

GCAN-PLC series

Programmable Logic Controller

User Manual



Revision History:

Version	Date	Reason
V1.00	2016/12/20	Create document
V2.01	2017/11/22	Add some parameters
V3.01	2018/01/22	Add communication protocol part
V3.20	2018/07/18	Adjust document structure
V3.25	2019/03/21	Update selection table

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1 Introduction

1.1 Overview

GCAN-PLC programmable logic controller is a bus module controller integrated with PLC function. It has the characteristics of compact, cost-effective, can be used to connect the CAN-Bus system, Modbus system and distributed bus terminal module, and these terminal modules can be expanded in a modular way.

A complete control system consists of a bus module controller (GCAN-PLC), 1-32 arbitrary number of GC series terminal modules (GC-1008, GC-3804, etc.) and a terminal module. The GCAN-PLC programmable controller supports automatic configuration. You do not need to set parameters on the computer. The controller will automatically assign the I/O interface according to the positional relationship of the inserted terminal module.

The GCAN-PLC programmable controller is programmed according to the IEC 61131-3 standard using the OpenPCS programming system. OpenPCS programming system provides a variety of debugging features (such as breakpoints, single-step, monitoring, etc.) to make debugging easier. The GCAN-PLC configuration/programming interface is a Micro-USB interface that can be used to load PLC programs.

The GCAN-PLC programmable controller complies with the ISO 11898 CAN bus protocol. Support CANopen/ Modbus RTU/ Modbus TCP communication protocol and can be used as CANopen/ Modbus RTU/ Modbus TCP master or slave.

GC series programmable controller expansion module currently includes: digital input expansion module, digital output expansion module, analog input expansion module, analog output expansion module, communication expansion module, etc.

1.2 Performance

- 1-channel CAN-Bus interface, 1-channel Ethernet interface, 1-channel serial interface(RS232 or RS485)
- Programming Software: OpenPCS (according to IEC 61131-3 standard)
- Support CANopen protocol master/slave function

- Support Modbus RTU/TCP master/slave function
- Up to 32 bus terminal modules (up to 32x8 I/O points)
- Transmit 4 PDOs (CANopen) and receive 4 PDOs (CANopen)
- Configuration mode is automatic configuration
- Supply power: 24V DC (18~36V)
- Input current, 400mA (total GC-bus current)
- Starting current: about 2.5 times continuous current
- Power contacts: maximum 24V DC/maximum 10A
- Electrical isolation: 1500 Vrms
- Working temperature: -40.00℃~ 85.00℃
- Dimensions: 100mm(L) * 69mm(W) * 48mm(H)
- IP grade: IP20

2 Installation

This chapter introduces the method installation and wiring, the meaning of the indicator and the interface.

2.1 Module appearance

GCAN-PLC programmable controller appearance as shown in Figure 2.1.

GCAN-PLC programmable controller includes three communication interfaces, a controller programming interface, a set of controller power interface, two sets of I/O power interfaces, two sets of Shielding line interfaces. Among them, the communication interface includes one Ethernet interface, one CAN-Bus interface and one RS232 interface.

