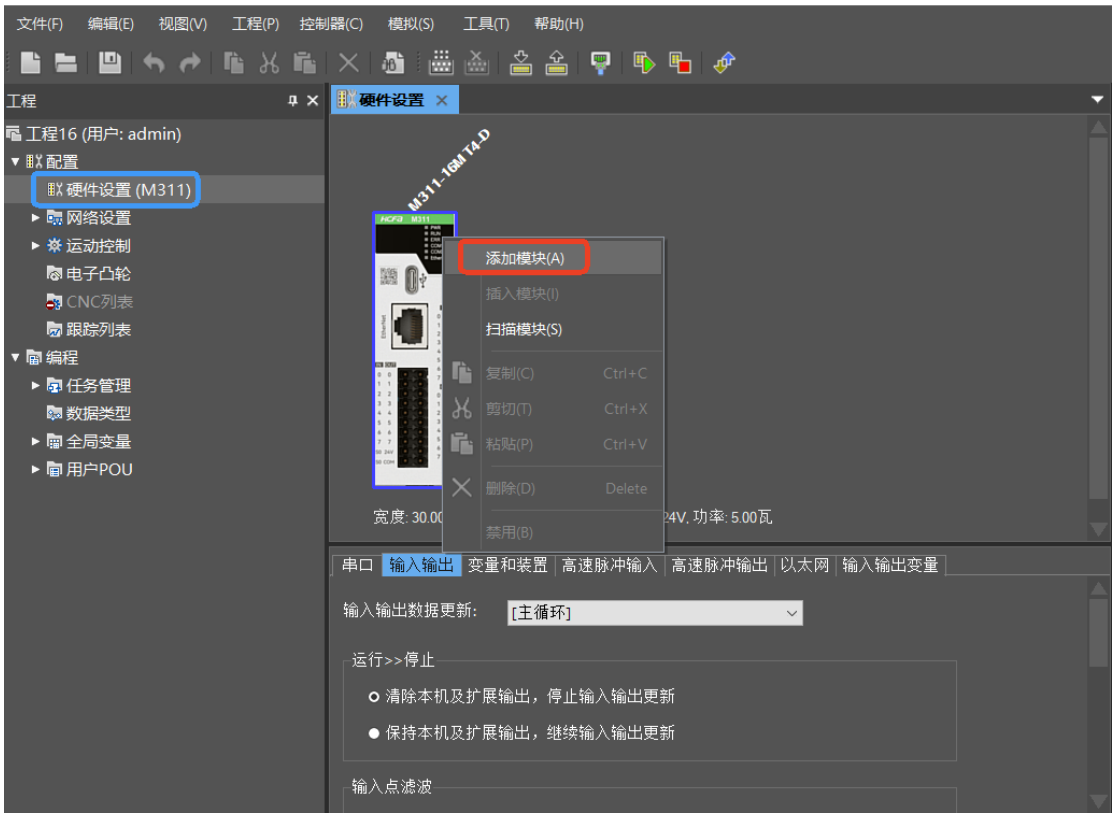
M series Tmperature Measurement modules Note

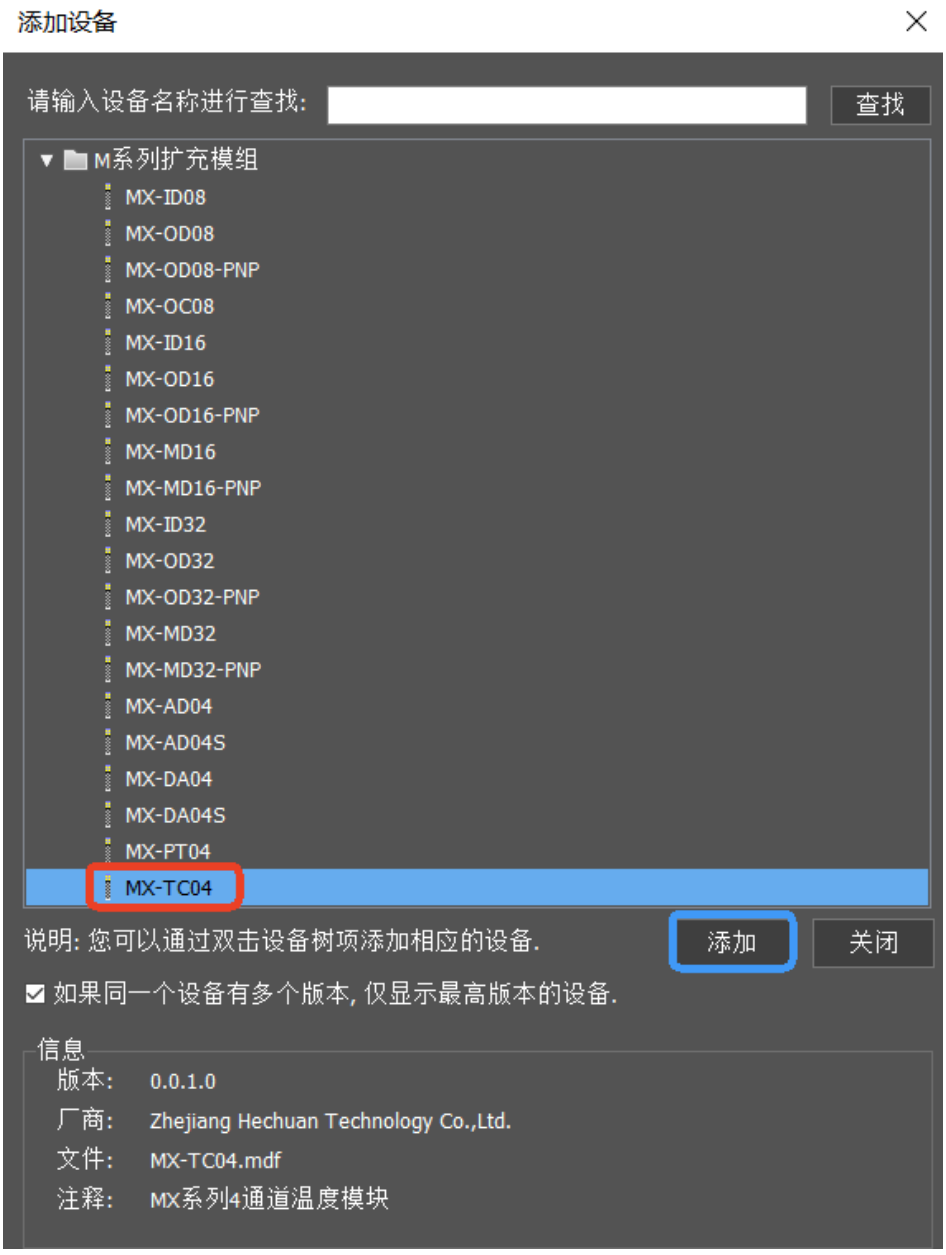
Programming Example for HCMX-TC04 Module

This example is illustrated based on a system built with the **HCM311 Controller**c and **HCMX-TC04-D Module**:

1. Double-click Hardware Settings in the blue box as shown below. Click the host icon on the right, then right-click it, and select the Add Module (A) option in the red box below to bring up the Add Device dialog box.

