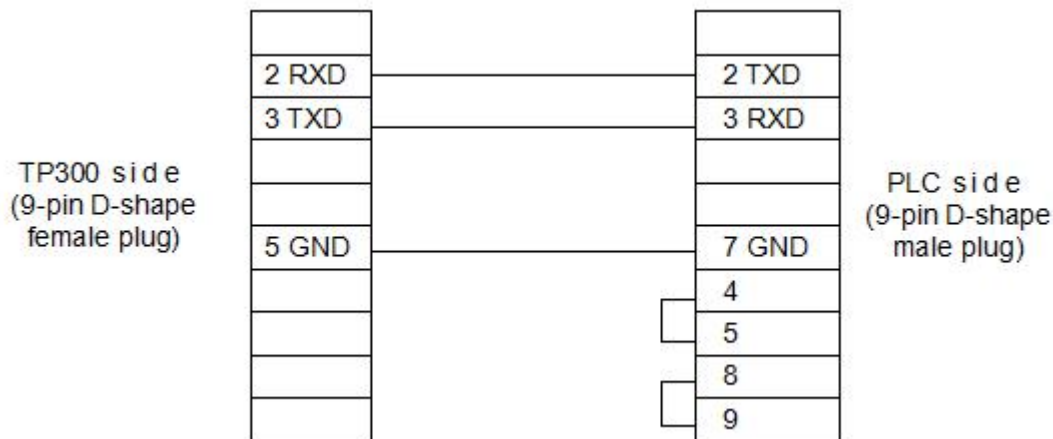
Connection guidance of TP300-FP cable
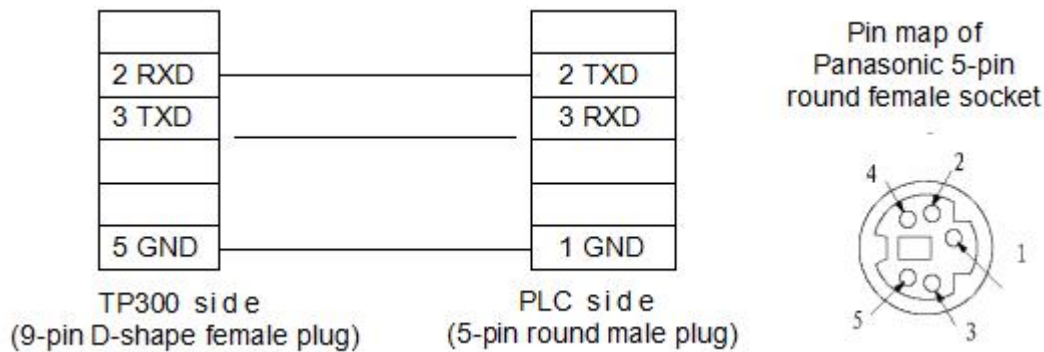
4.8 LG Master-K CNet Series

TP-300 can communicate with the LG Master-K series PLC. The communication port is Port2.

Item	Content
TP300 COM port	9-pin COM port
PLC COM port	Port2
Default parameters	9600bps, 8bits, 1stop, None
Station No.	Range: 0-31, default: 1
Protocol	CNet
Distance (Max.)	15 m
Communication pattern	RS232
Cable type	TP300-LG-CNet
Inner relay address	M000-M191F
Register parameter address	D0000-D4500

Connection guidance of TP300-LG-CNet cable
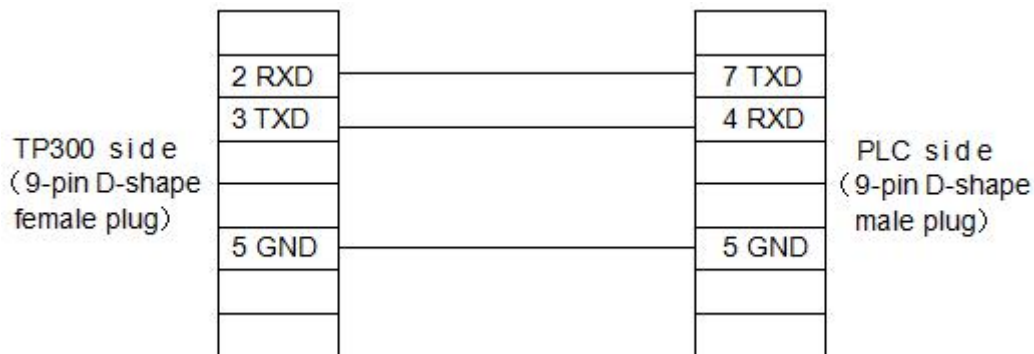
NOTE: THE PLC SWITCH SET——1(OFF), 2(ON)

4.9 LG Series supporting Modbus protocol

TP-300 can communicate with the LG series PLC that support Modbus protocol. The communication port is Port2.

Item	Content
TP300 COM port	9-pin COM port
PLC COM port	Port2
Default parameters	9600bps, 8bits, 1stop, Even
Station No.	Range: 1-31,default: 1
Protocol	Modbus RTU
Distance (Max.)	15 m
Communication pattern	RS232
Cable type	TP300-LG-Mod
Inner relay address	M000-M191F
Register parameter address	D0000-D4500

Connection guidance of TP300-LG -Mod cable
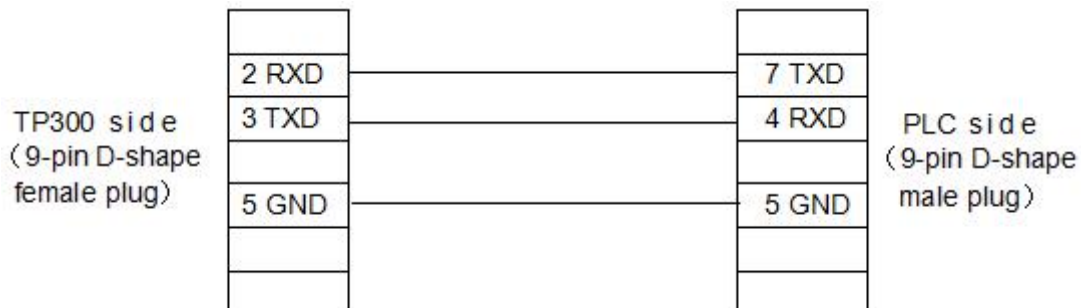
NOTE: THE PLC SWITCH SET——1(OFF), 2(ON)

4.10 LG Master-K 120S Programmable port

TP-300 can communicate with the LG Master-K 120s PLC via Programmable port.

