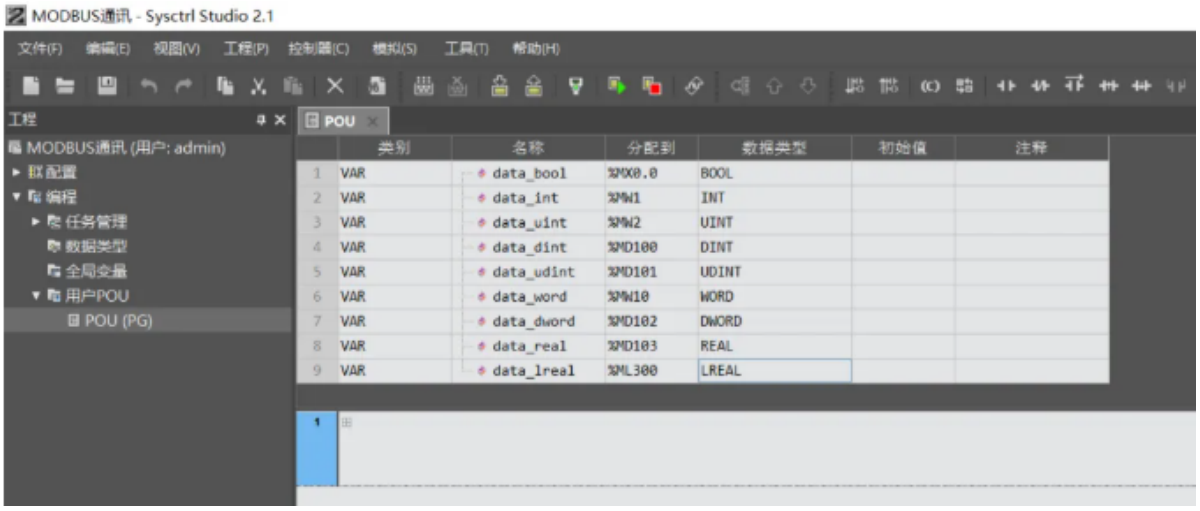
Modbus TCP communication

Sysctrl Studio project configuration

Step 1: Create a new project

Double-click to open the Sysctrl Studio software and create a new project. In the default POU, create new variables and assign them to corresponding addresses.



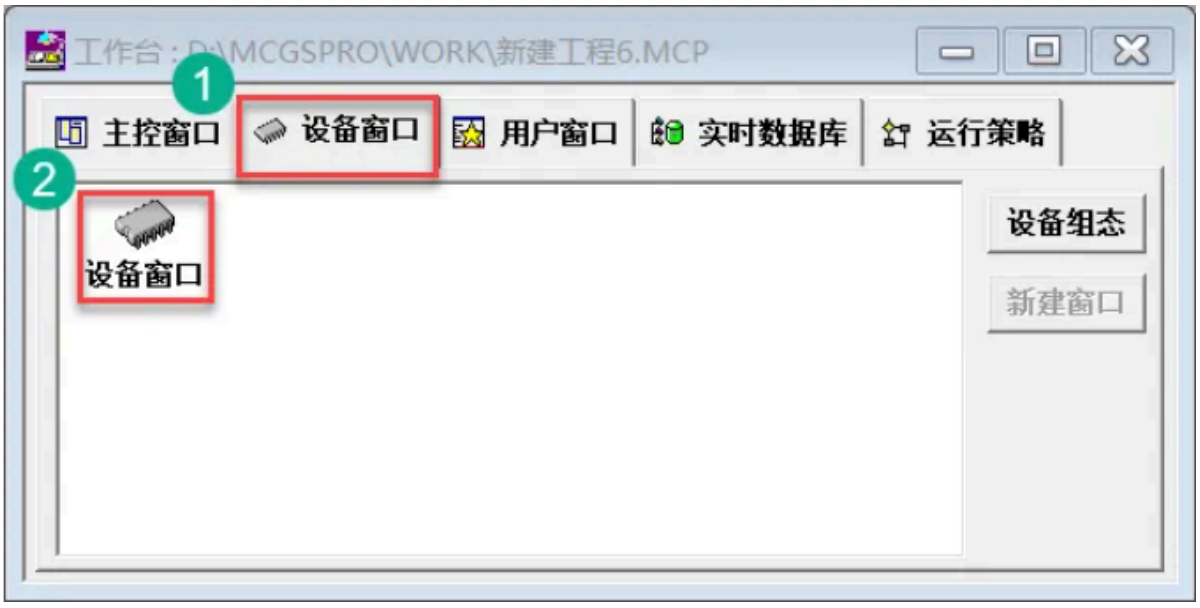
Step 2 : After compilation, download the program to the controller.

McgsPro software configuration

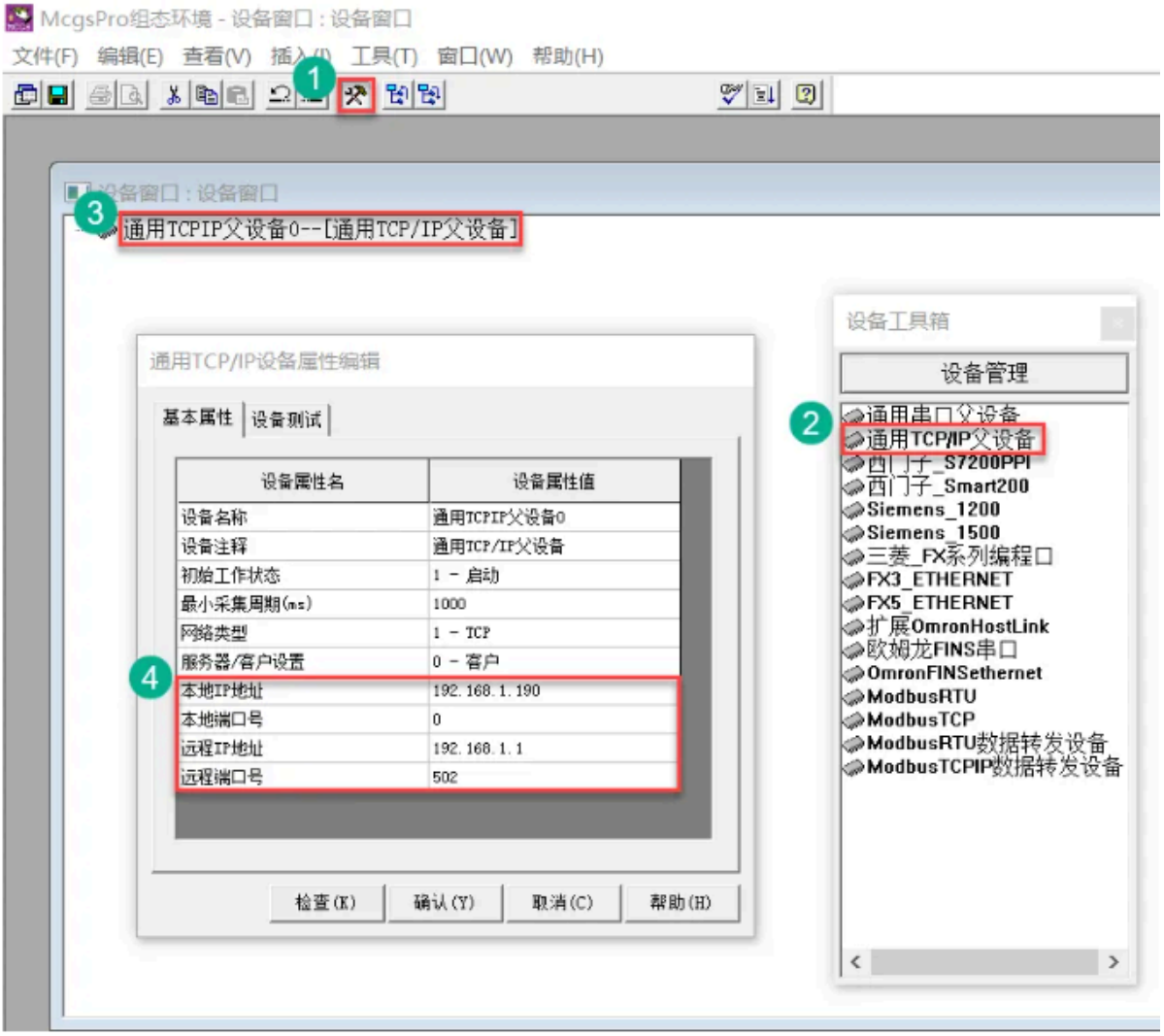
Step 1: Create a new project

(1) Open the McgsPro configuration software and create a new project.