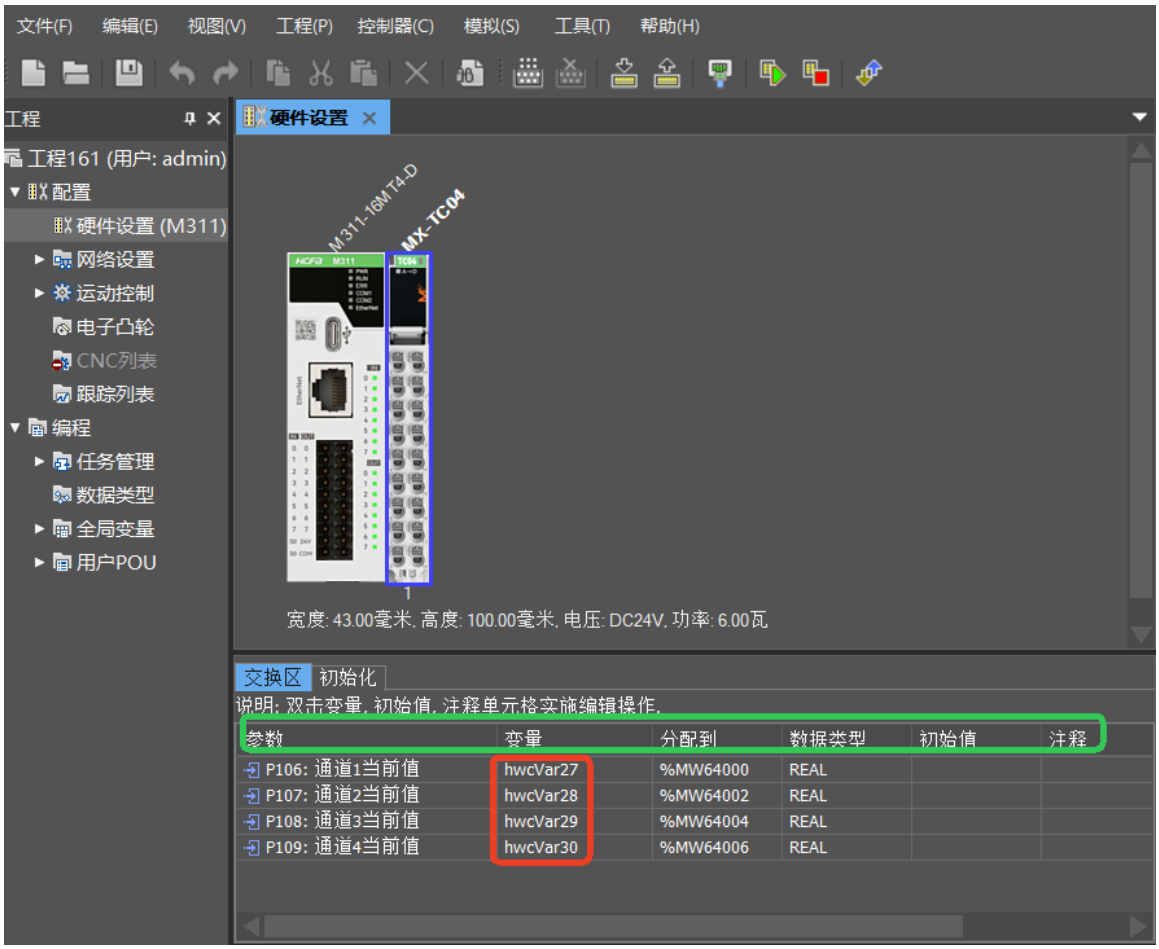


2. Double-click MX-TC04 in the red box as shown below to add the module. Alternatively, select MX-TC04 in the red box, then click the Add button in the blue box to add the module. After adding the module, click the Close button to exit the Add Device dialog box.



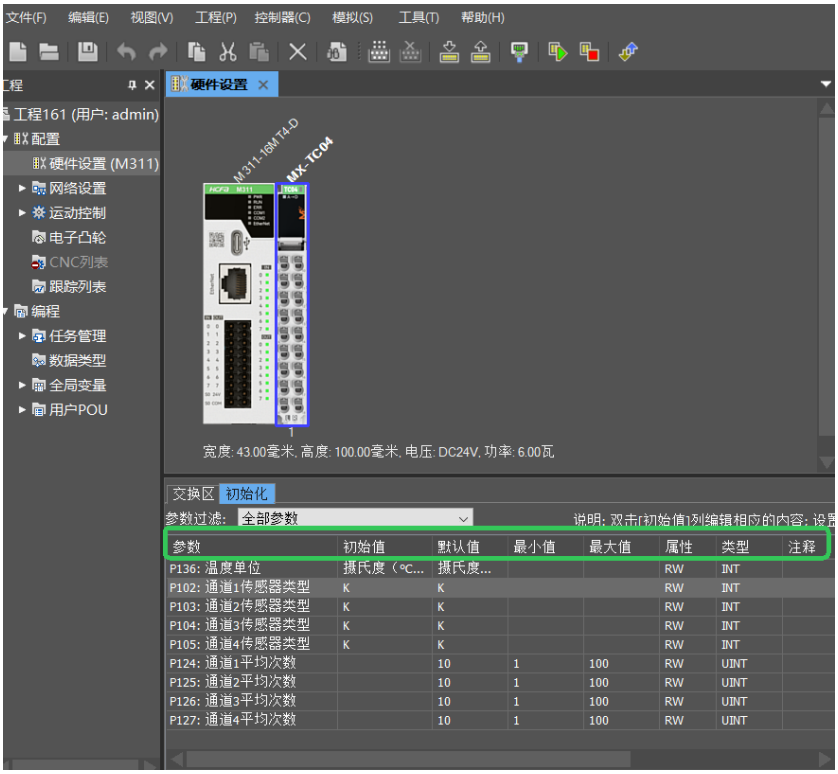
3. The interface after adding the module is shown below, which is divided into two tabs: **Exchange Area** and **Initialization**. The Exchange Area tab is displayed as follows. As indicated in the red box below, the software generates default variables for the current values of the module's 4 channels. Users can either modify the variable names or directly use the default ones. As shown in the green box below, the meanings of each parameter on the Exchange Area tab are described in the table below.

Parameters	Descriptions
Parameters	Parameter number and parameter name corresponding to the module. As shown in the figure below, P106: Channel 1 Current Value — P106 denotes the module parameter number, and Channel 1 Current Value denotes the module parameter name.
Varibale	Variable names in the controller to which the current value parameters of the module's 4 channels are mapped
Assigned to	Device in the controller to which the module parameters are mapped. The device here is determined by the module's position on the right side of the controller and cannot be modified. It is not recommended to use this device to read or control module parameters.
Data type	Data type corresponding to the variable, which is determined by the module parameter type and cannot be modified.
Initial value	Initial value corresponding to the variable, which is written once when the controller is running. No setting is required for temperature modules.
Comment	Comment corresponding to the variable.

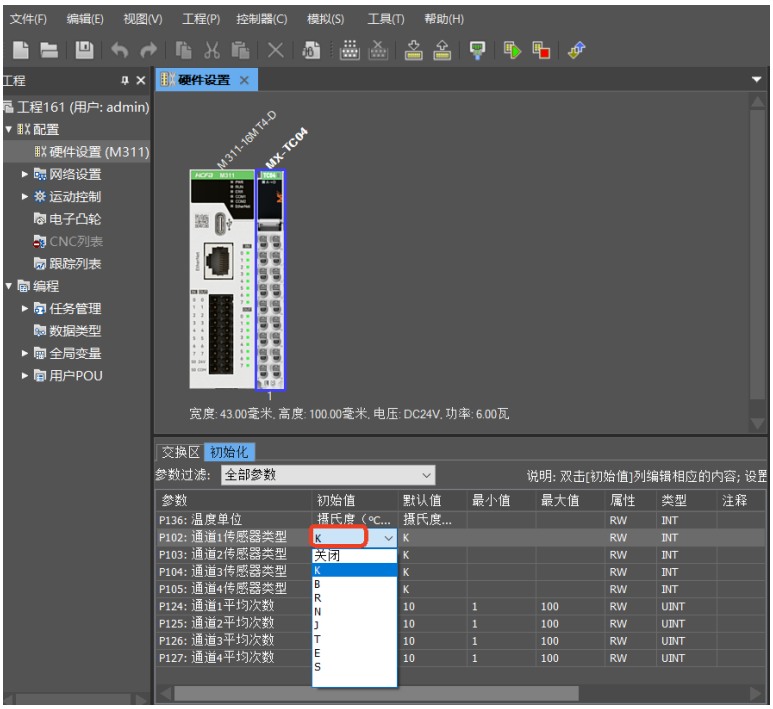

文件(F)
编辑(E)
视图(V)
工程(P)
控制器(C)
模拟(S)
工具(T)
帮助(H)
工程
工程161 (用户: admin)
配置
硬件设置 (M311)
网络设置
运动控制
电子凸轮
CNC列表
跟踪列表
编程
任务管理
数据类型
全局变量
用户POU
硬件设置
M311-16MT4-D
MX-TC04
宽度: 43.00毫米, 高度: 100.00毫米, 电压: DC24V, 功率: 6.00瓦
交换区
初始化
说明: 双击变量, 初始值, 注释单元格实施编辑操作.
参数
变量
分配到
数据类型
初始值
注释
P106: 通道1当前值
hwcVar27
%MW64000
REAL
P107: 通道2当前值
hwcVar28
%MW64002
REAL
P108: 通道3当前值
hwcVar29
%MW64004
REAL
P109: 通道4当前值
hwcVar30
%MW64006
REAL

4. The interface after adding the module is shown below, which is divided into two tabs: Exchange Area and Initialization. As indicated in the green box below, the meanings of each parameter on the Initialization tab are described in the table below.