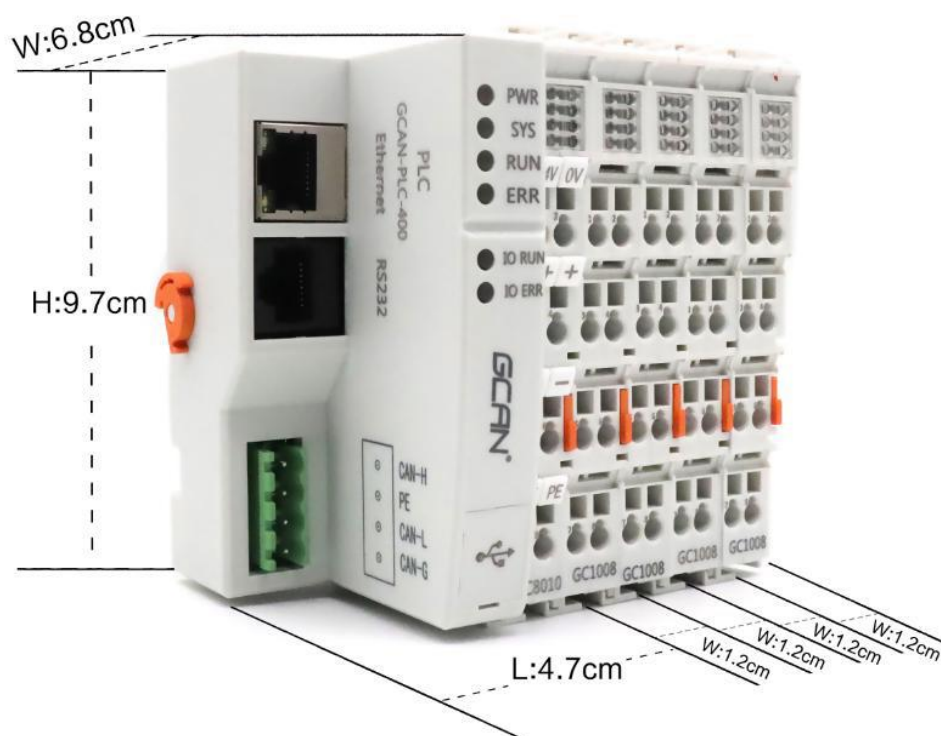


Figure 2.1 the appearance of GCAN-PLC programmable controller

2.2 Fixed module

GCAN-PLC programmable controller and its matching terminal installation method is shown in Figure 2.2