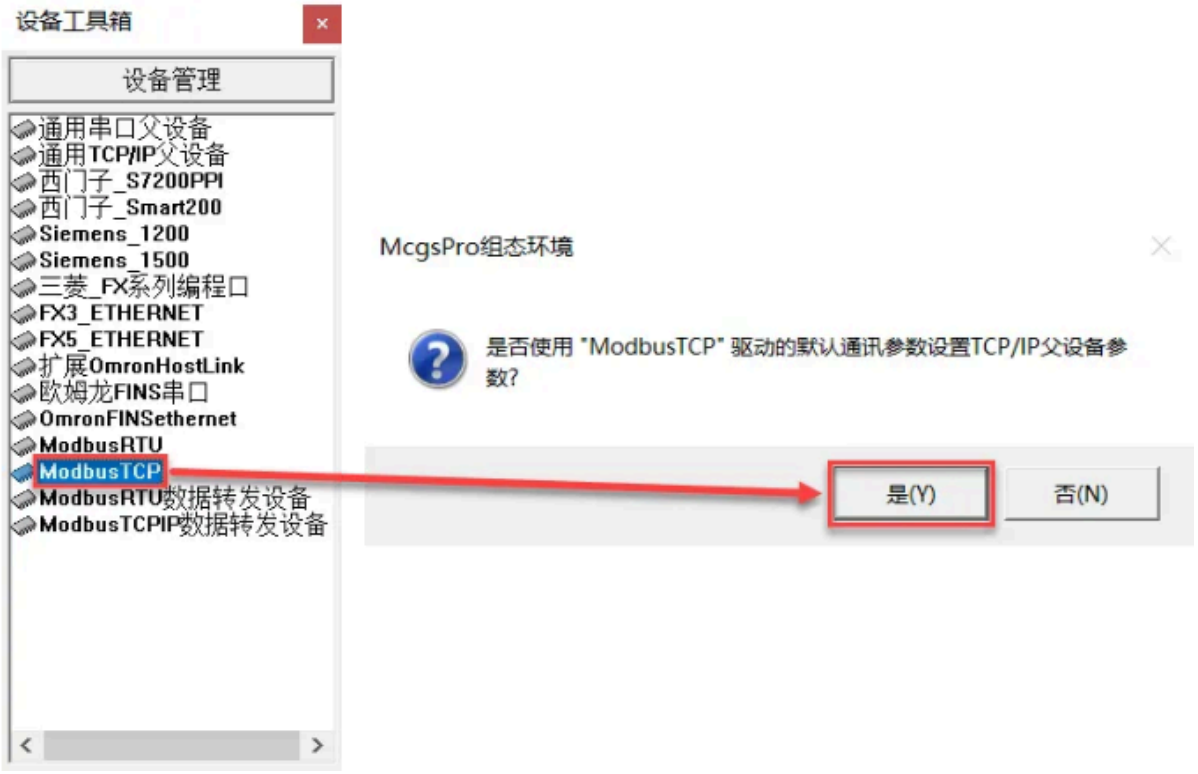
(2) Double-click [Device Window]



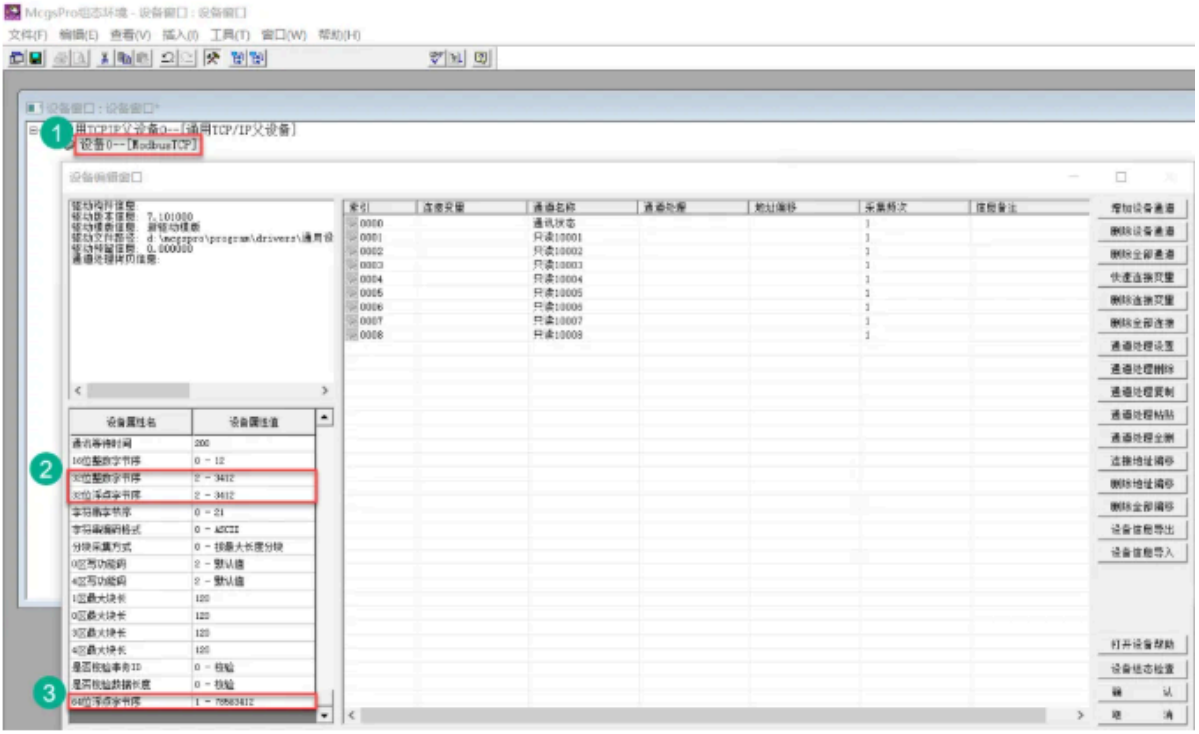
(3) Open the toolbox, select [Generic TCP/IP Parent Device], and click [Generic TCPIP Parent Device 0]. Enter 192.168.1.190 (HMI IP) in [Local IP Address], 192.168.1.1 (controller IP) in [Remote IP Address], and 502 in the remote port number.



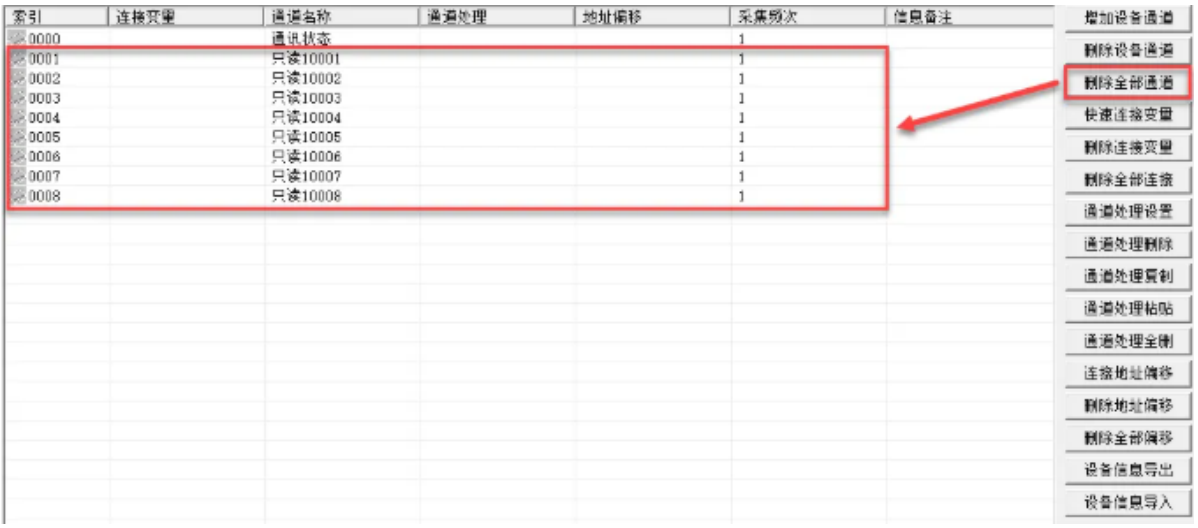
(4) Adding a Modbus TCP device



(5) Click [Device 0-[ModbusTCP]]. In the [Device Edit Window], select 2-3412 for 32-bit integer byte order and 32-bit floating point byte order, and select 1-78563412 for 64-bit floating point byte order.



(6) In the channel editing area, there will be default channels. If you do not use them, you can choose to delete all channels. According to the variables set in the Sysctrl project, add the corresponding device channels.



Step 2: Add channels

Address calculation relationship description

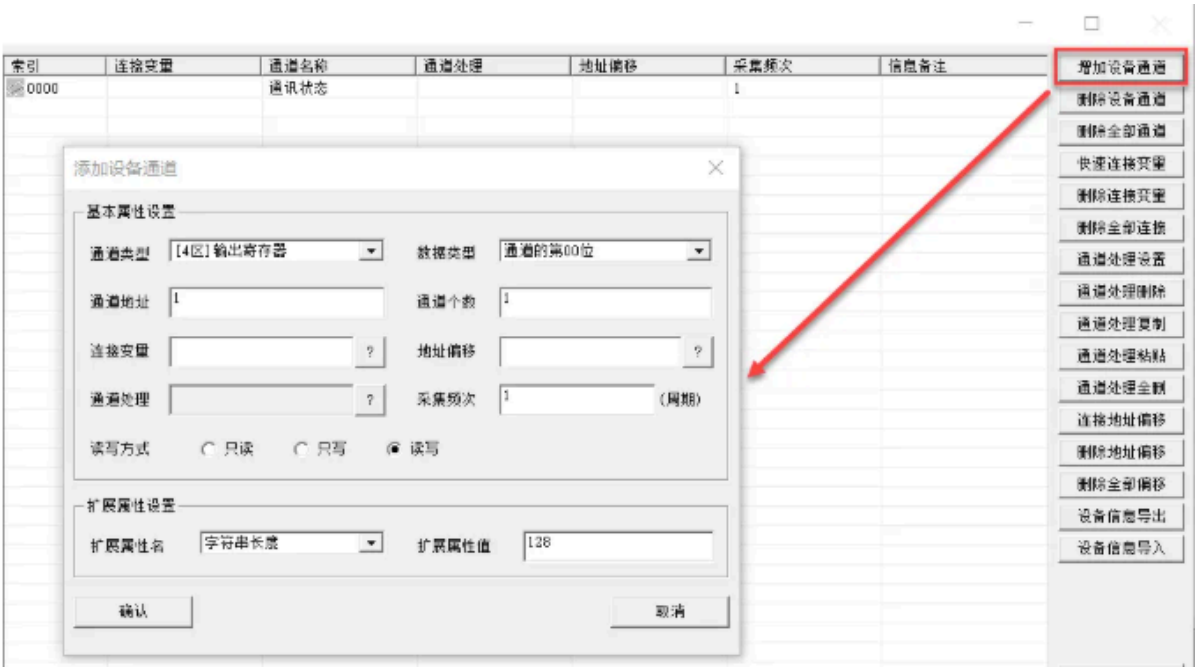
The following table applies to the Modbus address correspondence between the M series controller and the Kunlun touch screen.