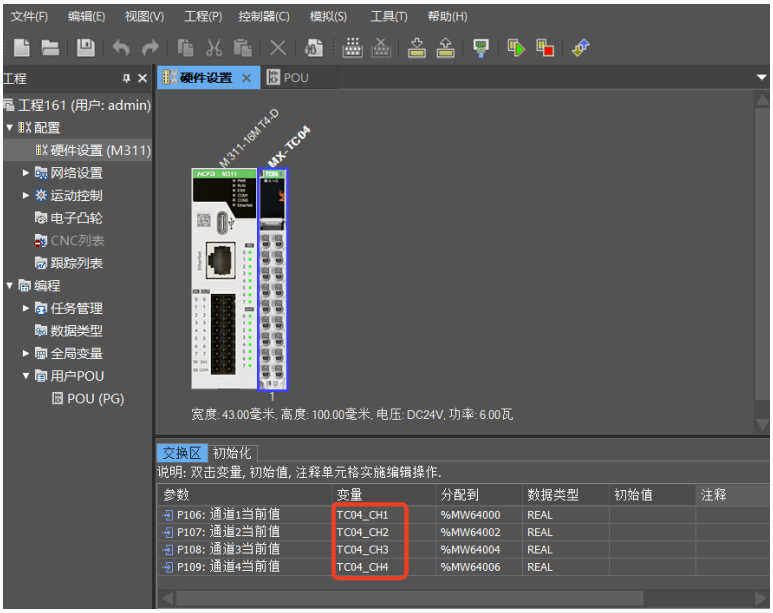
Parameters	Descriptions
Parameters	Parameter number and parameter name corresponding to the module. As shown in the figure below, P102: Channel 1 Sensor Type — P102 denotes the module parameter number, and Channel 1 Sensor Type denotes the module parameter name. For detailed explanations of the module-related parameters, please refer to the detailed descriptions in the Parameter Description chapter.
Initial value	The initial value of the module parameter is written to the module once in the following scenarios: when the controller operates after power-on, when the controller switches from stop to run mode, and when the controller runs after a download. The sensor type, averaging count, and other settings can be modified via the initial value of the parameter.
Default value	Default value of the module parameter
Minimum value	Minimum value of the module parameter
Maximum value	Maximum value of the module parameter
Property	Flag indicating whether the module parameter is readable and writable; **RW** means read-write capability.
Type	Data type corresponding to the module parameter
Comment	Comment corresponding to the module parameter



5. On the Initialization tab, double-click the area in the red box as shown below to modify the sensor type of Channel 1.

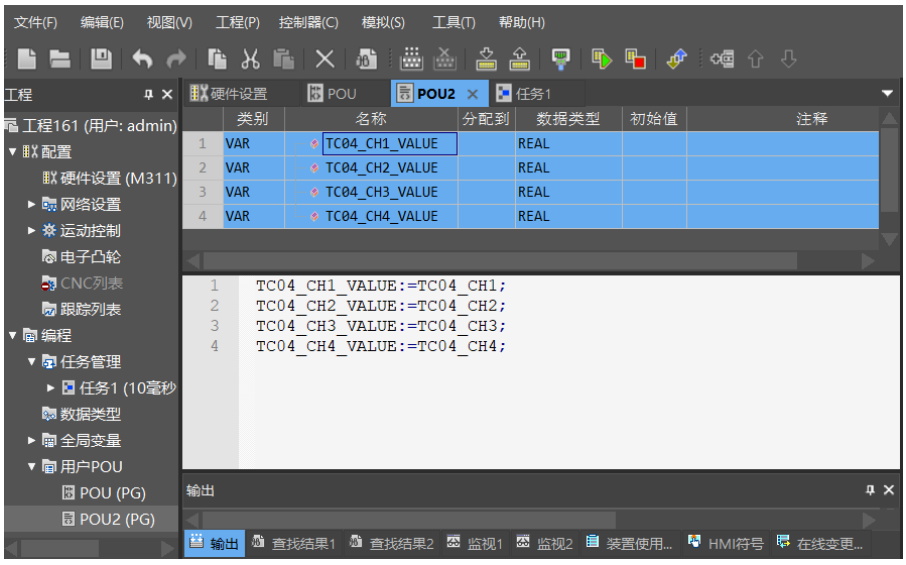


6. As indicated in the red box below, modify the variable names corresponding to the current values of the module's 4 channels.

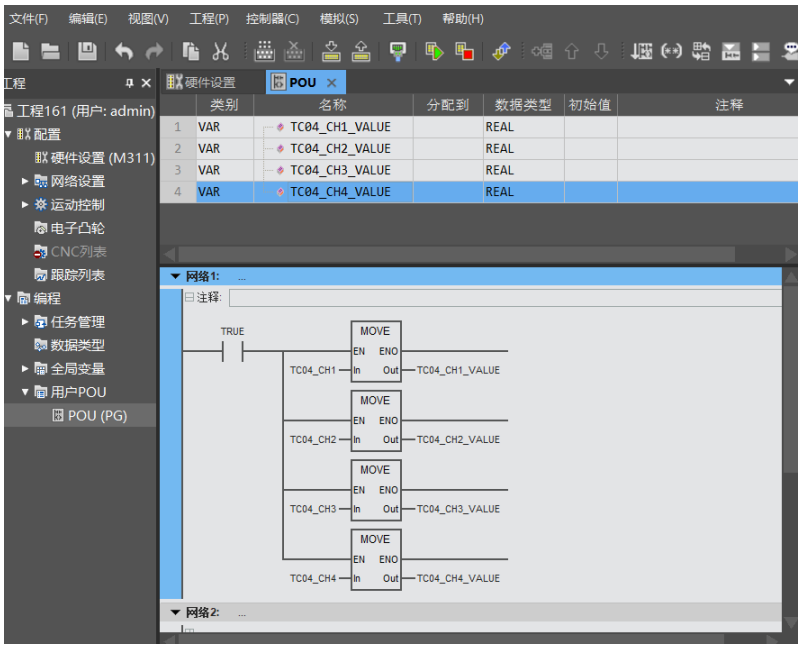


7. Program Example

Add custom variables TC04_CH1_VALUE, TC04_CH2_VALUE, TC04_CH3_VALUE, and TC04_CH4_VALUE to the variable table, and assign the current values of the four channels of the temperature module to these custom variables respectively. LD as follow:

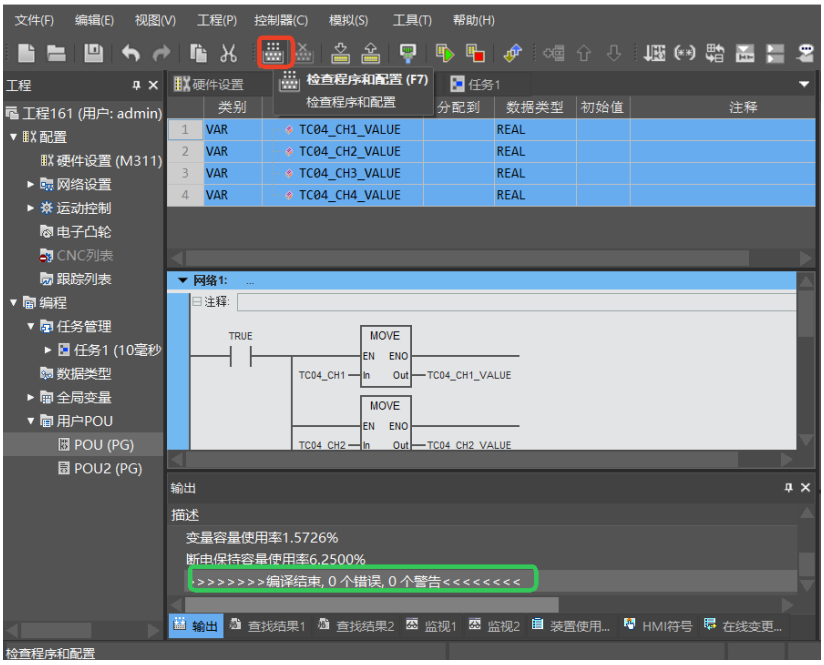


LD type:



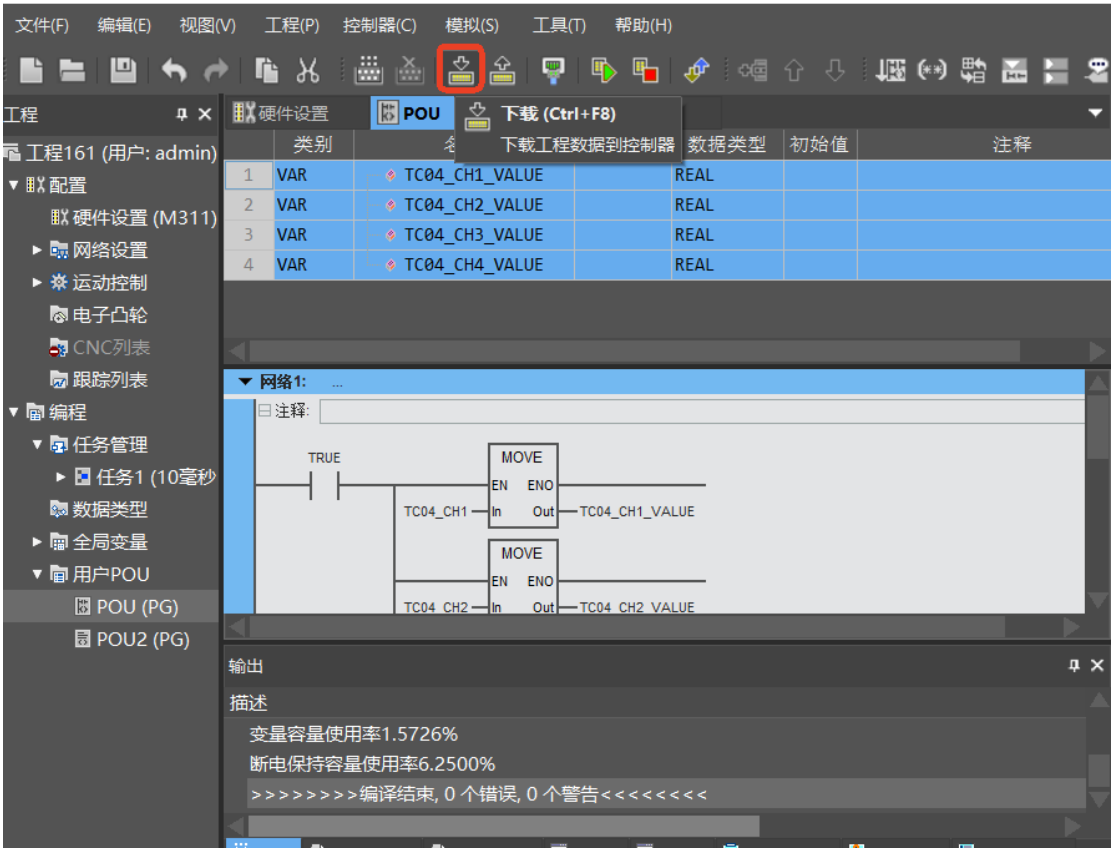
8. Check Programs and Configurations

   Click on the red box in the image below to check programs and configurations. If the green box shows 0 errors, it indicates that there are no issues with the programs and configurations.



9. Download

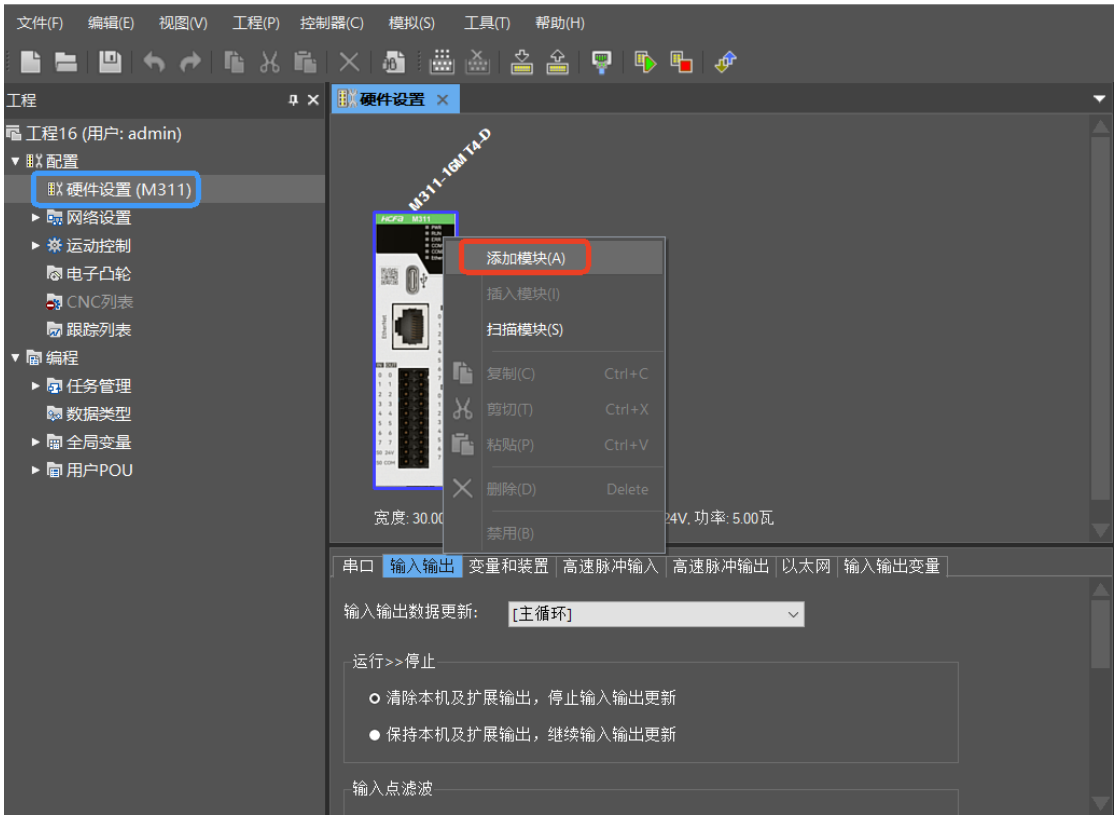
Click on the red box in the image below to download the project data to the controller.



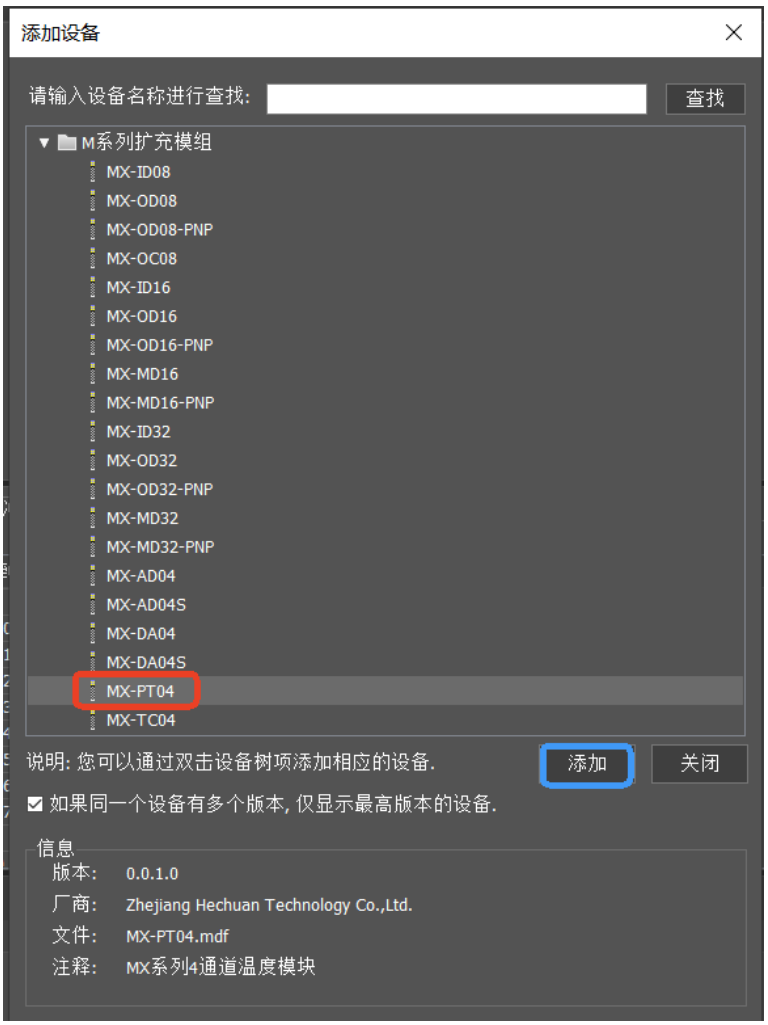
Programming Example for HCMX-PT04 Module

This example uses a system built with the HCM311 controller and the HCMX-PT04-D module for explanation:

1. Double-click the "Hardware Settings" in the blue box in the image below, click on the host icon on the right, then right-click and select the "Add Module (A)" option in the red box in the image below. The "Add Device" dialog box will pop up.