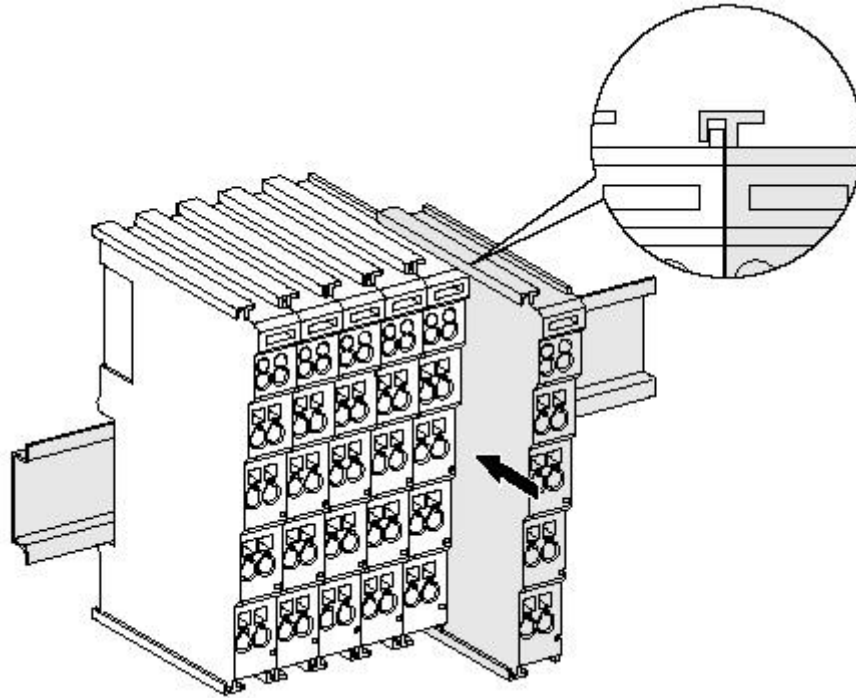


Figure 2.2 GCAN-PLC programmable controller installation

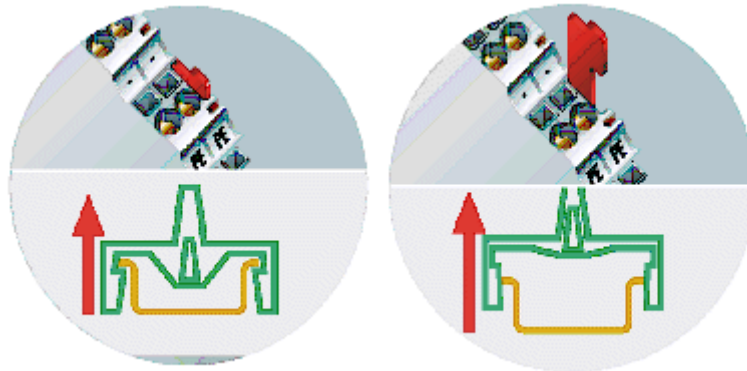


Figure 2.3 GCAN-PLC programmable controller self-locking mechanism

As shown figure 2.2, install the GCAN-PLC programmable controller on the guide rail until the lock is stuck. Then you need to rotate the orange knob on the left end of the controller counterclockwise to fix the left end of the controller on the guide rail. The GCAN-PLC programmable controller has a self-locking mechanism that can effectively prevent equipment from falling.

As shown figure 2.3, you can release the self-locking mechanism by pulling out the orange label and take out the controller or matching terminal module. Before taking out the controller, you need to rotate the orange knob on the left end of the controller clockwise to unlock it.

The GCAN-PLC programmable controller can connect up to 32 distributed bus terminal modules. When inserting the GC series terminal module, be sure to insert it along the groove on the right side of the existing module sequentially until the lock is stuck. **At the right end of the entire node, you need to install terminal module.** The terminal will guarantee the data transmission and power supply of the GC-Bus, or result in a system error without a terminal module.

When you assemble the nodes correctly, there is no obvious gap between the terminal modules. If the modules are not assembled correctly, the entire node will not operate normally.

2.3 Wiring method

The power wiring as shown in figure 2.4. First, use a flat-blade screwdriver to insert into the square hole, hold the top edge of the metal sheet in the square hole, and press toward the hole. Then, insert the wire into the hole. After plugging in, pull out the screwdriver and the wire can be firmly locked in the hole.