Name	Type	Number	Address	Property
I (Input device)	Bit device	%IX0.0~%IX0.7	6000 ~ 6007	Read-only
		%IX1.0~%IX1.7	6008 ~ 600F	Read-only
		.....	.....	Read-only
		%IX127.0~%IX127.7	63F8 ~ 63FF	Read-only
	Word device	%IW0~%IW63	8000 ~ 803F	Read-only
Q (Output device)	Bit device	%QX0.0~%QX0.7	A000 ~ A007	Read/Write
		%QX1.0~%QX1.7	A008 ~ A00F	Read/Write
		.....	.....	Read/Write
		%QX127.0~%QX127.7	A3F8 ~ A3FF	Read/Write
	Word device	%QW0~%QW63	A000 ~ A03F	Read/Write
M (Middle device)	Word device	%MW0~%MW32767	0000 ~ 7FFF	Read/Write

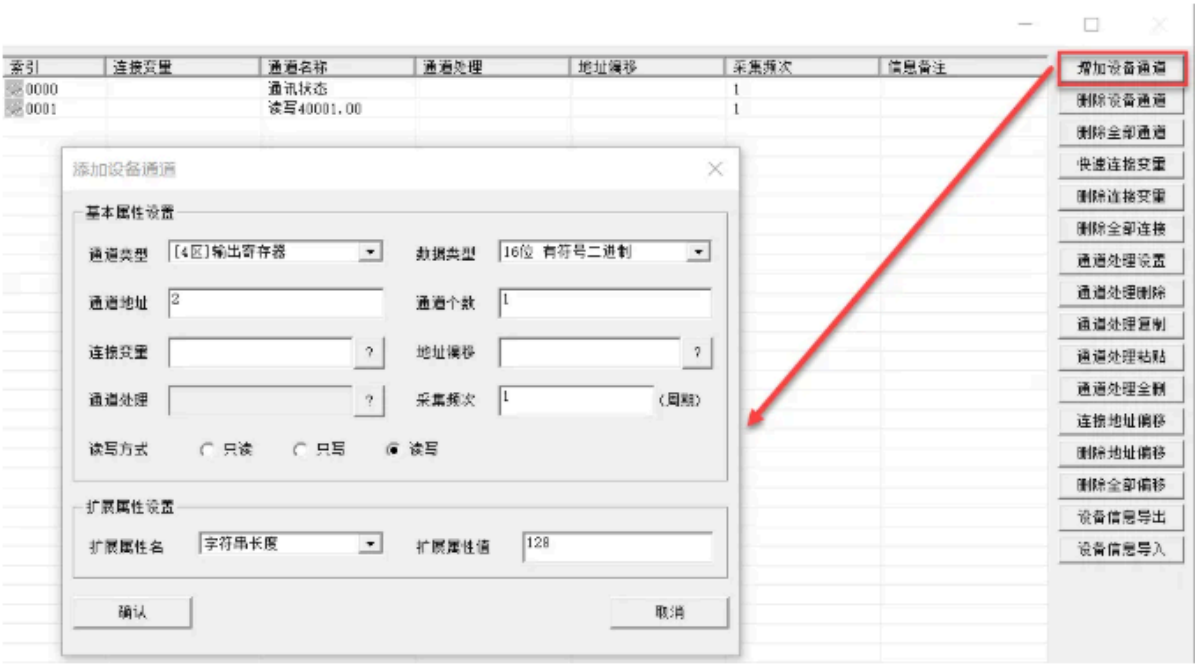
The corresponding address conversion method is as follows:

Address	Type	Algorithm	HMI Address
%IXA.B	1X	24576+ A*8 + B	%IX1.1 → 24576 + 1*8 + 1 = 24585
%IBA	3X_bit	24576 + A/2 (A/2 Divisible) [24576 + A/2(Round)].8 (A/2 Not divisible)	%IB20 → 24576 + 20/2 = 24586 %IB21 → [24576 + 21/2(Round)].8=24586.8
%IWA	3X	32768 + A	%IW10 → 32768 + 10 = 32778
%QXA.B	0X	40960+ A*8 + B	%QX1.1 → 40960 + 1*8 + 1 = 40969
%QBA	4X_bit	40960 + A/2 (A/2 Divisible) [40960 + A/2(Round)].8 (A/2 Not divisible)	%QB10 → 40960 + 10/2 = 40965 %QB11 → [40960 + 11/2(Round)].8=40965.8
%QWA	4X	40960 + A	%QW10 → 40960 + 10 = 40970
%MXA.B	4X_bit	A/2.B (A/2 Divisible) A/2(Round).(B+8) (A/2 Not divisible)	%MX500.3 → 500/2 = 250.3 %MX501.3 → [501/2(Round)].(3+8) = 250.11
%MBA	4X_bit	A/2 (A/2 Divisible) A/2(Round).8 (A/2 Not divisible)	%MB100 → 100/2 = 50 %MB101 → 101/2(Round).8 = 50.8
%MWA	4X	A	%MW100→ 100

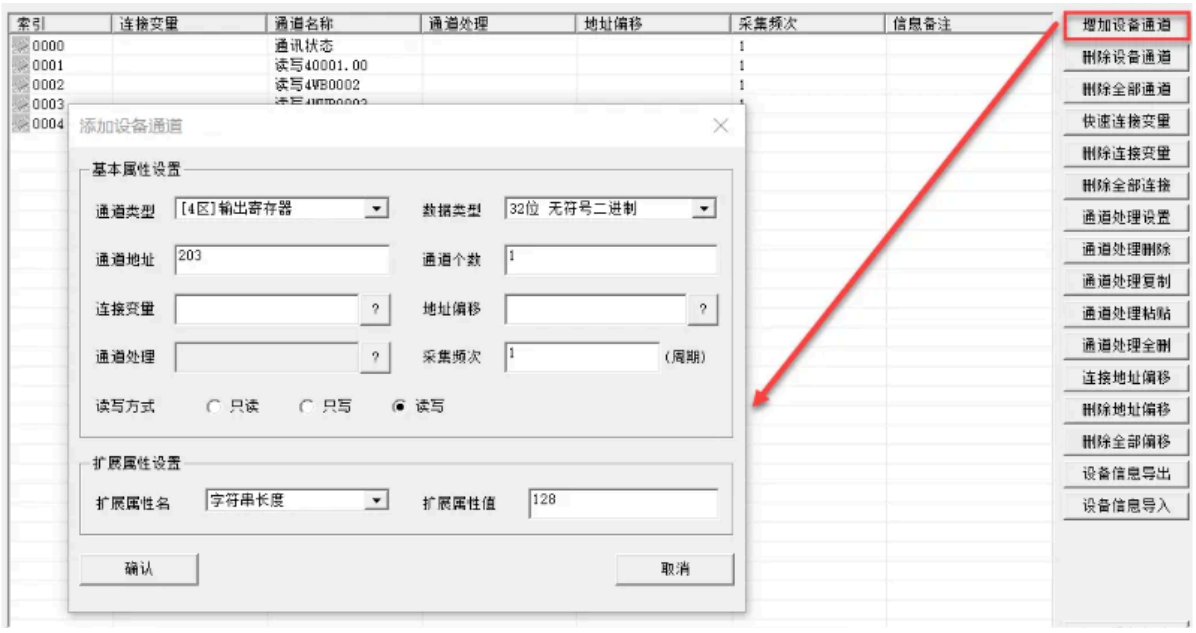
(1) Add the data_bool variable corresponding to the channel. Select [Area 4] Output Register for [Channel Type], select Bit 00 of the channel for [Data Type], and enter 1 for [Channel Address].



(2) Add the data_int variable to the corresponding channel. Select [Area 4] Output Register for [Channel Type], select 16-bit signed binary for [Data Type], and enter 2 for [Channel Address].



(3) Similarly, add other channels.



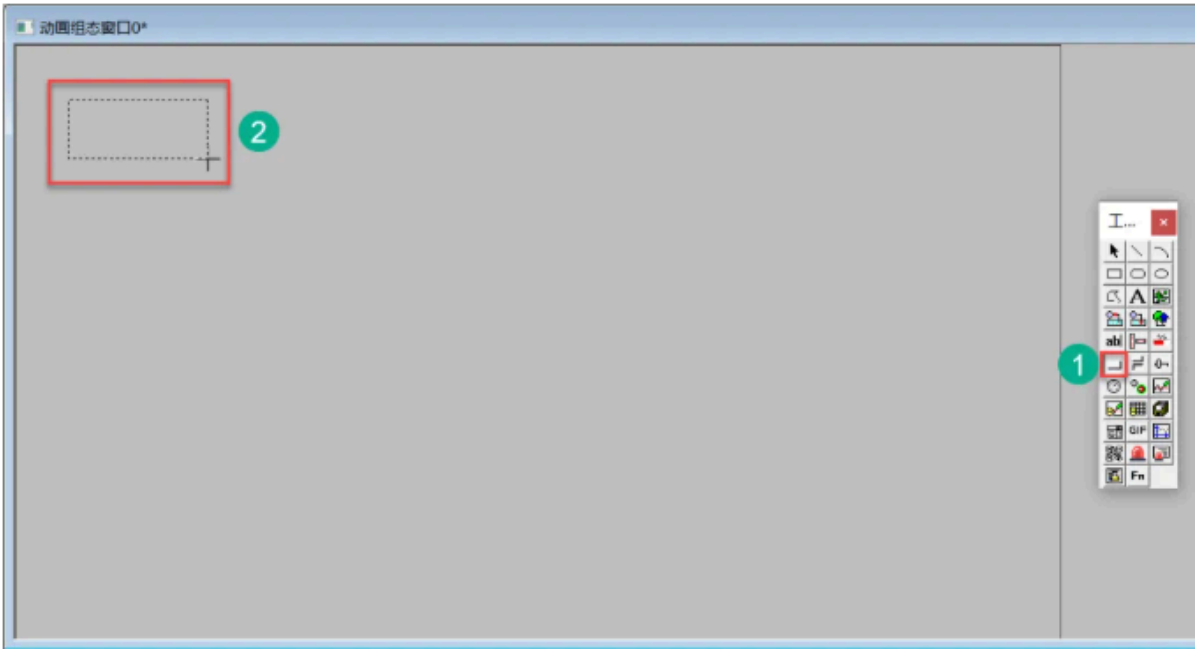
(4) After the channel is established, click [Quick Connect Variable], select [Default Device Variable Connection], and click [OK].