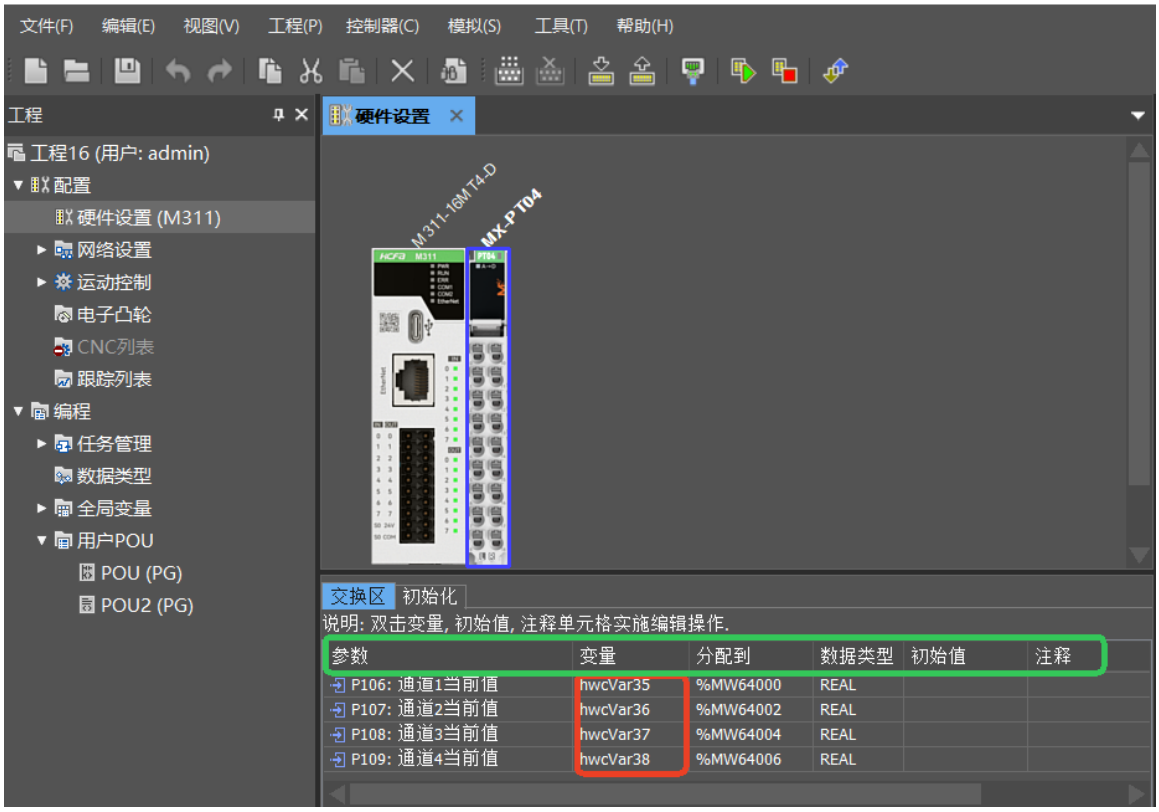


2. Double-click "MX-PT04" in the red box of the image below to add the module, or click to select "MX-PT04" in the red box and then click the "Add" button in the blue box to add the module. After adding the module, click the "Close" button in the image below to close the "Add Device" dialog box.



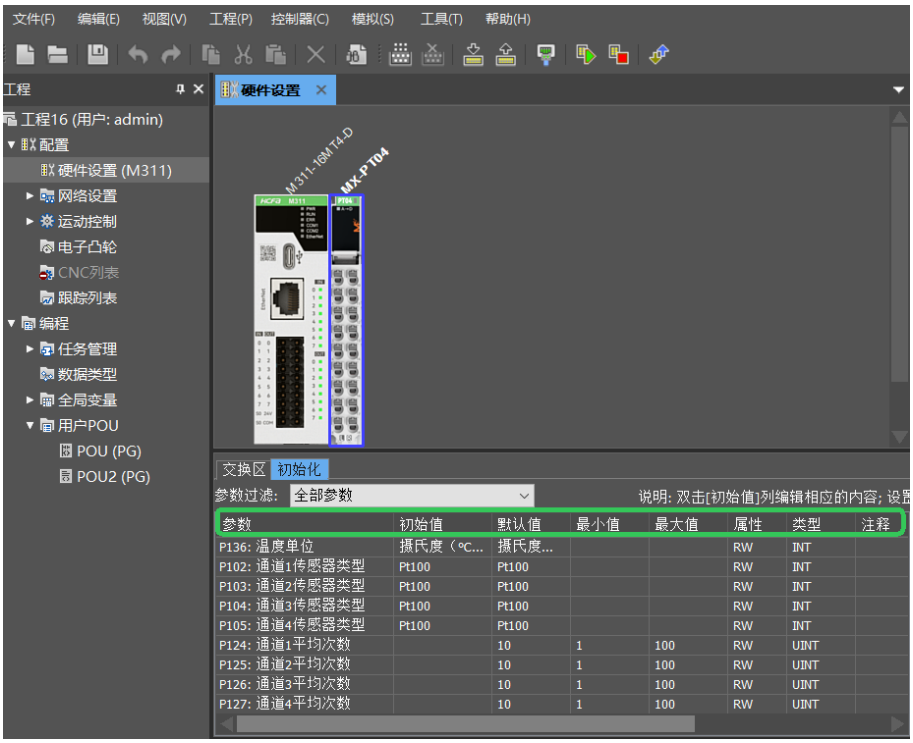
3. The interface after adding the module is shown below, which is divided into two tabs: Exchange Area and Initialization. The Exchange Area tab is displayed as follows. As indicated in the red box below, the software generates default variables for the current values of the module's 4 channels. Users can either modify the variable names or directly use the default ones. As shown in the green box below, the meanings of each parameter on the Exchange Area tab are described in the table below.

Parameters	Descriptions
Parameters	Parameter number and parameter name corresponding to the module. As shown in the figure below, P106: Channel 1 Current Value — P106 denotes the module parameter number, and Channel 1 Current Value denotes the module parameter name.
Varibale	Variable names in the controller to which the current value parameters of the module's 4 channels are mapped
Assigned to	Device in the controller to which the module parameters are mapped. The device here is determined by the module's position on the right side of the controller and cannot be modified. It is not recommended to use this device to read or control module parameters.
Data type	Data type corresponding to the variable, which is determined by the module parameter type and cannot be modified.
Initial value	Initial value corresponding to the variable, which is written once when the controller is running. No setting is required for temperature modules.
Comment	Comment corresponding to the variable.

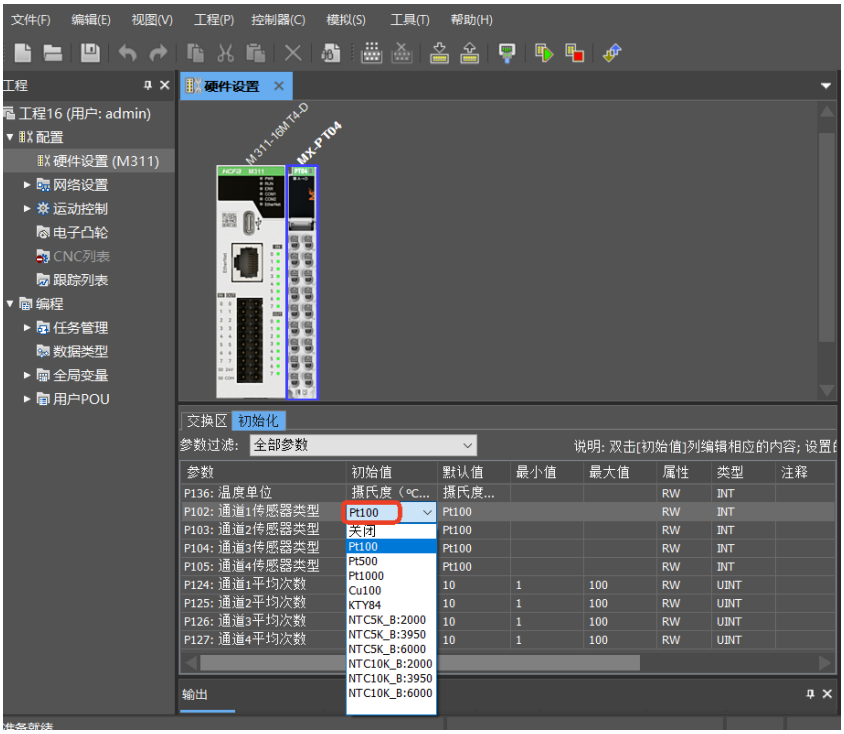

文件(F)
编辑(E)
视图(V)
工程(P)
控制器(C)
模拟(S)
工具(T)
帮助(H)
工程
工程16 (用户: admin)
配置
硬件设置 (M311)
网络设置
运动控制
电子凸轮
CNC列表
跟踪列表
编程
任务管理
数据类型
全局变量
用户POU
POU (PG)
POU2 (PG)
硬件设置
M311-16MT4-D
MX-PT04
交换区
初始化
说明: 双击变量, 初始值, 注释单元格实施编辑操作.
参数
变量
分配到
数据类型
初始值
注释
P106: 通道1当前值
hwcVar35
%MW64000
REAL
P107: 通道2当前值
hwcVar36
%MW64002
REAL
P108: 通道3当前值
hwcVar37
%MW64004
REAL
P109: 通道4当前值
hwcVar38
%MW64006
REAL

4. The interface after adding the module is shown below, which is divided into two tabs: Exchange Area and Initialization. As indicated in the green box below, the meanings of each parameter on the Initialization tab are described in the table below.