Item	Content
TP300 COM port	9-pin COM port
PLC COM port	Programming port
Default parameters	38400bps, 8bits, 1stop, none
Station No.	Range: 1-31,default: 1
Protocol	LG MASTER-K protocol
Distance (Max.)	15 m
Communication pattern	RS232
Cable type	TP300-LG-Mod
Inner relay address	M000-M191F
Register parameter address	D0000-D4500

Connection guidance of TP300-LG-Mod cable
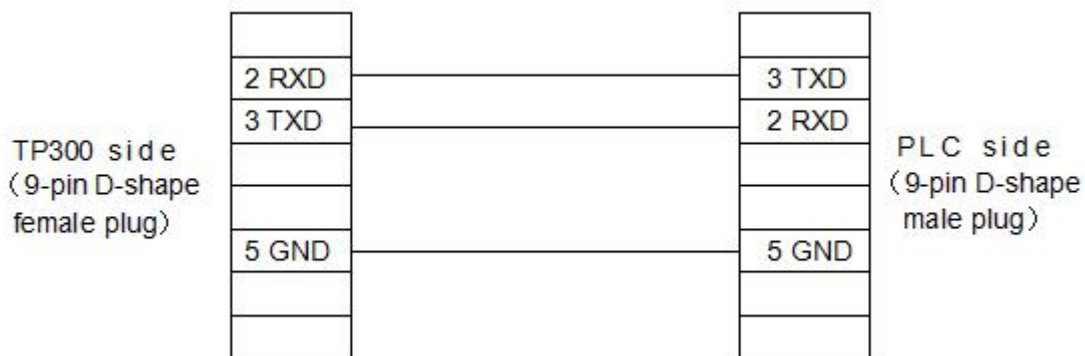
NOTE: THE PLC SWITCH SET——1(OFF), 2(ON)

4.11 FACON Series

TP300 can communicate with FACON MU/MC series PLC. The communication port is Port0

Item	Content
TP300 COM port	9-pin COM port
PLC COM port	Programming port
Default parameters	9600bps, 7bits, 1stop, Even
Station No.	Range: 1-254,default: 1
Protocol	FACON communication protocol
Distance (Max.)	15 m
Comm. mode	RS232
Cable type	TP300-FACON
Inner relay address	M0000-M2001
Register parameter address	R0000- R8071

Connection guidance of TP300-FACON cable

15-pin COM port plug of FACON PLC
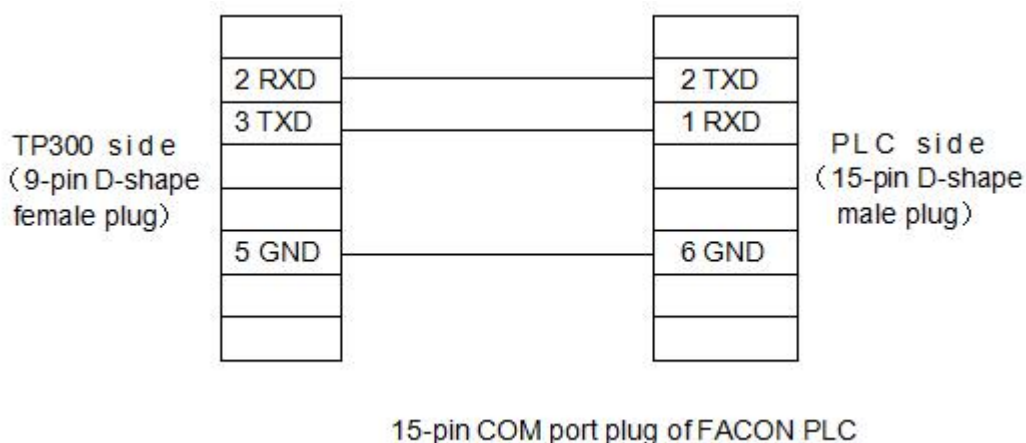
4.12 KOYO S Series

TP-300 can communicate with the KOYO S series PLC. When communicating with SZ-4, either Port1 or Port2 can be used as communication port.

Item	Content
TP300 COM port	9-pin COM port
PLC COM port	Programming port or external communication port
Default parameters	9600bps, 8bits, 1stop, ODD
Station No.	Station 1
Distance (Max.)	15m
Comm. mode	RS232
Cable type	TP300-SZ for SZ, SH, SH series TP300-SG for SU, SG series
Inner relay address	M000-M377
Register parameter address	R2000-R3777

Note: All addresses are shown in octal mode

Connection guidance of TP300-SZ cable

Pin map of RJ12 6-pin female socket
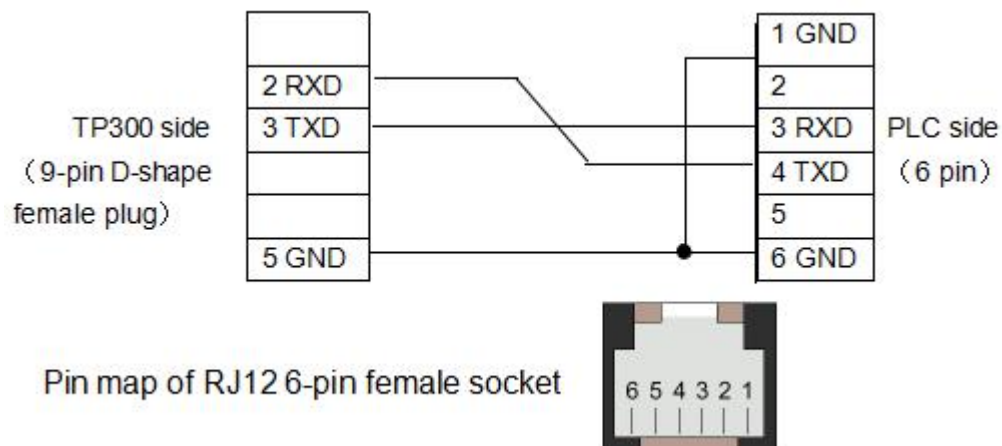
Connection guidance of TP300-SG cable
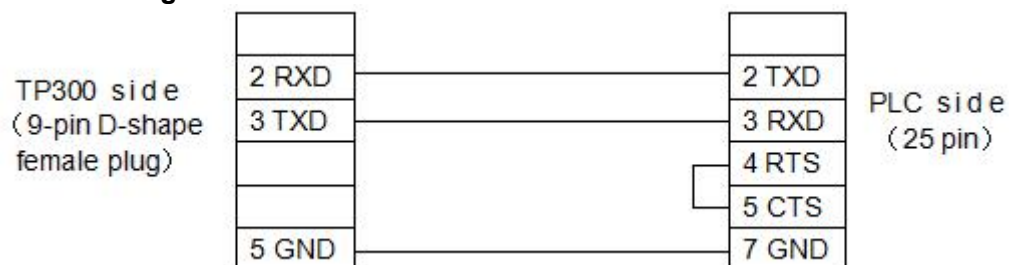
4.13 ECOSTEP Series

TP-300 can communicate with Kinco ECOSTEP series PLC. The communication port is RS232 port.