(5) Add variable definitions. Click [OK] and select [Add All] in the pop-up window.

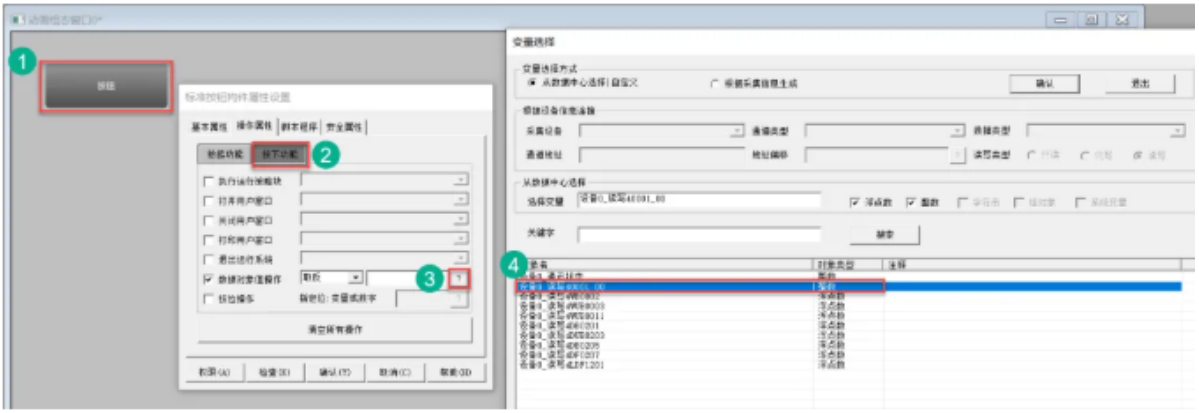
Step 3: Create a new component

(1) Click [User Window], double-click [Window 0]

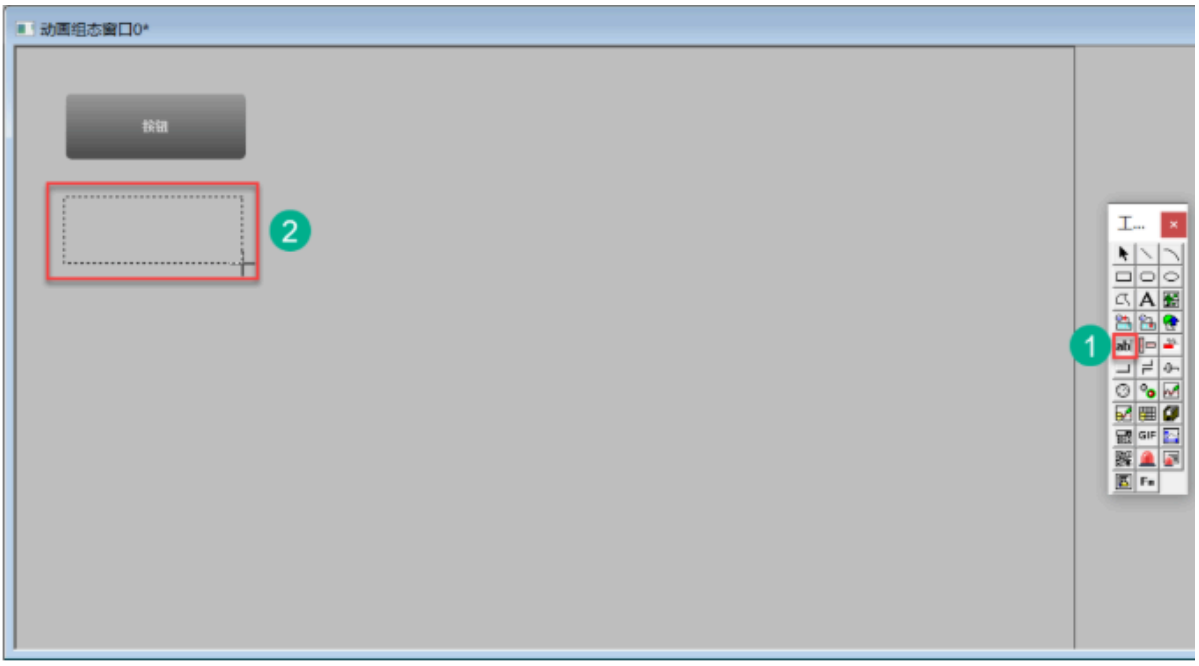
(2) Create a new button component and bind it to a bool variable. Click the button component and draw the button component in the [Animation Configuration Window 0].



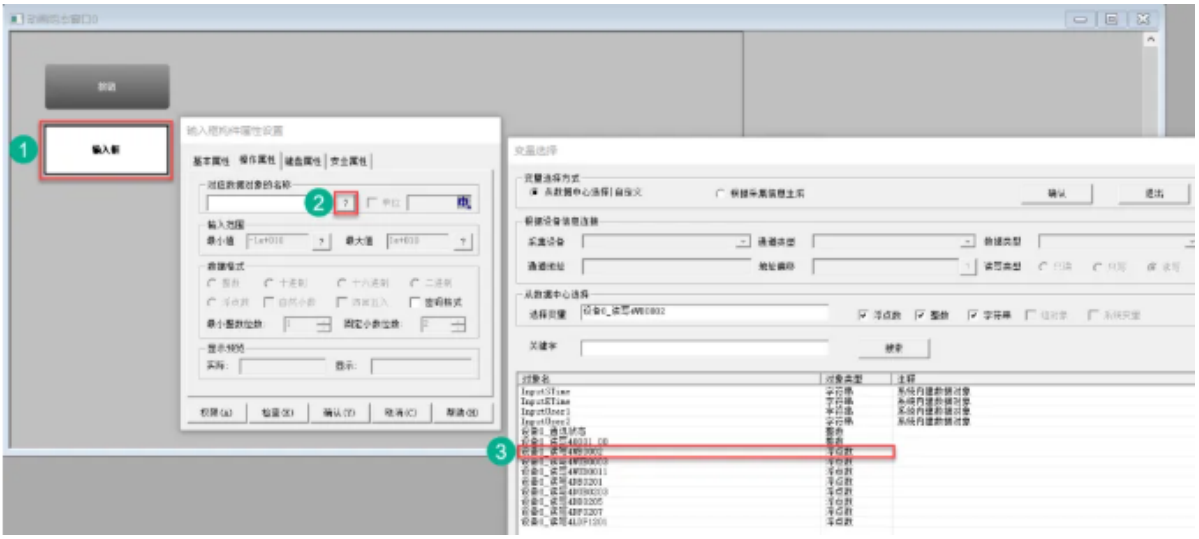
Double-click the button component and select [Press Function] in the Operation Properties interface. Check [Data Object Value Operation], select [Invert],click [?], and select the device channel to be bound.



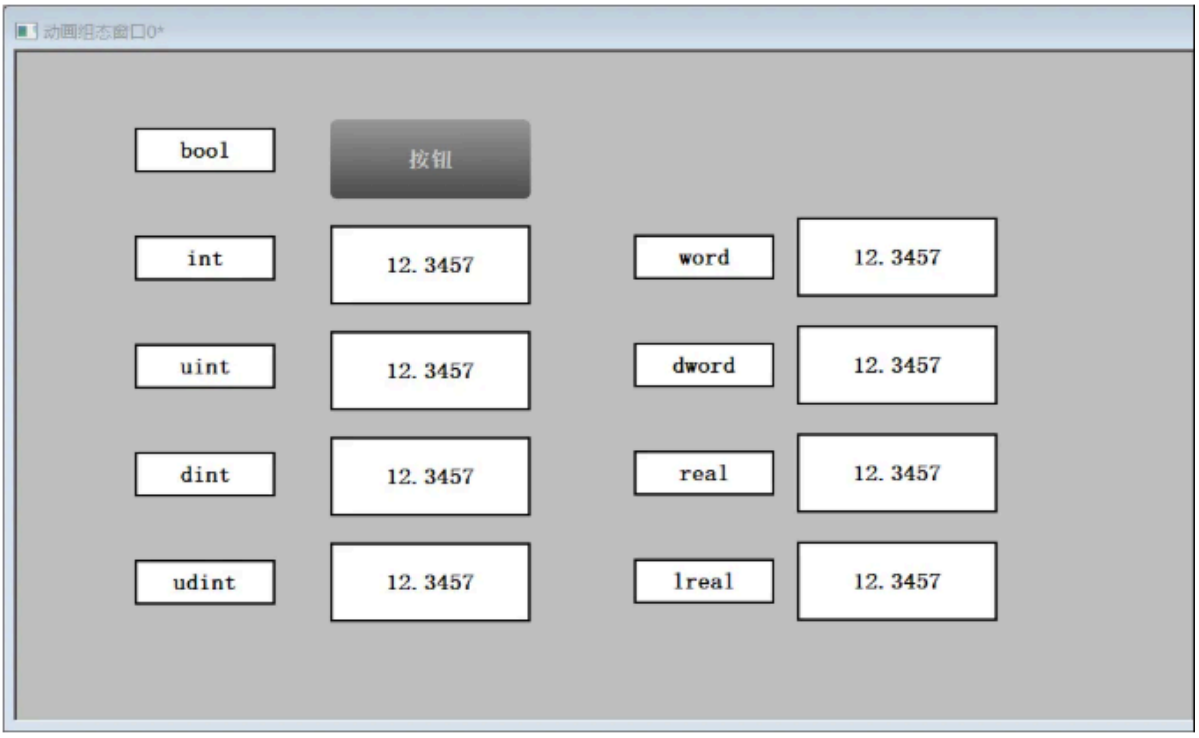
(3) Create an input box component and bind it to an int variable. Click the input box component and draw the input box component in the [Animation Configuration Window 0].