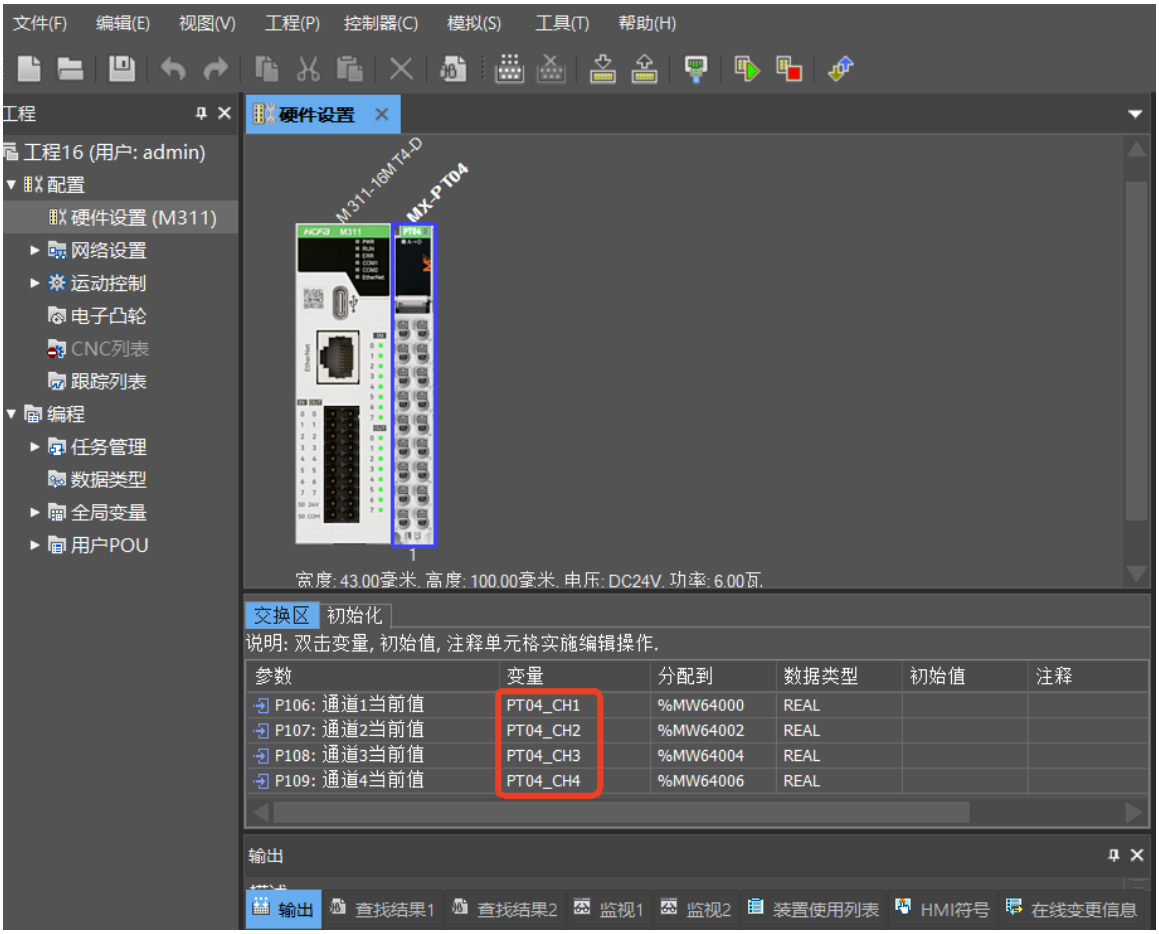
Parameters	Descriptions
Parameters	Parameter number and parameter name corresponding to the module. As shown in the figure below, P102: Channel 1 Sensor Type — P102 denotes the module parameter number, and Channel 1 Sensor Type denotes the module parameter name. For detailed explanations of the module-related parameters, please refer to the detailed descriptions in the Parameter Description chapter.
Initial value	The initial value of the module parameter is written to the module once in the following scenarios: when the controller operates after power-on, when the controller switches from stop to run mode, and when the controller runs after a download. The sensor type, averaging count, and other settings can be modified via the initial value of the parameter.
Default value	Default value of the module parameter
Minimum value	Minimum value of the module parameter
Maximum value	Maximum value of the module parameter
Property	Flag indicating whether the module parameter is readable and writable; **RW** means read-write capability.
Type	Data type corresponding to the module parameter
Comment	Comment corresponding to the module parameter



5. On the "Initialization" page, double-click the area marked in red in the image below to change the sensor type for Channel 1.



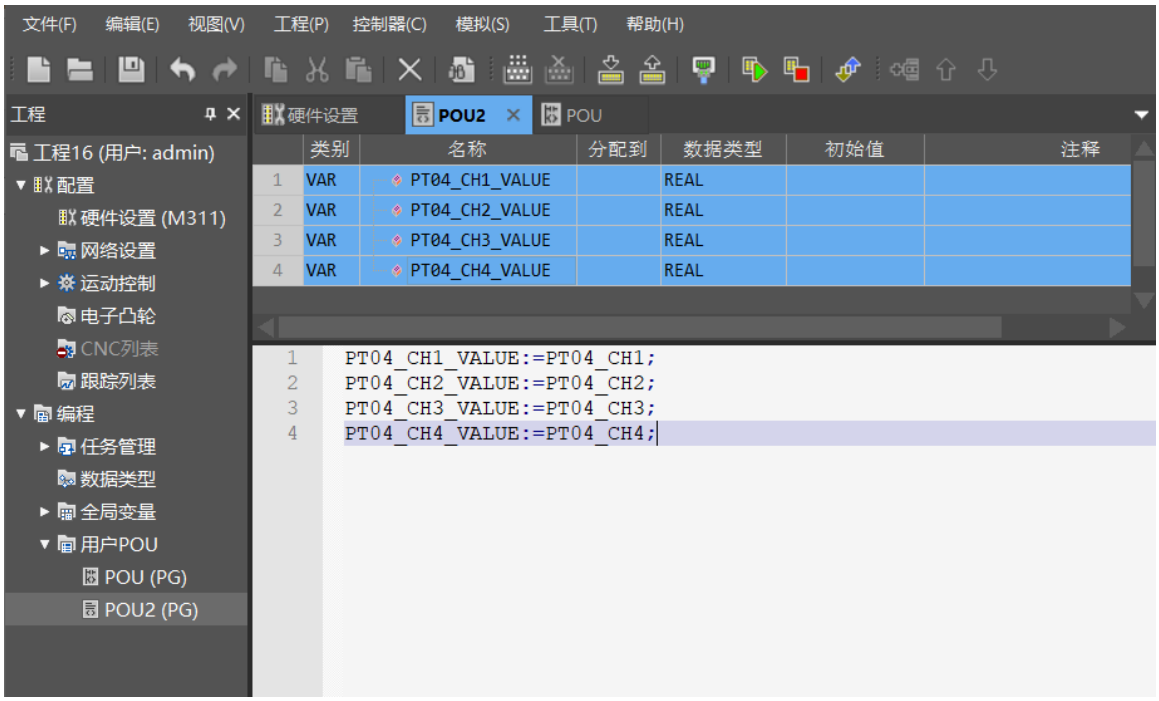
6. As shown in the red box in the image below, modify the variable names corresponding to the current values of the module's four channels.