Item	Content
TP300 COM port	9-pin COM port
PLC COM port	RS232
Default parameters	9600bps, 8bits, 1stop, None
Station No.	Range: 1-f,default: 1
Protocol	ECOSTEP
Distance (Max.)	15 M
Comm. mode	RS232/485/422
Cable type	TP300-ECOSTEP-CAB232/485/422

Connection guidance of TP300-ECOSTEP-CAB232 cable
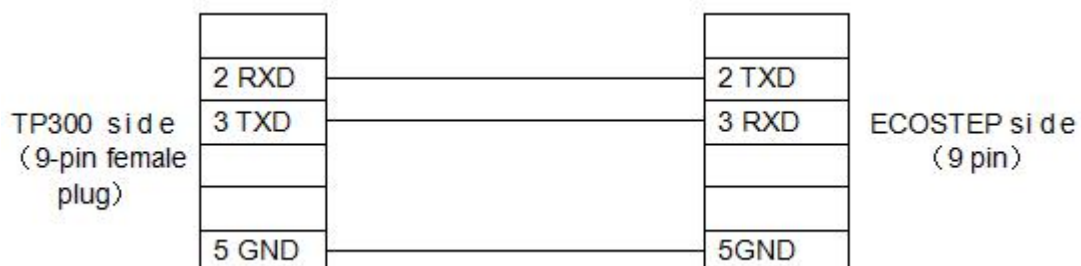
Connection guidance of TP300-ECOSTEP-CAB485 cable

TP300 side
（9-pin female plug）

| 1 TD+ |
| 9 RD+ |
| 6 TD- |
| 8 RD- |
| 5 GND |

| 2 RD+ |
| 3 TD+ |
| 7 RD- |
| 8 TD- |
| 5GND |

ECOSTEP side
（9 pin）
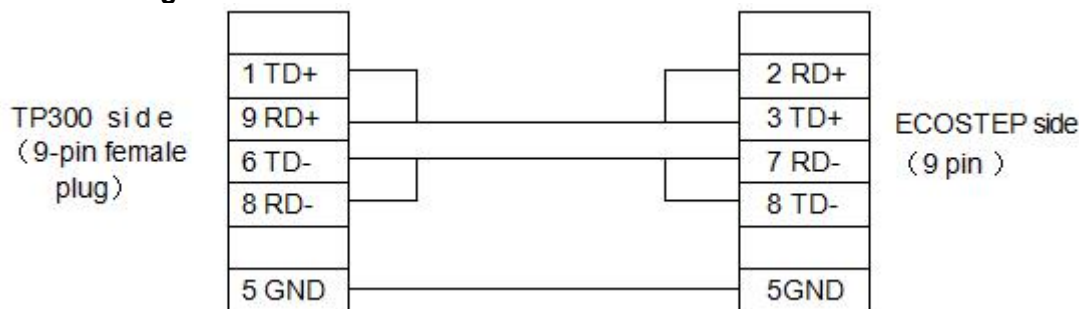
Connection guidance of TP300-ECOSTEP-CAB422 cable

TP300 side
（9-pin female plug）

| 1 TD+ |
| 9 RD+ |
| 6 TD- |
| 8 RD- |
| 5 GND |

| 2 RD+ |
| 3 TD+ |
| 7 RD- |
| 8 TD- |
| 5 GND |

ECOSTEP side
（9 pin）
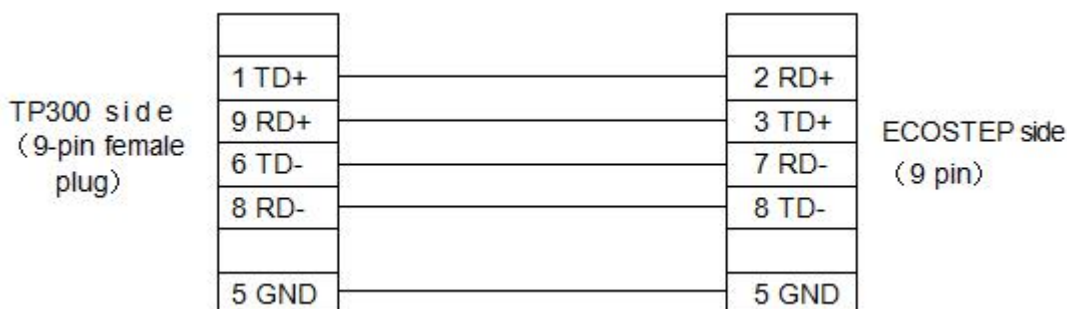
4.14 AB Micrologix Series

TP-300 can communicate with Allen-Bradley Micrologix series PLC. The communication port is the programming port.

Item	Content
TP300 COM port	9-pin COM port
PLC COM port	Programming port
Default parameters	19200bps, 8bits, 1stop, None
Station No.	The station number is fixed on 1 and can not be changed
Protocol	AB DF1
Distance (Max.)	15 m
Comm. Mode	RS232
Cable type	TP300-AB
Inner relay address	B3/9/10/11/12/13: 0-254
Register parameter address	N7/9/10/11/12/13/14/15: 0-254

Connection Guidance of TP300-AB cable

TP300 side
（9-pin D-shape female plug）

| 2 RXD |
| 3 TXD |
| 5 GND |

| 4 RXD |
| 7 TXD |
| 2 GND |

PLC side
（8-pin round male）
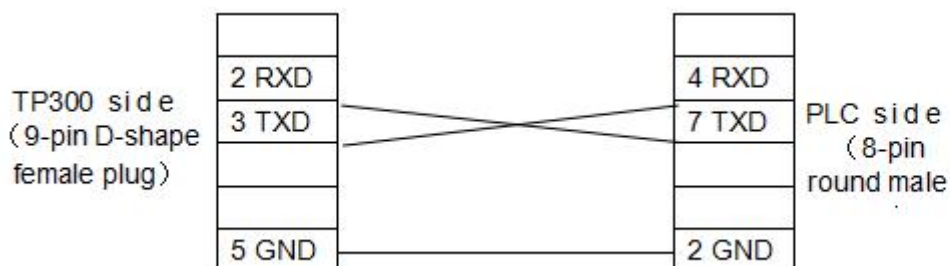
Pin map of 8-pin round female socket

4.15 MODBUS RTU/ASCII/EMERSON/RTU EXTEND

TP-300 can communicate with any slave device that supports MODBUS RTU or MODBUS ASCII.