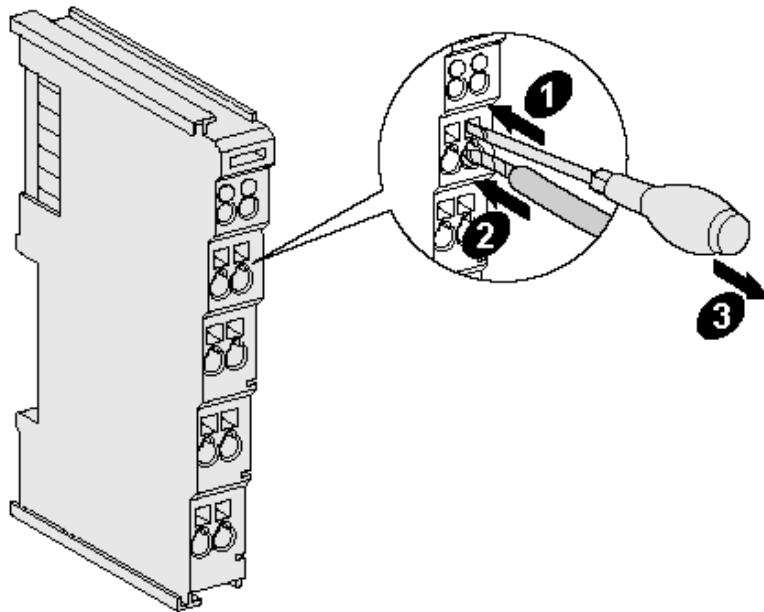


Figure 2.4 GCAN-PLC, the power wiring of programmable controller

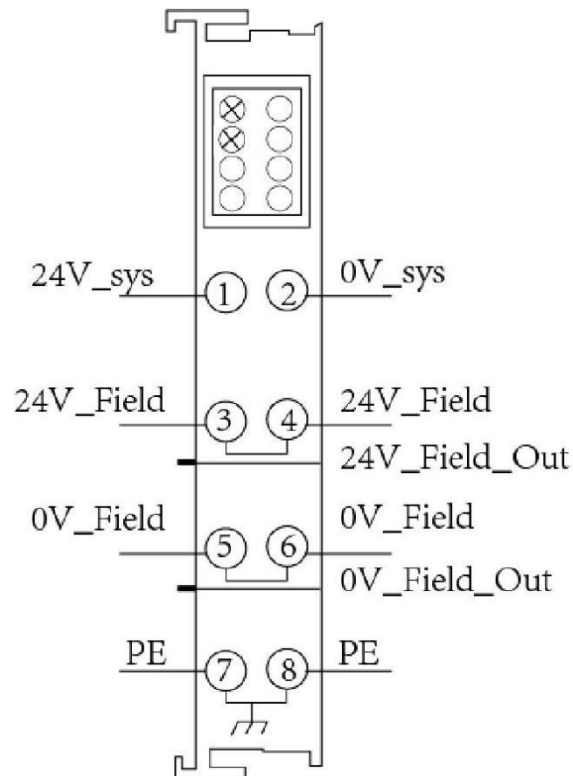


Figure 2.5 GCAN-PLC 8011, Power terminal block

The power terminal block of the GCAN-PLC programmable controller is shown in Figure 2.5, including 8 terminals. The number corresponding to each terminal and its meaning are shown in Table 2.1.

Note: The terminal 3 and terminal 4, terminal 5 and terminal 6, terminal 7 and terminal 8 are connected inside the module.

Terminal	Number	Definition
24V	1	Input 24V power
0V	2	GND power
+	3	IO positive power
+	4	IO positive power
-	5	IO negative power
-	6	IO negative power
PE	7	shield
PE	8	shield

Table 2.1 GCAN-PLC terminal definition

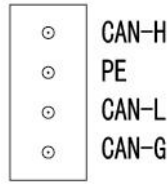


Figure 2.6 GCAN-PLC, CAN-Bus terminal block

The CAN-Bus terminal block of the GCAN-PLC programmable controller is shown in Figure 2.6, including 4 terminals. The number corresponding to each terminal and its meaning are shown in Table 2.2.

Terminal	Number	Definition
CAN-H	1	CAN-High
PE	2	Shield
CAN-L	3	CAN-Low
CAN-G	4	CAN-GND

Table 2.2 GCAN-PLC, CAN-Bus terminal definition

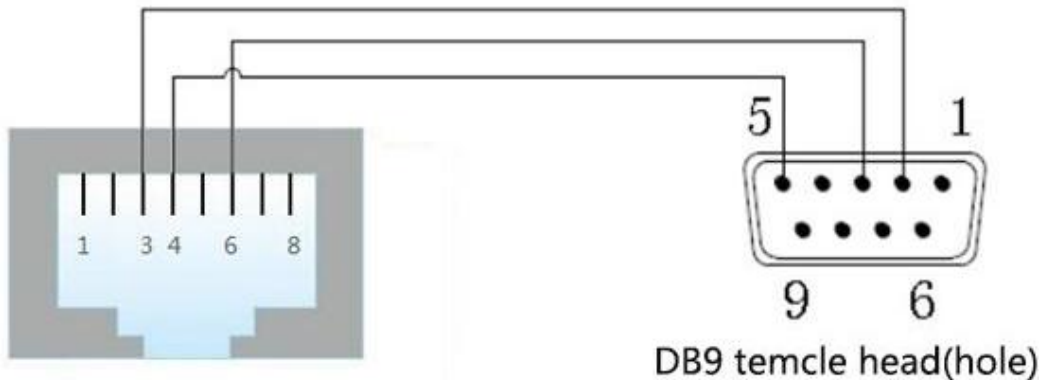


Figure 2.7 GCAN-PLC RS-232 interface

As shown in figure 2.7, Serial interface of GCAN-PLC uses RJ45 interface.

The specific definitions are shown in Table 2.3

Terminal	RJ45 Number	DB9 Number	Definition
RS232_TX	3	2	RS232 Transmit
RS232_RX	6	3	RS232 Receive
GND	4	5	Signal ground
RS485_A+	8	7	RS485 A+
RS485_B-	1	8	RS485 B-

Table 2.3 GCAN-PLC Serial interface definition

2.4 System status indicator

GCAN-PLC programmable controller has two sets of status indicators, contains 6 circular status indicators in the left area and 2 power indicators in the right area.