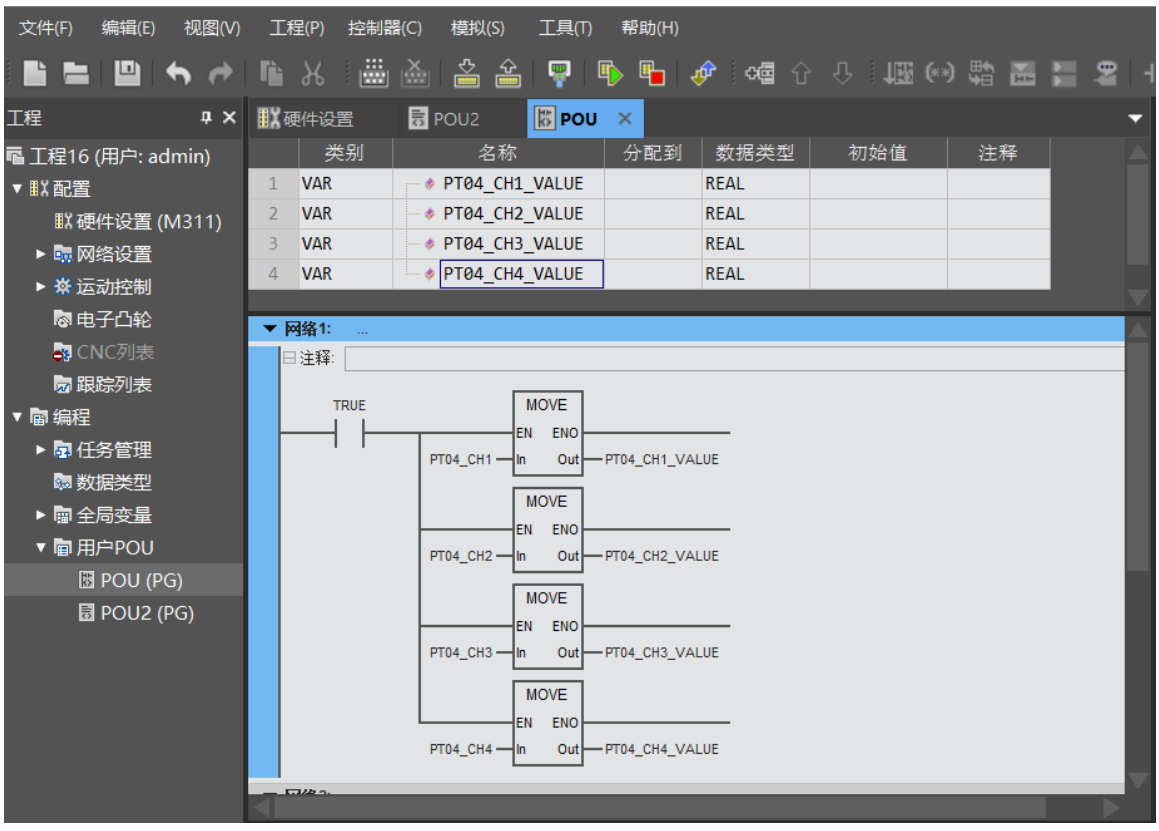
7. Program example

In the variable table, add custom variables PT04_CH1_VALUE, PT04_CH2_VALUE, PT04_CH3_VALUE, and PT04_CH4_VALUE. Then, assign the current values of the four channels of the temperature module to these custom variables, respectively.

ST type

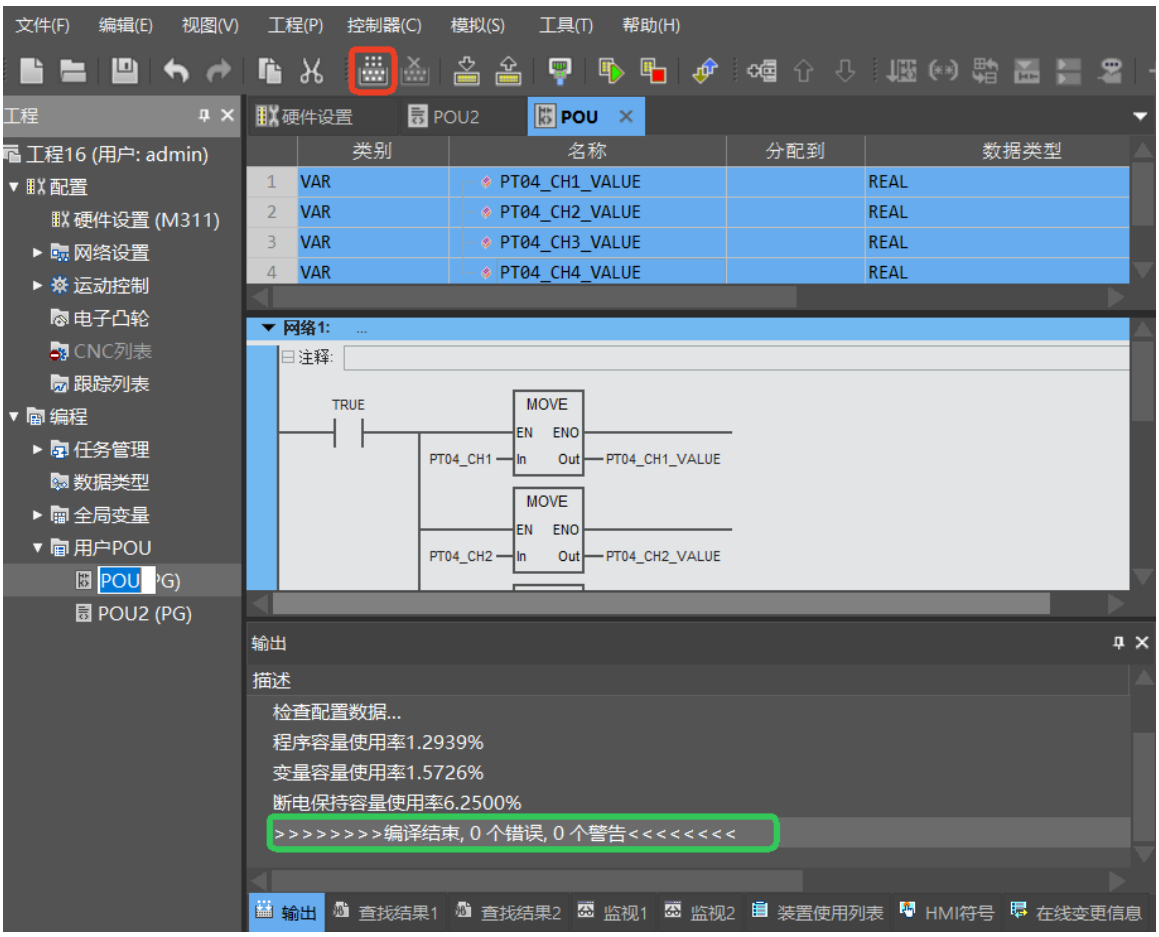


LD type:



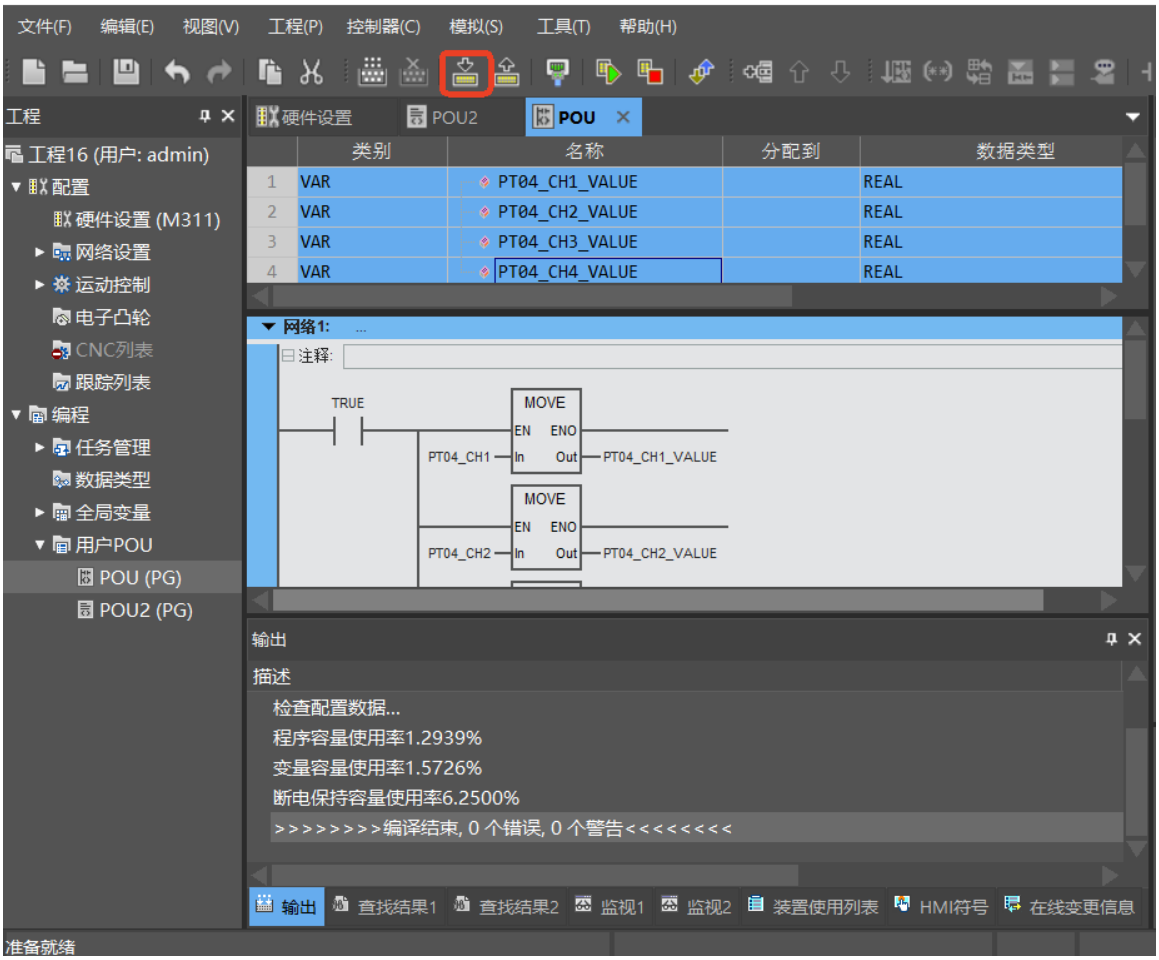
8. **Check Program and Configuration**

   Click the area marked in red in the image below to check the program and configuration. If the area marked in green shows 0 errors, it indicates that there are no issues with the program and configuration.