Item	Content
TP300 COM port	9-pin COM port
Default parameters (RTU)	19200bps, 8bits, 1stop, Even
Default parameters (ASCII)	19200bps, 7bits, 1stop, Even
Station No.	Range: 1-247, default: 1
Protocol	MODBUS RTU/ASCII
Distance (Max.)	15 M
Comm. mode	RS232/485/422
Cable type	TP300-MODBUS-RS232/485/422
Inner relay address	0X/1X 1-9999
Register parameter address	3X/4X 1-9999

Connection Guidance of TP300-MODBUS-RS232 cable
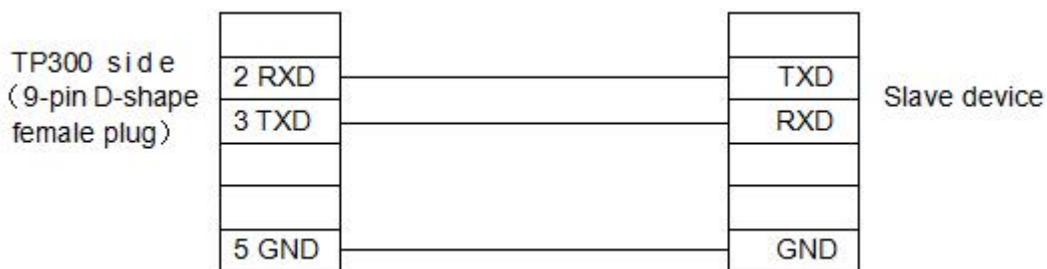
Connection Guidance of TP300-MODBUS-RS485 cable
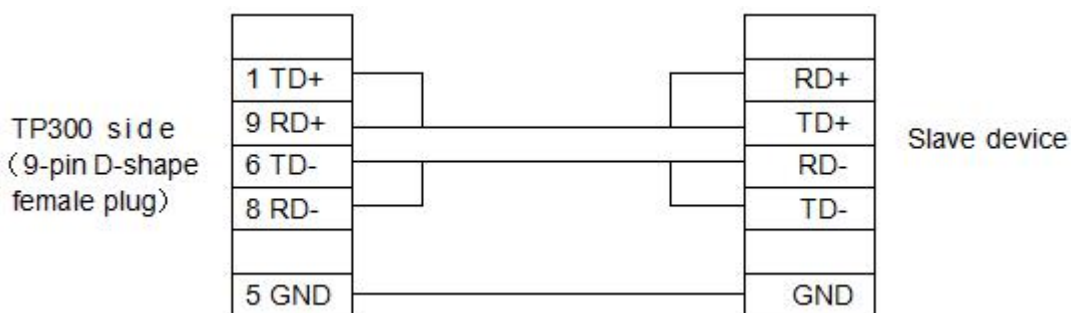
Connection Guidance of TP300-MODBUS-RS422 cable
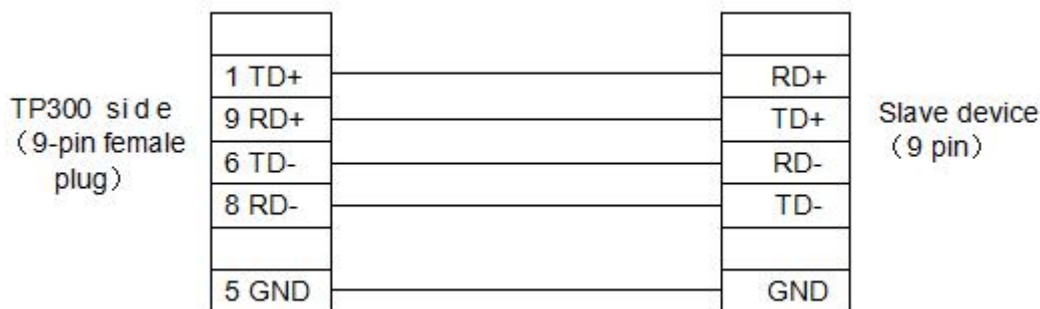
4.16 MODBUS SERVER

TP-300 can communicate with MASTER device that supports MODBUS RTU.

Item	Content
TP300 COM port	9-pin COM port
Default parameters (RTU)	19200bps, 8bits, 1stop, Even
Default parameters (ASCII)	19200bps, 7bits, 1stop, Even
Station No.	Range: 1-247,default: 1
Protocol	MODBUS SERVER
Distance (Max.)	15 m
Comm. mode	RS232/485/422
Cable type	TP300-MODBUS-RS232/485/422
Inner relay address	0X/1X　　1-9999
Register parameter address	3X/4X　　1-9999

Connection guidance of TP300-MODBUS-RS232 cable

TP300 side
（9-pin D-shape female plug）

2 RXD	——	TXD
3 TXD	——	RXD
5 GND	——	GND

Master device

Connection guidance of TP300-MODBUS-RS485 cable

TP300 side
（9-pin D-shape female plug）

1 TD+	RD+
9 RD+	TD+
6 TD-	RD-
8 RD-	TD-
5 GND	GND

Master device

Connection guidance of TP300-MODBUS-RS422 cable

TP300 side
（9-pin female plug）

1 TD+	——	RD+
9 RD+	——	TD+
6 TD-	——	RD-
8 RD-	——	TD-
5 GND	——	GND

Master device
（9 pin）
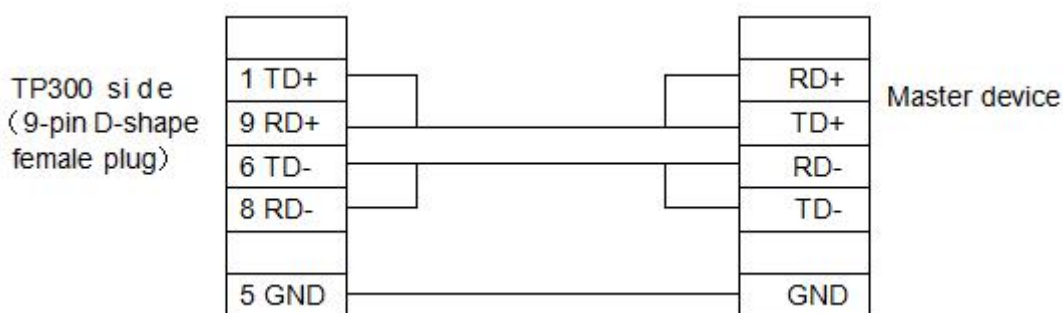
4.17 Haiwell freedom protocol

TP300 can provide its 255-byte memory as a slave device. Through the freedom protocol, the 255-byte memory can be visited for display function.