The specific indicating function of the indicator is shown in table 2.4.

Indicator	Color	Status
PWR	green	Power
SYS	green	System
RUN	green	Run
ERR	green	Error
IO RUN	green	GC-Bus run
IO ERR	green	GC-Bus error
NO.1 on the right	green	Power
NO.3 on the right	green	GC-Bus power

Table 2.4 GCAN-PLC, indicators

Indicator	Status	Meaning
PWR	bright	Power supply normally
	not bright	Power supply abnormally
SYS	Blinking	Working status
	not bright	Initialization error
RUN	Blinking	Run normal
	not bright	stop
ERR	bright	System error
	not bright	System normal
IO RUN	Blinking	GC-Bus run normally
	not bright	GC-Bus stop
IO ERR	bright	GC-Bus error
	not bright	GC-Bus normal
Terminal module		
NO.1 on the right	bright	Power supply normally
	not bright	Power supply abnormally
NO.3 on the right	bright	External power supply normally
	not bright	External Power supply abnormally

Table 2.5 GCAN-PLC, indicators status

3 Communication connection

3.1 Serial connection

GCAN-PLC Programmable Controller uses standard serial port level, so the module can directly connect to the device with RS232 interface.

3.2 CAN connection

When gcan-plc is connected to CAN bus, it only needs to connect CAN_H to CAN_H and CAN_L to CAN_L to establish communication.

There must be two 120 ohms terminal resistance at the farthest end of CAN-Bus network; if the node number is more than 2, intermediate nodes needn't to install 120 ohms terminal resistance. For branch connections, the length should not exceed 3 meters.

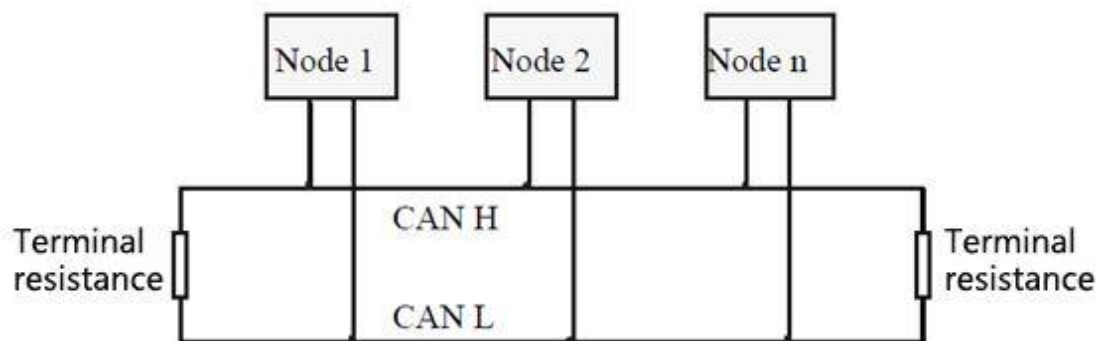


Figure 3.1 CAN-Bus network structure

Note: CAN-Bus cable can be used with ordinary twisted-pair and shielded twisted-pair.

Baud rate	Distance
1 Mbit/s	40m
500 kbit/s	110m
250 kbit/s	240m
125 kbit/s	500m
50 kbit/s	1.3km
20 kbit/s	3.3km
10 kbit/s	6.6km
5 kbit/s	13km

Table 3.1 the relationship between CAN-Bus length and baud rate.

3.3 CAN-Bus terminal resistance

GCAN-PLC Programmable Controller hasn't integrated 120Ω terminal resistance. If the number of nodes is more than 2, the middle node does not need to install 120Ω terminal resistance. When you need to use it, connect the both sides of the resistance to CAN_H and CAN_L.