Double-click the input box component, click [?], and select the channel to be bound.

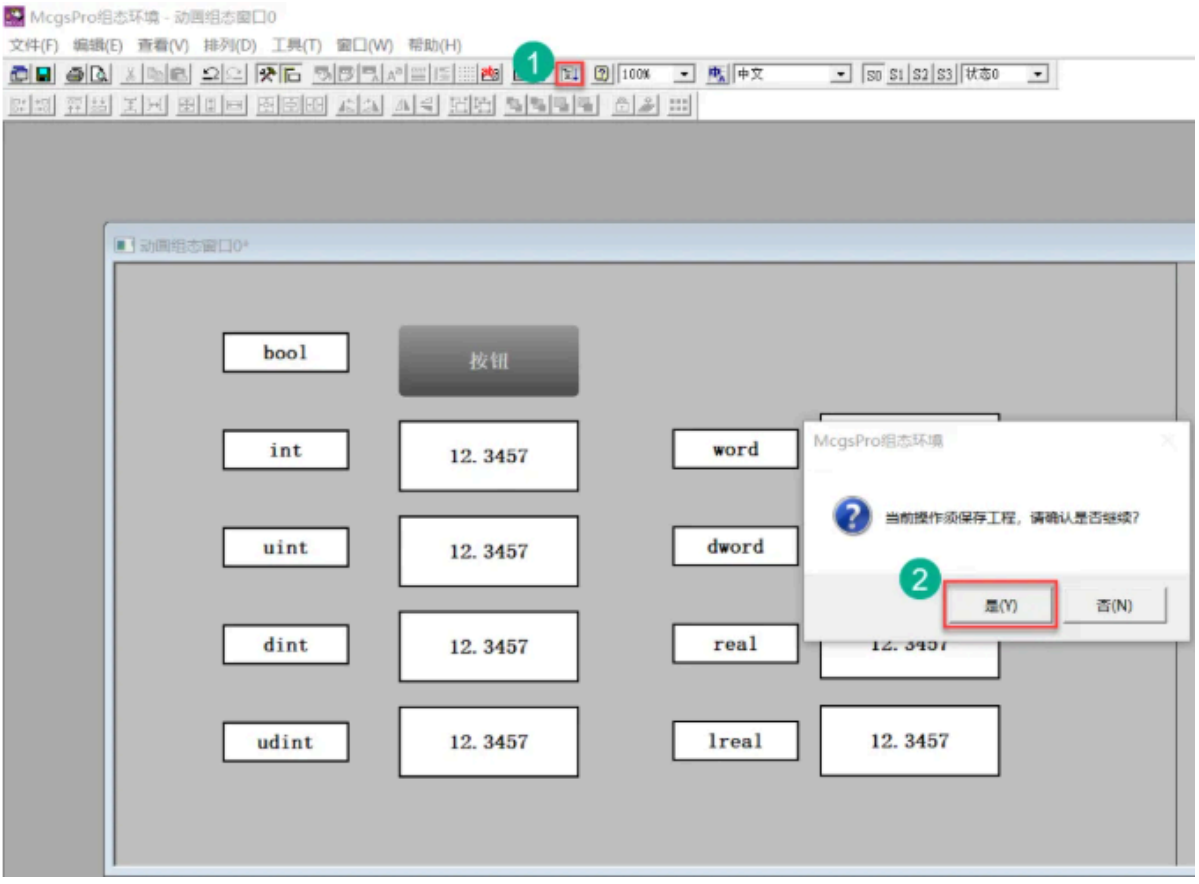


(4) Similarly, create other components and bind them to the corresponding channels. For easy distinction, add text here.

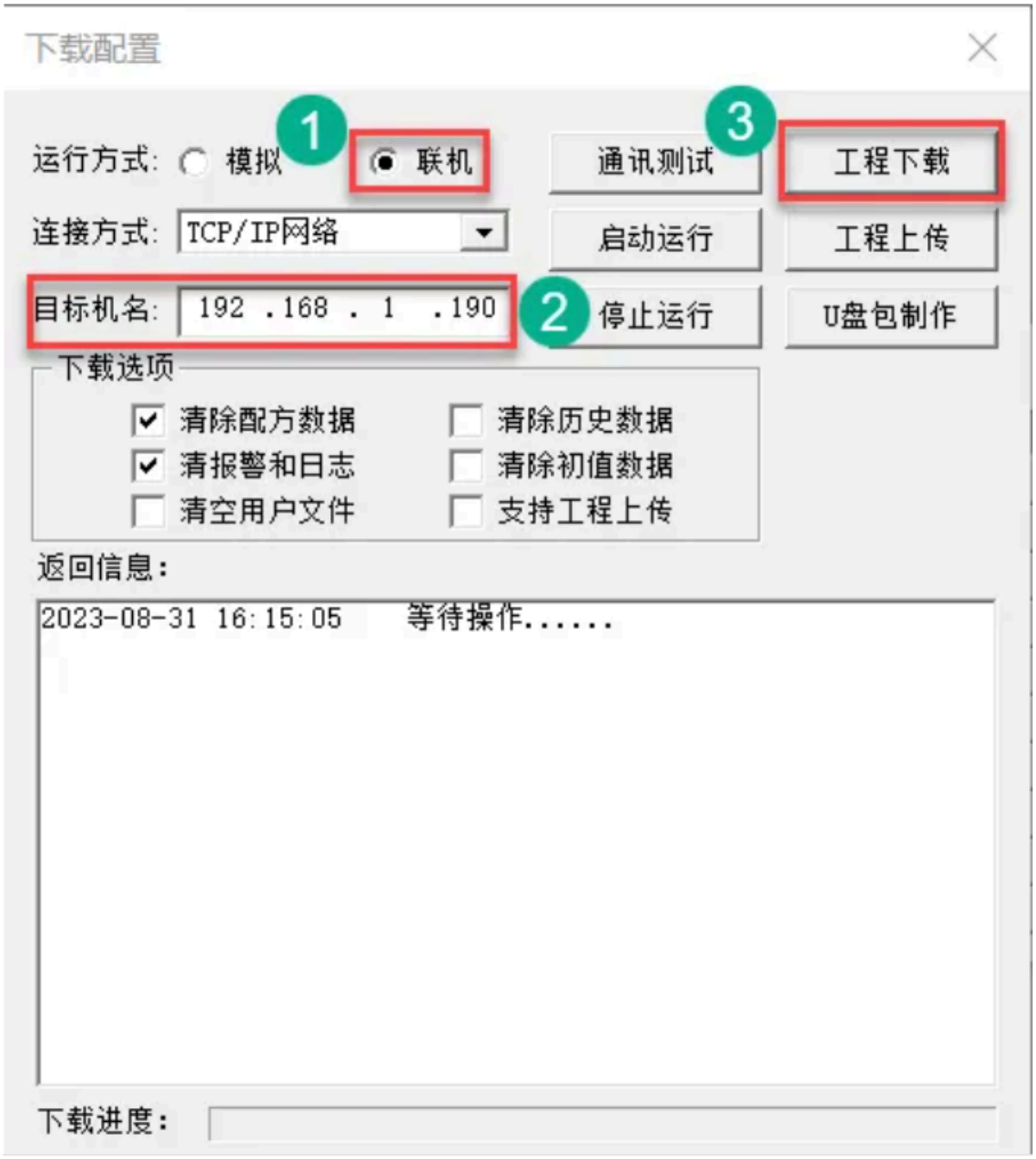


Step 4: Download the program

(1) In the upper menu bar, click [Download and Run]



(2) Select Online in [Run Mode], enter the touch screen IP address (192.168.1.190) in the target machine name, and click [Project Download].