9. Download

Click the area marked in red in the image below to download the project data to the controller.



Parameters Description

HCMX-TC04-D

Parameters	Default	Min.	Max.	Porperty	Type	Description
Firmwre version	N/A			RO	UNIT	Sensor type 0：Disable 1：K 2：B 3：R 4：N 5：J 6：T 7：E 8：S
102: CH1 mode	1	0	65535	RW	UNIT	
103: CH2 mode	1	0	65535	RW	UNIT	
104: CH3 mode	1	0	65535	RW	UNIT	
105: CH4 mode	1	0	65535	RW	UNIT	
106: CH1 Current temperature value	0			RO	INT	Temperature range corresponding to the sensor type, unit: ℃ / °F K：-270.0℃～ 1370.0℃， -454.0° F~2498.0° F B：200.0℃～ 1800.0℃， 392.0° F ～ 3272.0° F R：-50.0℃～ 1765.0℃， -58.0° F~3209.0° F N：-200.0℃～ 1300.0℃， -328.0° F ～ 2372.0° F J：-210.0℃～ 1200.0℃， -346.0° F~2192.0° F T：-270.0℃～ 400.0℃， -454.0° F~752.0° F E：-270.0℃～ 1000.0℃， -454.0° F ～ 1832.0° F S：-50.0℃～ 1765.0℃， -58.0° F~3209.0° F
107: CH2 Current temperature value	0			RO	INT	
108: CH3 Current temperature value	0			RO	INT	
109: CH4 Current temperature value	0			RO	INT	

119 : Error code				RO	UNIT	Error Codes Corresponding to the Module: BIT 0: Module power supply abnormal BIT 1: Cold junction resistance abnormal BIT 2: Internal hardware abnormal BIT 4: CH1 exceeds upper or lower limit BIT 5: CH2 exceeds upper or lower limit BIT 6: CH3 exceeds upper or lower limit BIT 7: CH4 exceeds upper or lower limit BIT 8: CH1 sensor open circuit BIT 9: CH2 sensor open circuit BIT 10: CH3 sensor open circuit BIT 11: CH4 sensor open circuit BIT 12: Failed factory production process
124 : CH1 Averaging Count	10	1	100	RW	UINT	1~100
125 : CH2 Averaging Count	10	1	100	RW	UINT	1~100
126 : CH3 Averaging Count	10	1	100	RW	UINT	1~100
127 : CH4 Averaging Count	10	1	100	RW	UINT	1~100
128 : CH1 Upper limit setting Count				RW	INT	The temperature range corresponding to the upper limit setpoint or lower limit units :0.1°C / 0.1°F. K: -270℃ ~ 1370℃ / -454°F ~ 2498°F B: 200℃ ~ 1800℃ /
129 : CH2 Upper limit setting Count				RW	INT	

130 : CH3 Upper limit setting Count				RW	INT	392°F ~ 3272°F R: -50℃ ~ 1765℃ / -58°F ~ 3209°F N: -200℃ ~ 1300℃ / -328°F ~ 2372°F J: -210℃ ~ 1200℃ / -346°F ~ 2192°F T: -270℃ ~ 400℃ / -454°F ~ 752°F E: -270℃ ~ 1000℃ / -454°F ~ 1832°F S: -50℃ ~ 1765℃ / -58°F ~ 3209°F
131 : CH4 Upper limit setting Count				RW	INT	
132 : CH1 Lower limit setting Count				RW	INT	
133 : CH2 Lower limit setting Count				RW	INT	
134 : CH3 Lower limit setting Count				RW	INT	
135 : CH4 Lower limit setting Count				RW	INT	
136 : Temperature Units	0	0	1	RW	INT	Temperature Units for All Channels 0: Celsius (℃) 1: Fahrenheit(℉)

HCMX-PT04-D

Parameters	Default	Min.	Max.	Porperty	Type	Description
Firmwre version	N/A			RO	UNIT	Sensor type 0：Disable 1：Pt100 2：Pt500 3：Pt1000 7：Cu100 8：KTY84 9：NTC5K_B:2000 10：NTC5K_B:3950 11：NTC5K_B:6000 12：NTC10K_B:2000 13：NTC10K_B:3950 14：NTC10K_B:6000
102: CH1 mode	1	0	65535	RW	UNIT	
103: CH2 mode	1	0	65535	RW	UNIT	
104: CH3 mode	1	0	65535	RW	UNIT	
105: CH4 mode	1	0	65535	RW	UNIT	
106: CH1 Current temperature value	0			RO	INT	Temperature range corresponding to the sensor type, unit: ℃ / ℉ Pt100：-200.0℃～ 850.0℃, -328.0 ℉～ 1562.0 ℉ Pt500：-200.0℃～ 850.0℃, -328.0 ℉～ 1562.0 ℉ Pt1000：-200.0℃～ 850.0℃, -328.0 ℉～ 1562.0 ℉ Cu100：-50.0℃～ 150.0℃, -58.0 ℉～ 302.0 ℉ KTY84：0.0℃～ 200.0℃, 32.0 ℉～ 392.0 ℉ NTC5K_B:2000：-30.0℃～ 200.0℃, -22.0 ℉～ 392.0 ℉ NTC5K_B:3950：-15.0℃～ 100.0℃, 5.0 ℉～ 212.0 ℉ NTC5K_B:6000：0.0℃～ 100.0℃, 32.0 ℉～ 212.0 ℉ NTC10K_B:2000：-25.0℃～ 200.0℃, -13.0 ℉～ 392.0 ℉ NTC10K_B:3950：0.0℃～ 150.0℃, 32.0 ℉～ 302.0 ℉
107: CH2 Current temperature value	0			RO	INT	
108: CH3 Current temperature value	0			RO	INT	
109: CH4 Current temperature value	0			RO	INT	

						NTC10K_B:6000：6.0℃～ 100.0℃， 42.8 ℉～ 212.0 ℉
119 : Error code				RO	UNIT	Error Codes Corresponding to the Module: BIT 0: Module power supply abnormal BIT 2: Internal abnormal BIT 4: CH1 exceeds upper or lower limit BIT 5: CH2 exceeds upper or lower limit BIT 6: CH3 exceeds upper or lower limit BIT 7: CH4 exceeds upper or lower limit BIT 8: CH1 sensor open circuit BIT 9: CH2 sensor open circuit BIT 10: CH3 sensor open circuit BIT 11: CH4 sensor open circuit BIT 12: Failed factory production process
124 : CH1 Averaging Count	10	1	100	RW	UINT	1-100
125 : CH2 Averaging Count	10	1	100	RW	UINT	1-100
126 : CH3 Averaging Count	10	1	100	RW	UINT	1-100
127 : CH4 Averaging Count	10	1	100	RW	UINT	1-100
128 : CH1 Upper limit setting Count				RW	INT	The temperature range corresponding to the upper limit setpoint or lower limit units :0.1°C / 0.1°F. Pt100：-200℃～ 850℃， -328 ℉～ 1562 ℉ Pt500：-200℃～ 850℃，
129 : CH2 Upper limit setting Count				RW	INT	

130 : CH3 Upper limit setting Count				RW	INT	-328 ℉ ~ 1562 ℉ Pt1000：-200℃ ~ 850℃, -328 ℉ ~ 1562 ℉ Cu100：-50℃ ~ 150℃, -58 ℉ ~ 302 ℉ KTY84：0℃ ~ 200℃, 32 ℉ ~ 392 ℉ NTC5K_B:2000：-30℃ ~ 200℃, -22 ℉ ~ 392 ℉ NTC5K_B:3950：-15℃ ~ 100℃, 5 ℉ ~ 212 ℉ NTC5K_B:6000：0℃ ~ 100℃, 32 ℉ ~ 212 ℉ NTC10K_B:2000：-25℃ ~ 200℃, -13 ℉ ~ 392 ℉ NTC10K_B:3950：0℃ ~ 150℃, 32 ℉ ~ 302 ℉ NTC10K_B:6000：6℃ ~ 100℃, 42.8 ℉ ~ 212 ℉
131 : CH4 Upper limit setting Count				RW	INT	
132 : CH1 Lower limit setting Count				RW	INT	
133 : CH2 Lower limit setting Count				RW	INT	
134 : CH3 Lower limit setting Count				RW	INT	
135 : CH4 Lower limit setting Count				RW	INT	
136 : Temperature Units	0	0	1	RW	INT	Temperature Units for All Channels 0: Celsius (℃) 1: Fahrenheit(℉)