Item	Content
TP300 COM port	9-pin COM port
Default parameters	19200bps, 8bits, 1stop, None
Station No.	Range: 0-255,default: 1
Protocol	Freedom protocol
Distance (Max.)	15 m
Comm. mode	RS232/485/422
Cable type	TP300-FREEPTC-RS232/485/422
Inner relay address	MWx.i(x=0..254,i=0..F)
Register parameter address	MW 0-254

Connection guidance of TP300-FREEPTC-RS232 cable
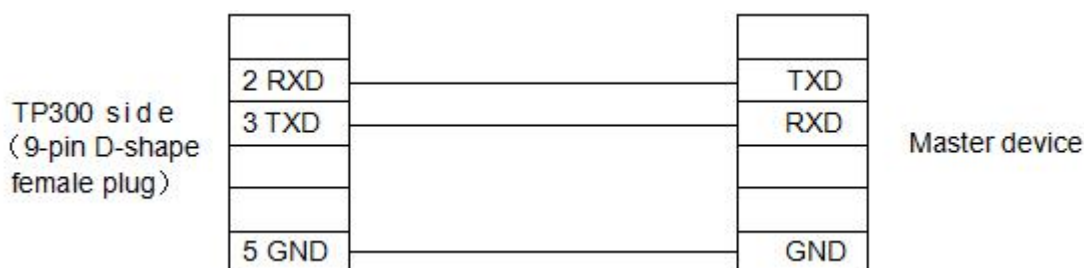
Connection guidance of TP300-FREEPTC-RS485 cable
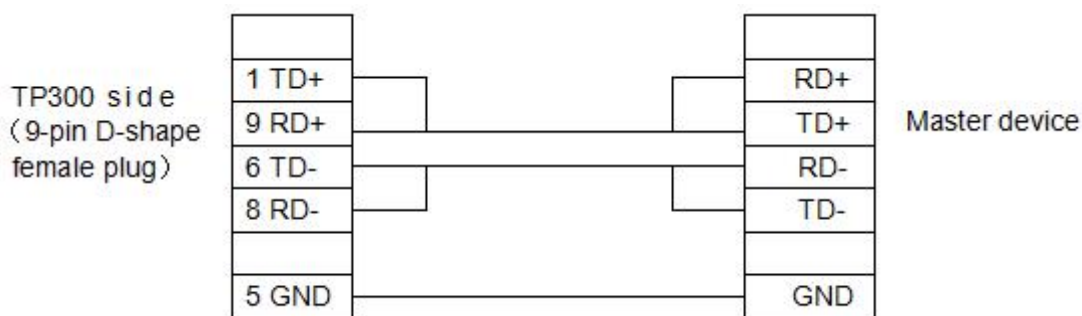
Connection guidance of TP300-FREEPTC-RS422 cable
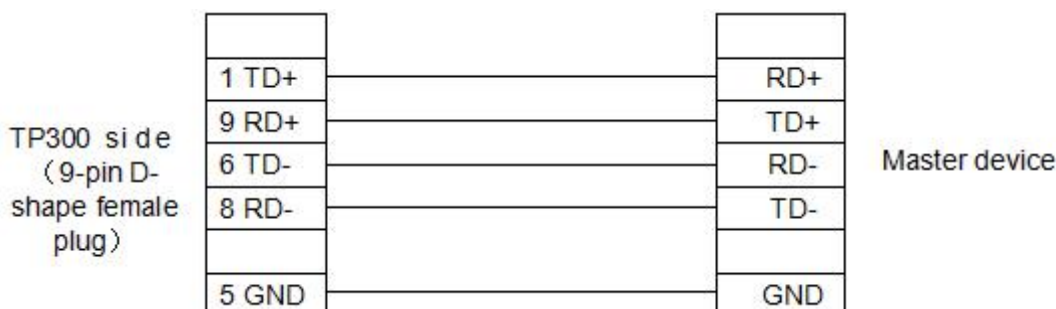
4.18 SAIA PCD S-BUS PROTOCOL

TP300 can communicate with SAIA PCD by using S-BUS protocol.

Item	Content
TP300 COM port	9-pin COM port
Default parameters	9600bps, 8bits, 1stop, None
Station No.	Range:0-255,default:1,same with PCD station no.
Protocol	S-BUS
Distance (Max.)	15m(RS232) 1200m(RS485)
Comm. mode	RS232/485
Cable type	TP300-SAIA
Inner relay address	Flag 0-8191
Register parameter address	Register 0-4095

Connection guidance of TP300-SAIA-RS232 cable
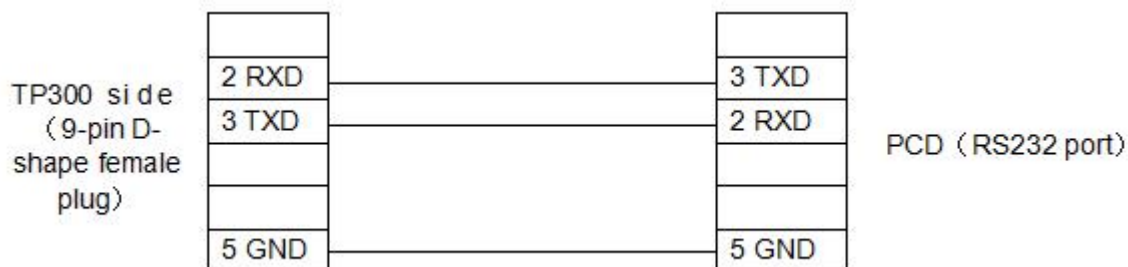
Connection guidance of TP300-SAIA-RS485 cable
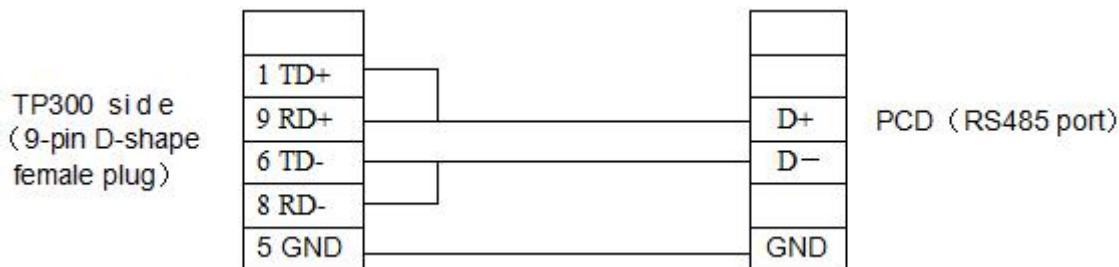
4.19 VIGOR PLC