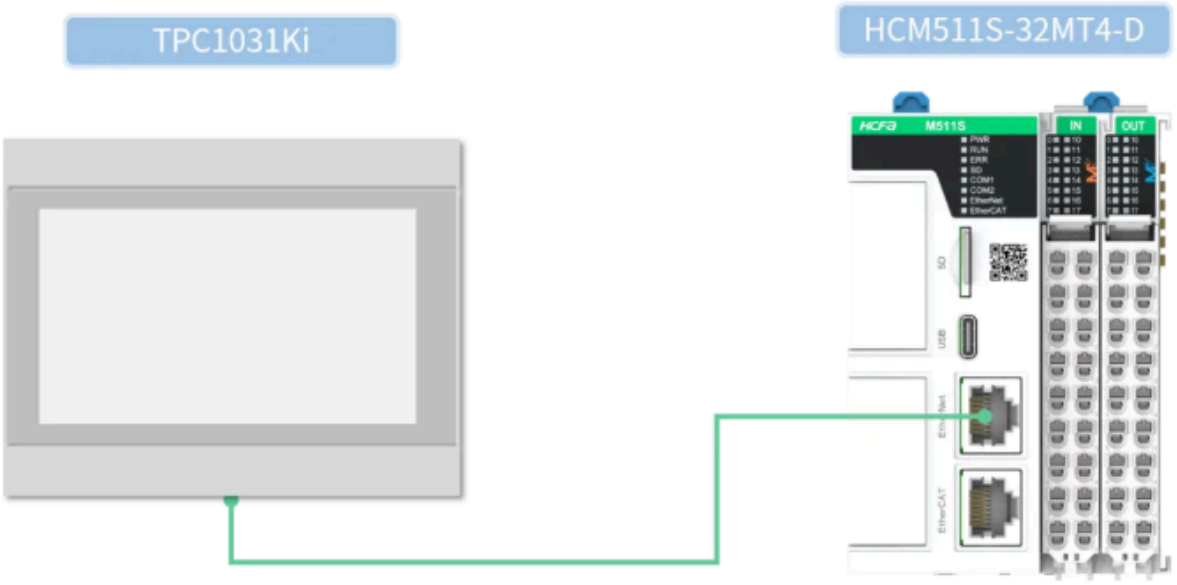


(3) The pop-up window indicates that the download is successful

Communication test

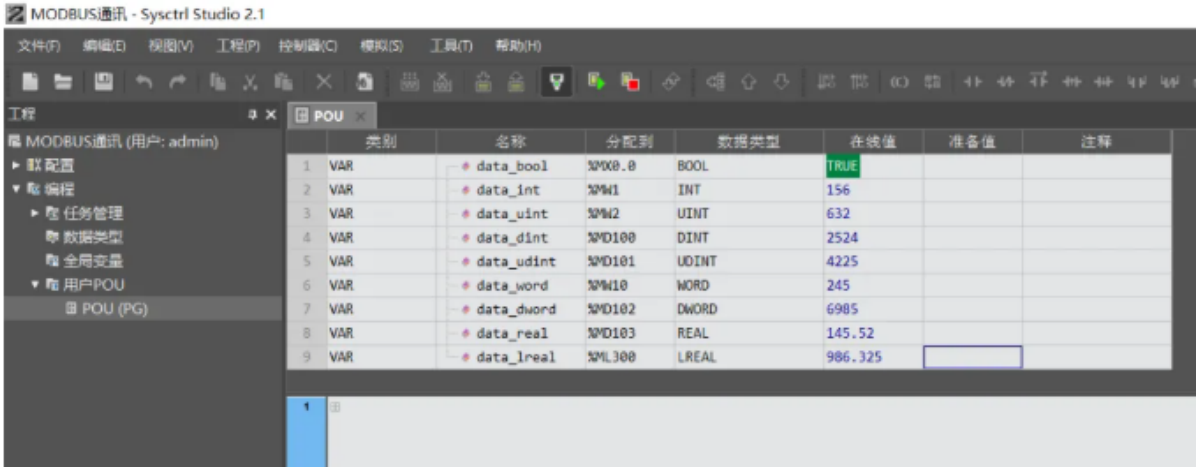
Step 1: Device connection

This tutorial uses the M controller HCM511S-32MT4-D and the touch screen TPC1031Ki. The Modbus TCP communication connection method is shown in the figure below.

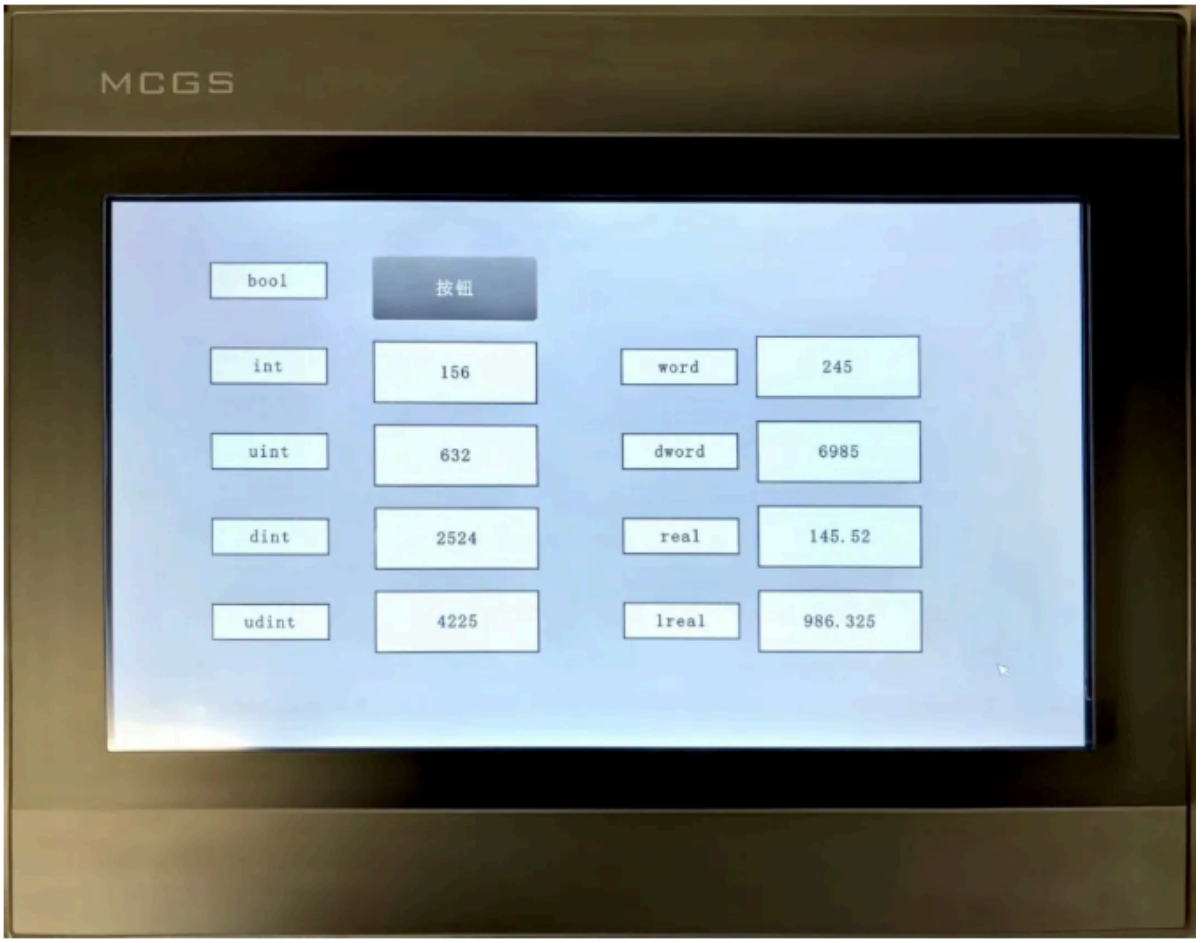


Step 2: Engineering Testing

The Sysctrl project enters the monitoring state and assigns values to variables.



At the same time, the touch screen component displays the corresponding value.