Item	Content
TP300 COM port	RS232 Programming port
PLC COM port	Programming port or external communication port
Default parameters	19200bps, 7bits, 1stop, Even
Station No.	Default1
Distance (Max.)	15 m(Twisted pair)
Comm. mode	RS232
Cable type	TP300-Vigor-RS232
Inner relay address	X0-X255 Y0-Y255 M0-M255
Register parameter address	D0-D7999 T0-T255 C0-C255

Connection guidance of TP300-Vigor-RS232 cable

COM by VB programmer port:
TP300 RS232 port
9-pin D-shape female plug

5	GND		SG	Pin1
2	RXD		TX	Pin2
3	TXD		RX	Pin3

VIGOR VB PLC
Programmer port
4Pin JST-2.0 Socket
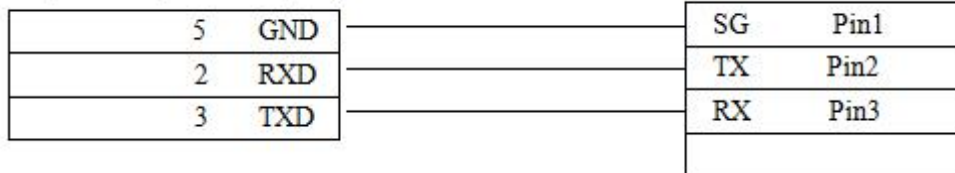
Note: TP300 can communicate with VIGOR PLC directly by using programming cable.

4.20 PLC EMERSON EC20 SERIES PLC

Item	Content
TP300 COM Port	RS232 COM port
PLC COM port	Programming port or external communication port
Default parameters	19200bps, 8bits, 1stop, Even
Station No.	default: 1
Distance (Max.)	15 m(Twisted-pair)
Comm. mode	RS232
Cable type	TP300-Emerson-RS232/RS485
Inner relay address	X0-X377(Octal) Y0-Y377(Octal)…
Register parameter address	D0-D7999 T0-T255…

Refer to the Emerson PLC manual for more detailed addresses.

Connection guidance of TP300-Emerson-RS232 cable

TP300 side
(9-pin D-shape female plug)

2 RXD		TXD	
3 TXD		RXD	
5 GND		GND	

PLC side
green wiring terminal
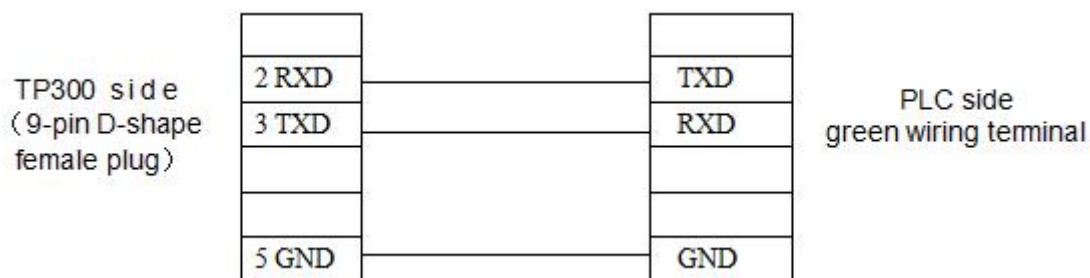
Connection guidance of TP300-Emerson-RS485 cable

TP300 side
(9-pin D-shape female plug)

1 TD+		
9 RD+	+	
6 TD-	−	
8 RD-		
5GND	GND	

PLC side
green wiring terminal
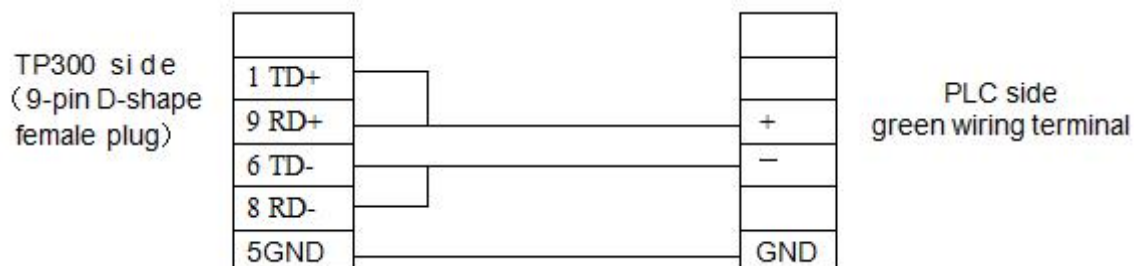
TP300 can communicate with Emerson PLC directly by using their programming cable.

4.21 PLC KEYENCE KV Series

Item	Content
TP300 COM port	RS232 COM port
PLC COM port	Programming port or external communication port
Default parameters	9600bps, 8bits, 1stop, Even
Station No.	Default1
Distance (Max.)	15 m(Twist pair cable)
Comm. mode	RS232
Cable type	TP300-Keyence-RS232
Inner relay address	R0000-R9999
Register parameter address	DM000-DM1999

Connection guidance of TP300-Keyence-RS232 cable

With Keyence PLC programming cable (see Keyence PLC manual) followed by a section of the wire as shown below:

TP300 side
（9-pin D-shape female plug）

2 RXD	
3 TXD	
5 GND	

PLC side
（9-pin D-shape male plug）

2 TXD	
3 RXD	
5GND	
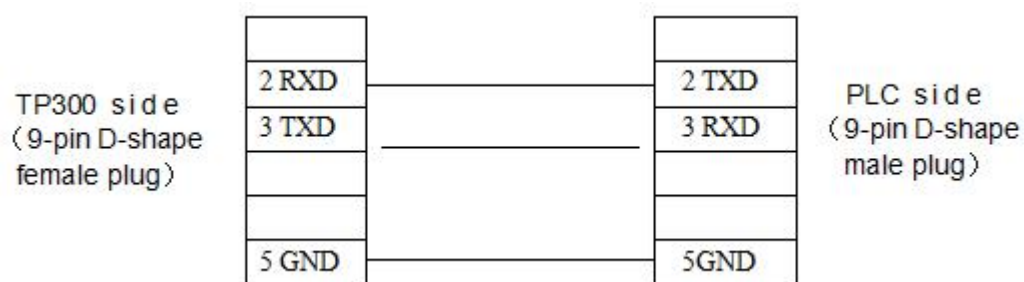
Haiwell TP300 V2.0.5 Configuration Software

Release Note

TP300 V2.0.5 is a new configuration software for the new version hardware of TP-300. New type of CPU and greater memory make the new hardware architecture swifter and more stable. TP300 V1.0.0 supports more types of PLC; downloads the configuration faster; provides more useful functions. new functions will be described in Appendix 3.

New Features :

- Configuration downloading is 5-10 times faster than the old version.
- The program runs faster. Especially when there are many dynamic controls (for example, registers) in the window, the respond speed of keyboard and the refresh speed of display are obviously faster than the old version.
- Support more protocol: AB-DF1,ECOSTEP,MODBUS RTU/ASCII/SERVER,SAIA PCD and more.
- Dynamic texts are displayed non-continuously. It can display the value of an arbitrary register (<65535).
- Alarm list can be used with all protocols. The offset in some protocols is no longer required to be 0.
- Setting the register parameters can be done with a single function key.
- The register data can be converted to engineering data.
- Supports the inputting, setting and displaying of hexadecimal number.
- Supports the enhanced free protocol. As the display unit of the slave device, it can visit the memory of 255 words.
- The password manipulation is more convenient.
- Starts and responds faster.
- Remote upgrade function. When a new version software is available, the user can upgrade the software by downloading the new version from our website. The software of TP300 will be updated automatically during the configuration window downloading. The process of updating will be easily.
- Compatible with the project of old version TP300.

New Functions :

**1.** The dynamic texts can correspond to the register of any data length only the value is less than 65535, the different content will be displayed corresponding to different value of the register. The value can be non-continuous signed decimal numbers or unsigned decimal numbers or hexadecimal numbers. The user can log dynamic texts corresponding to as many as 32 statuses.

Example: Display the dynamic text controlled by register V10. The dynamic text to be displayed has three statuses: "In gear", "Temp. Lower" and "Position arrived". The three texts correspond to the V10 register value 2a, 30e and d43f (HEX form) respectively. Input "2a" in the "Value" space of the first row and "In gear" in the "Context" space on the right. Input the other two statuses in the same way. If the value of register V10 is 2a, the dynamic text be displayed is "In gear". If it is 30e, "Temp. Lower" will be displayed. Other conditions can be inferred from the two examples above.

2. Project Data Conversion

After selecting the "Limited" checkbox, the designer can select the original data or the project data from the list.
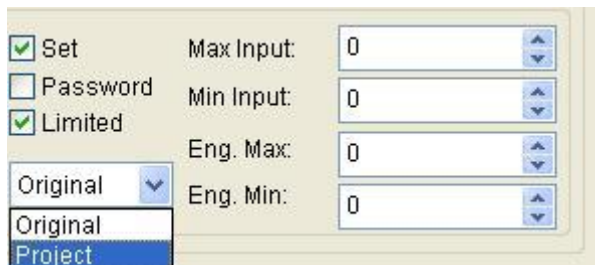
The original data option means that the data in the register will be displayed without any calculation. The position of the decimal point is determined by the value of the "Decimal"property. For example, if "Decimal"=2 and the register value is 14561, it will be displayed as 145.61.

The project data option means that the data read from the register will be converted to project data before being displayed. The conversion is done following the formula below:

The Converted Data = Eng. Min + (original register data – Min Input) × (Eng. Max – Eng. Min) / (Max Input – Min Input)

For instance, the data stored in the register is the binary output of a 12-digits A/D, while the data being actually displayed is a voltage between –10000mV and 10000 mV. It can be set as follows:

In this way, the result of A/D conversion in the register is displayed as the voltage value.

Note: Because of the limited accuracy of floating point operation, there may be some errors in the conversion result.

3. Set the register parameters with single function key

Select a function key and select the option button "Set Register". A parameter can be written into a designated register when the function key is pressed. The following figure shows how to write hexadecimal number 7FFF into address 0 of V register.

4. Alarm List

The setting of alarm list is shown in the figure below:

The alarm start address can be set arbitrarily.

5. Password

Password must be entered before changing the data. Press [ENT] to show the window below:

There are three choices of [▲],[▼] and [ENT] keys.Select 1 to log in; select 2 to log out; press [ESC] to return to the monitoring mode.

Select 1, the window will be like the figure below:

Input the password with the number keys, the number input will be displayed as "*". Press [ENT] when the password has been input.

If the password is correct, it will show the window below:
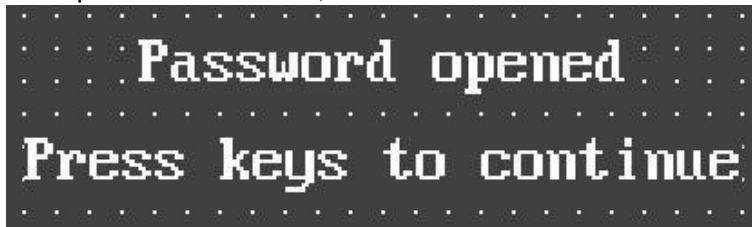
If the password is incorrect, it will show the window below:
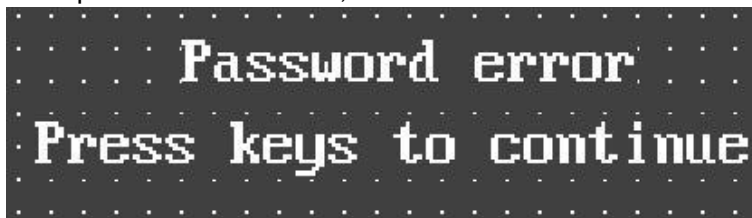
Select 2 to log out, it will show the window below:

Appendix 1：Freedom protocol document

Freedom protocol: It is a simple communication protocol for connecting the controller with the TP300. The controller is the master device, and the TP300 is the slave device. To communicate with this protocol, the user only need to write some simple writing/reading programs,that is you can read / write to the internal registers(MW0 ~ MW254) of TP300.