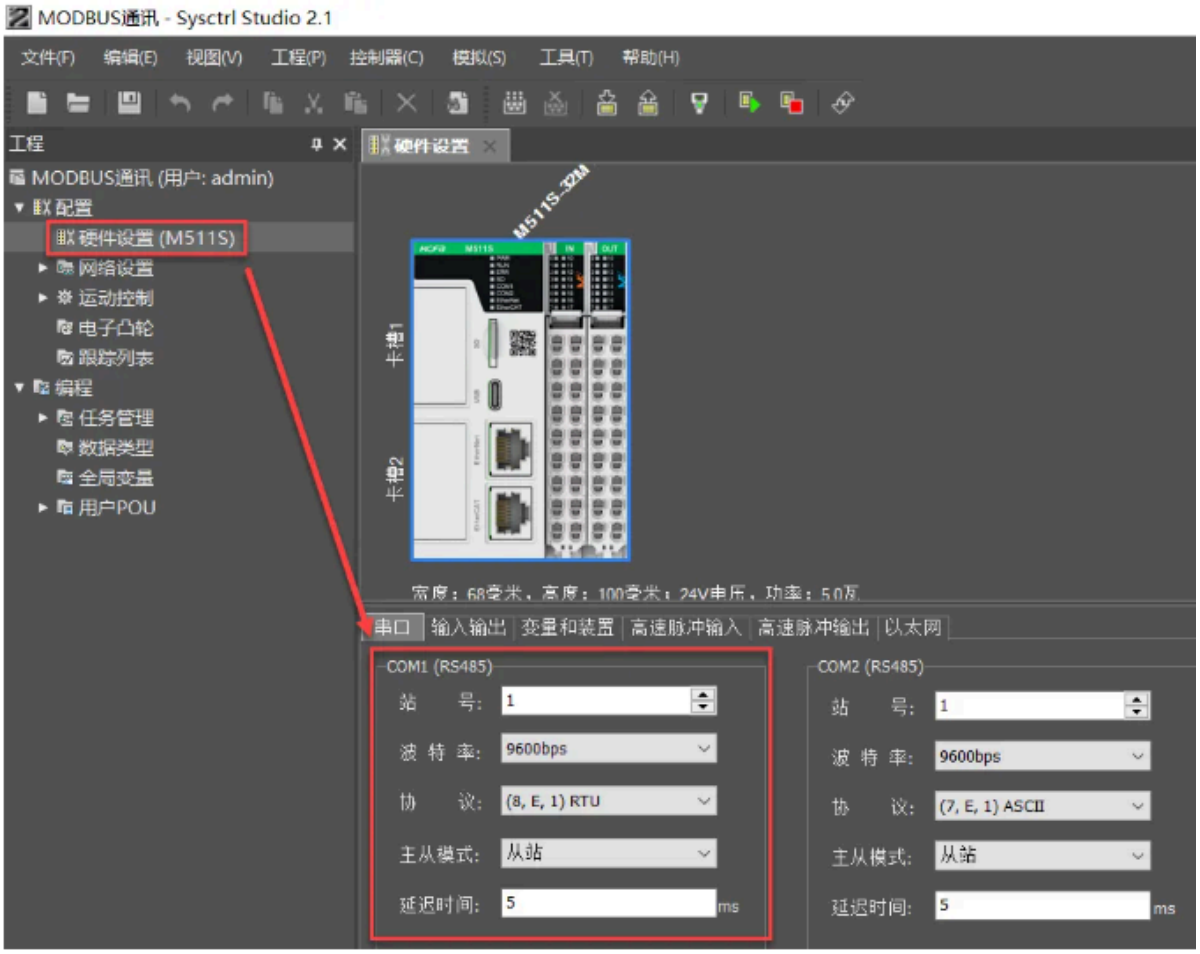


Modbus RTU communication

Sysctrl Studio project configuration

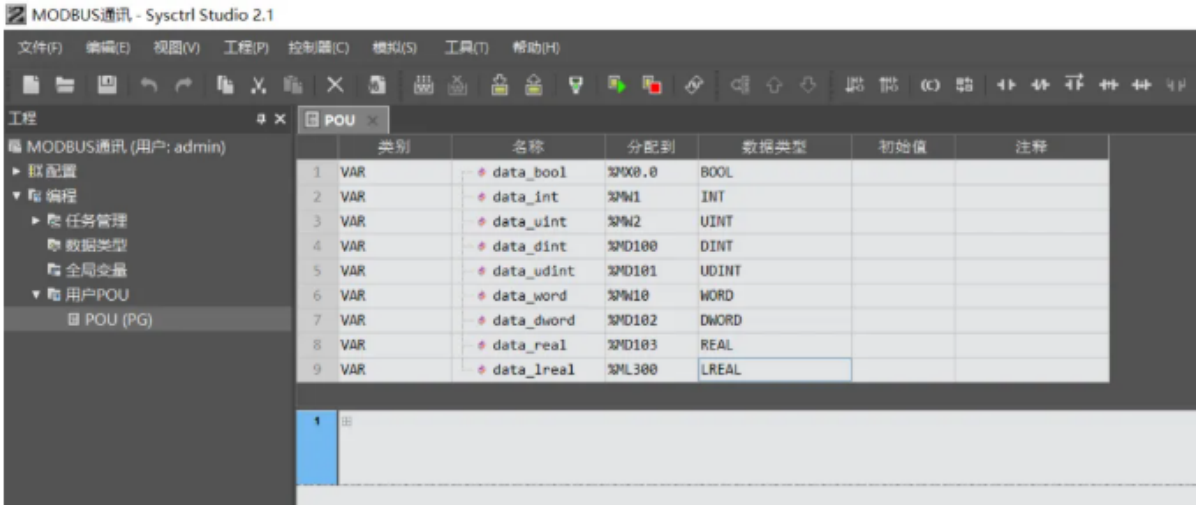
Step 1: Create a new project

Double-click to open Sysctrl Studio and create a new project. Click [Hardware Settings] and make the following settings on the serial port interface. Set the default station number to 1, the baud rate to 9600bps, the protocol to (8,E,1) RTU, and the master-slave mode to slave (with the touch screen as the master).



Step 2: Create a new variable

Open the default POU, right-click in the variable declaration area and select "Add Variable", create a new variable and assign it to the corresponding address. When assigning addresses, pay attention to the device range.



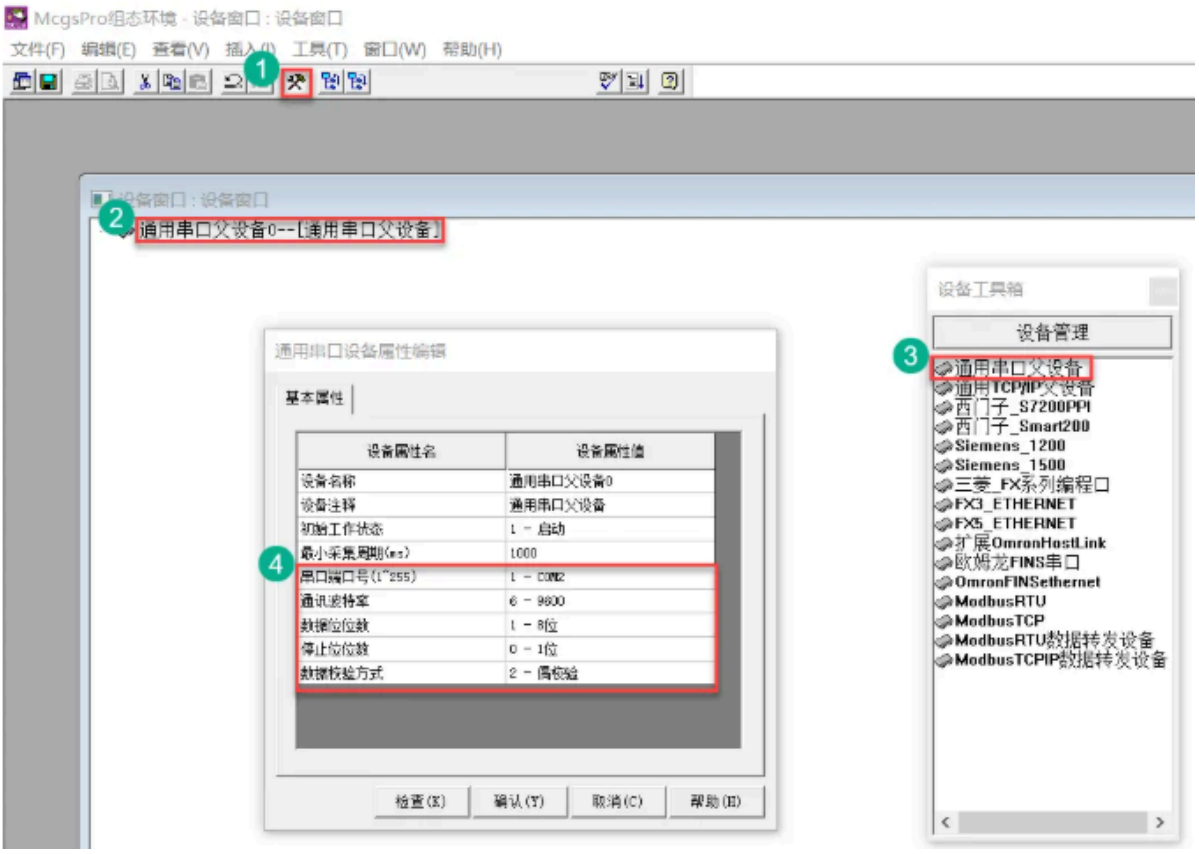
McgsPro software configuration

Step 1: Create a new project

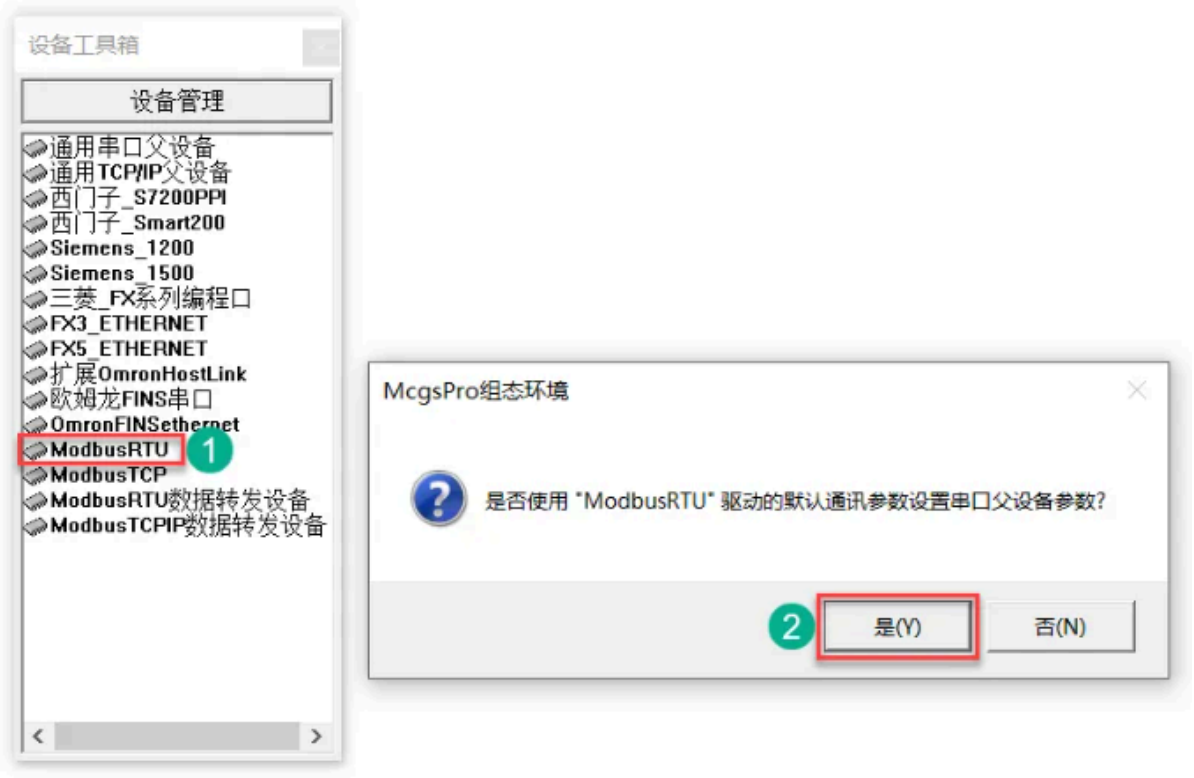
(1) Open the McgsPro configuration software, select [File] in the upper left corner, and click [New Project].