For example: Set up a new project,choose the protocol(free type), set communication parameters(The recommended communication parameters are: 19200bps, 8bits, 1stop and none parity), sta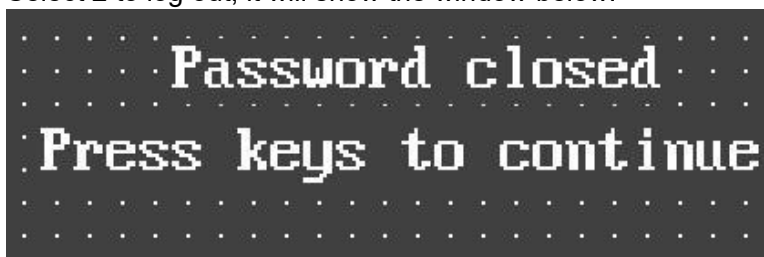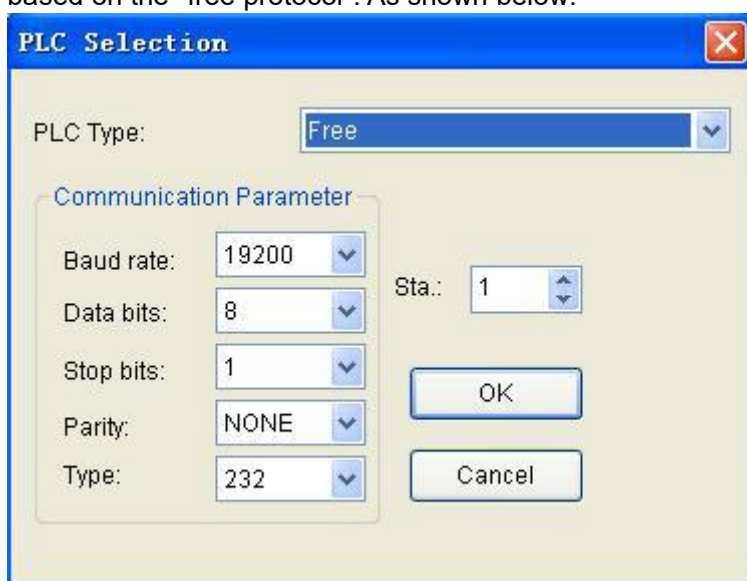tion number settings of TP300　(station number: 1~255). The above settings for TP300 is based on the "free protocol". As shown below:

Note:
  ① PLC manufacturer type: choose "free type"
  ② Station number: the station number for slave device TP300(1~255)
  ③ Set communication parameters: the recommended communication parameters are : 19200bps , 8bits , 1stop and none parity.The protocol supports all the setting compounds except those of 7bits.The baud rate range is 1200-115200,the user can select within the range according to the conditions.

At first, the controller sends a request to the TP300. After the TP300 has accepted that request,it will send a response to the controller. The maximum number of words that are exchanged between the TP300 and the controller is 255. They are MW0-MW254. every bit of the words can be used as a coil. The form of the bit is MWx.i(x=0..254,i=0..F).

Note that the maximum number of words that can be visited by the protocol each time is 128. If the user wants to visit the whole memory continuously, please visit twice.

Form of the Request:

Station No.	Command	Address	Length	[Data]	Parity

Station No.: The station number of the TP300 (0-255, 0 represents the broadcasting mode, the TP300 needn't send response).

Command: 'R' (0x52) represents reading from the TP300; 'W' (0x57) represents writing to the TP300.

Address: The search number of MW (0-254)

Length: The number of MW to be written/read (1-128)

Data: The value of MW, NULL when Command is 'R'

Parity: Sum up all the bytes from the station number to that before the parity. Divide the sum by 0x100.The remainder is the parity.

(Note: if the parity is 0x5a, the check will be skipped.)

Form of Response:

Station No.	Status	[Address	Length	Data]	Parity

Status: The status of the communication

  ：0 – normal

  ：1 – address error (address > 254)

  ：2 – length error (length > 128 or length = 0)

  ：3 – range error (address + length > 255)

  ：4 – command error (the command is none of 'R'(0x52) and 'W'(0x57)) When the command is 'W' or error value. The gray items (address, length and data) are NULL.

Form of Data:

MWi (High)	MWi (Low)	MWi+1 (High)	MWi+1 (Low)	…	MWi+n-1 (High)	MWi+n-1 (Low)

' i' is the address; 'n' is the length.

At first, the controller sends a request to the TP300. After the TP300 has accepted the request,it will check the parity. If the parity is correct and the station number is the same as that of the TP300,the TP300 will respond to that request. If not, the TP300 won' t give any response. If it is in broadcasting mode (the station number is 0), the TP300 will never respond to the request.

The controller will check if the response of the TP300 is over time. If the delay is more than 50 ms,it is considered to be over time. The controller should send the request again.

The TP300 checks if the receiving of data is overtime. If the delay is more than 25ms, it will be considered to be overtime. The TP300 will initialize the communication and wait for the new request from the controller. Thus, the transmission interval within a frame can't be more than 25ms, or it will be over time. For the same reason, the interval between different frames should be greater than 25ms to ensure the stability of communication.

Reading (read data from the TP300)

Controller

Station No.	'R'	Address	Length	Parity

TP300

Station No.	Status	Address	Length	Data	Parity

Data: the value of MW to be read

Writing (write data to the TP300)

Station No.	'W'	Address	Length	Data	Parity

TP300

Station No.	Status	Parity

Status: 0-OK

Example

a) The controller reads MW0,MW1 from TP300

  The controller sends: 01H 52H 00H 02H 55H

  TP300 responds：01H 00H 00H 02H 00H 00H 00H 0CH 0FH (MW0=0 MW1=12)

  (MW0=0 MW1=12)

b) The controller writes 256 to MW0

  The controller sends：01H 57H 00H 01H 01H 00H 5AH

  TP300 responds：01H 00H 01H

Appendix 2：Important Notes

- Function keys such as ALM, SET, ENT, UP and DOWN have default basic functions. If these functions conflict with the user-defined functions, the basic functions will be disabled. The basic function of register setting for [SET] has the highest priority. Although it can be defined to execute other functions, the register setting function will not be disabled. So if it is necessary to execute the function for setting register, please don't define [SET] for other functions.

- If only one digit of the number is needed to change, move the cursor with the [◄] and [►] key to that digit and press the expected number key to change the digit. If it is necessary to input the hexadecimal number A-F, set the digit to 0 or 9 firstly and press [▲] and [▼] to get the expected hexadecimal number.

- If the actual value of the register is over the length set by the user, it will be cut from the end. That will certainly cause some errors. So the user must set the length of register to the maximum that could possibly reach according to the type of register. Although in many conditions the great value will not be used in project, enough margins are necessary. Or the data that have been cut off when error occurs will be considered to be legal.

- Any key pressing in the screen saver window is invalid and will not execute any function. Any key pressing will awake the screen saver to the original window.

- If the low value is greater than the high value in the limits setting of register, bar graph and trend line, the program will check it out and report an error during downloading. Configuration will not be downloaded until the error has been fixed.

- When setting the register data, the user can input the number continuously with the number keys after pressing [CLR]. That will make the input of number faster.

- When the stability of communication can be ensured, please use the baud rate as high as possible. A higher baud rate can improve the refresh frequent greatly and reduce the response time of the key.

Appendix 3：New configuration function in TP300

Clock function introduction

Add the data type TM for configuring clock：

TM0~TM6 mean: sec./min./hour/day/month/week/year

It can display and set date and time by setting the register type for TM.

After selecting the clock module, from the pointed byte to write the date and time value to the PLC in the form of the BCD code, the default is WORD type, two bytes make up a write. Each time a fixed number of seconds are written. All are written when initialized,write all at the beginning of each minute, the other only write seconds.