(2) Double-click [Device Window]

(3) Open the toolbox, select [Universal Serial Port Parent Device], and click [Universal Serial Port Parent Device 0]. In the pop-up window, select 1-COM2 for [Serial Port Number], 9600 for [Communication Baud Rate], 8 for [Data Bits], 1 for [Stop Bits], and even for [Data Parity]. These settings must be consistent with the Sysctrl project settings.

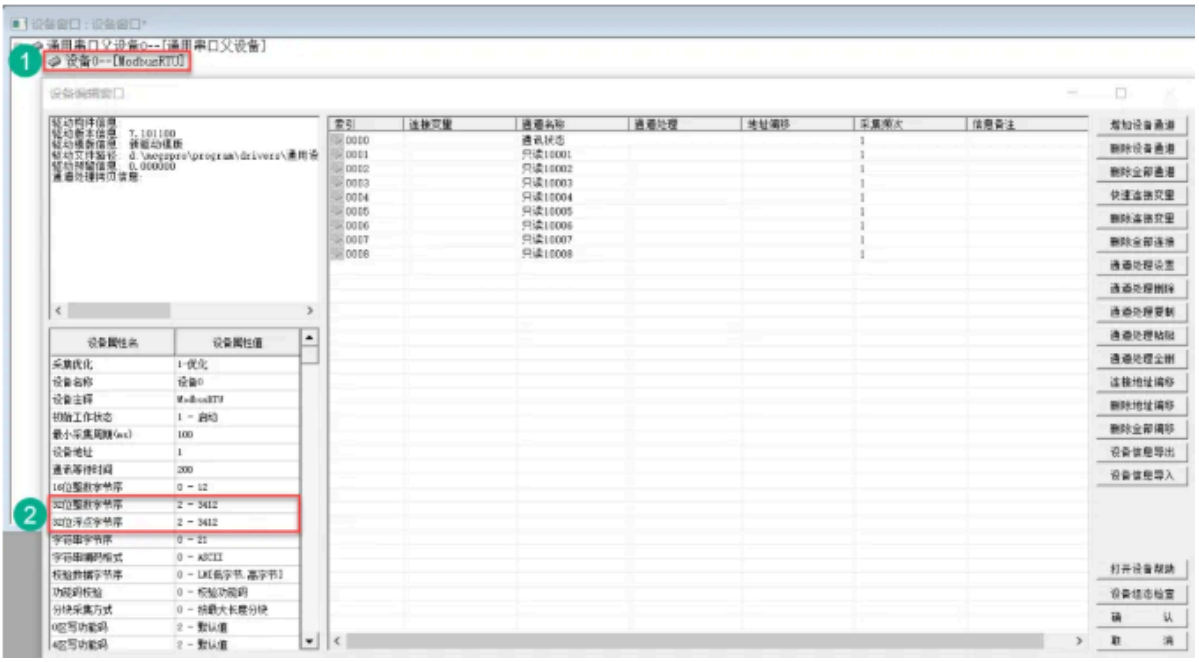


(4) Add Modbus_RTU device



(5) Double-click Device 0—[ModbusRTU]. In the [Device Edit Window], select 2-3412 for 32-bit integer byte order and 32-bit floating point byte order.

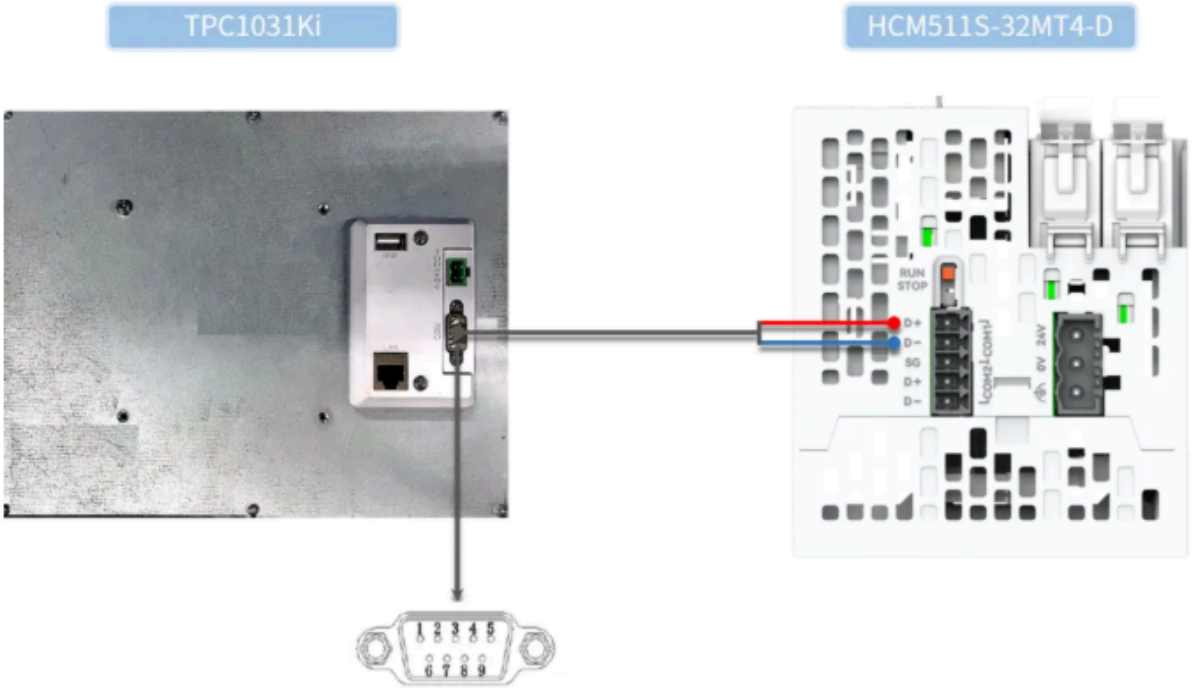
Note: Modbus RTU devices do not currently support 64-bit floating point numbers.



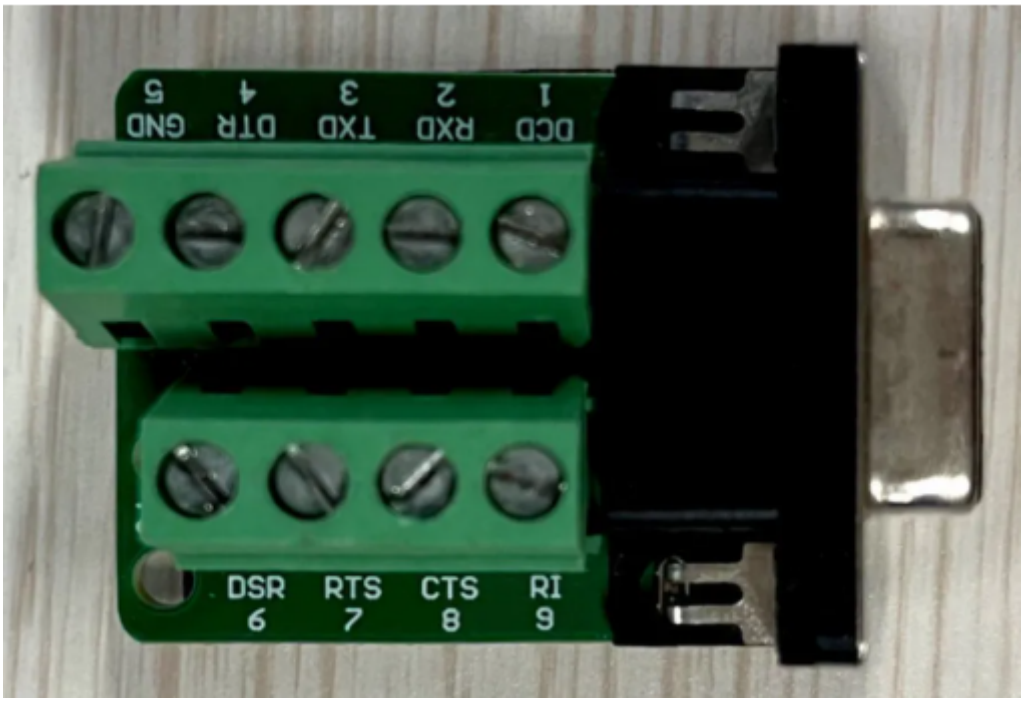
The process of creating new channels and components is basically the same as that of Modbus TCP communication.

Communication connection

This tutorial uses the M controller HCM511S-32MT4-D and the touch screen TPC1031Ki. The Modbus RTU communication connection method is shown in the figure below.

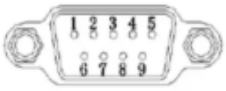


A serial port tool is used here. The Kunluntongtai touch screen's RS485 interface is a DB9 male connector, with pin 7 for RS485+ and pin 8 for RS485-. Connect pins 7 and 8 of the serial port tool to the D+ and D- terminals of the M511S, respectively. Plug the DP9 female connector on the other end of the serial port tool into the touch screen's COM port.



The HMI COM interface DB9 male pin definition is as follows.

DB9接口公头



接口	引脚	定义
COM1	2	RS232 RXD
	3	RS232 TXD
	5	GND
COM2	7	RS485+
	8	RS485-