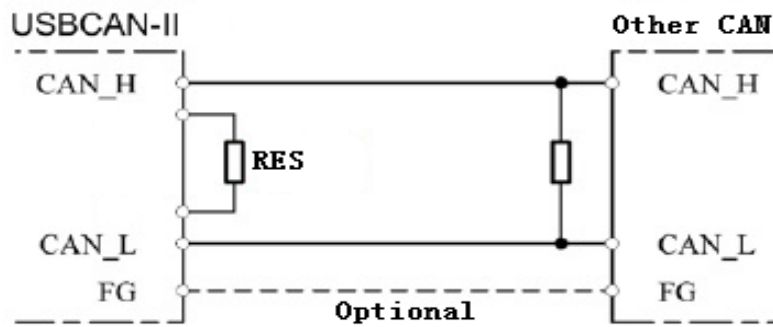


Figure 3.2 GCAN-PLC connect with other nodes

4 PLC kernel refresh

GCAN-PLC programmable controller provides 1 kernel refresh interface, 1 operating switch and 1 reset button. The physical map is shown in figure 4.1.

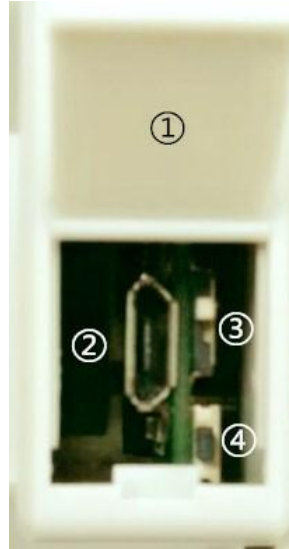


Figure 4.1 the physical map of kernel upgrade interface

In figure 4.1,

- ① the cover of kernel upgrade interface.
- ② Micro-USB interface, kernel upgrade interface can connect to USB-A interface of PC with Micro-USB.
- ③ Run/Stop button
- ④ Reset button.

Note: When the DIP of the run/stop button is at the top (back to the reset button side), the PLC is in operation.

When the DIP of the run/stop button is at the bottom (towards the reset button side), the PLC is stopped.

5 OpenPCS Programming software usage

5.1 Installation of OpenPCS

OpenPCS 2008 programming software can be download on the internet.

5.2 Programming interface

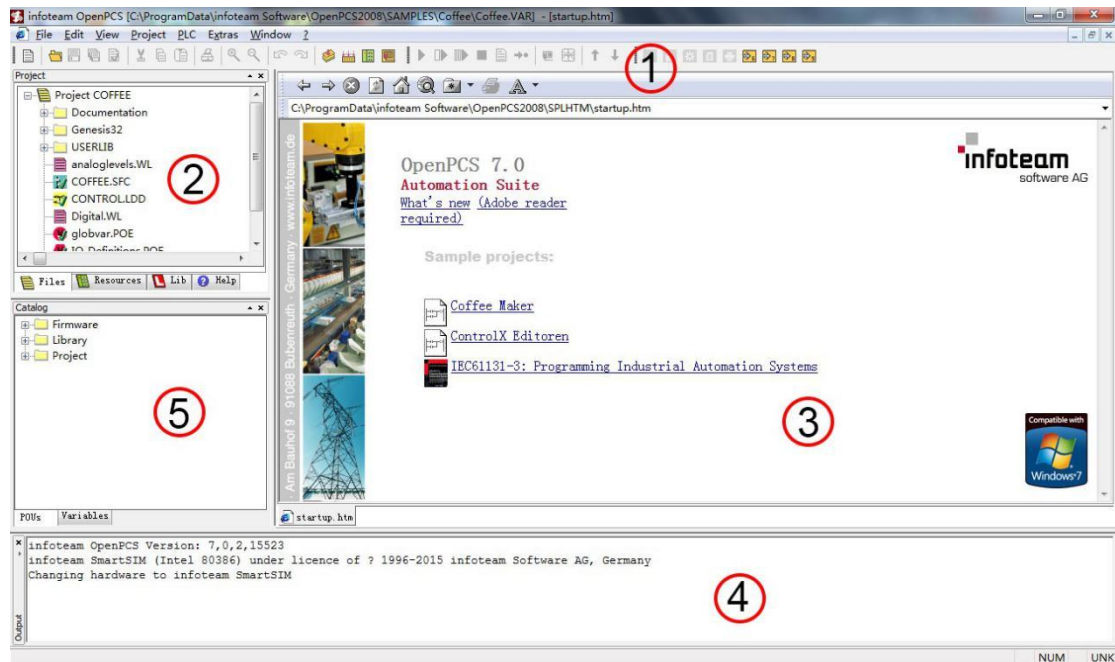


Figure 5.1 OpenPCS programming interface

Programming interface of OpenPCS mainly contains:

- 1) Menu
- 2) Project window
- 3) Edit window
- 4) Output window
- 5) Catalog window

5.3 Project creation

5.3.1 Create project

Click “File”, than select ”New” to create a new file, as shown in Figure 9.2.

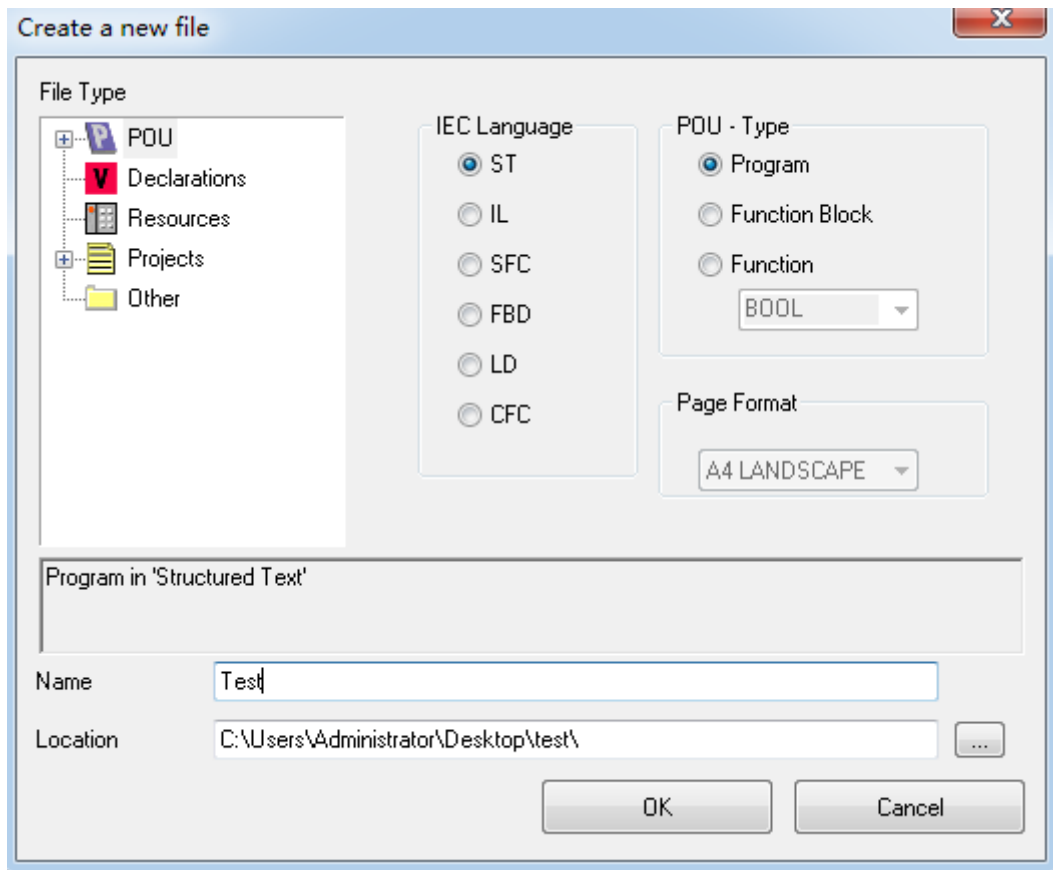


Figure 5.2 Create a new file

5.3.2 Add files

Add files for project (eg: add function blocks -Sample FC), as shown in Figure 5.3.

Note: Names cannot start with numbers

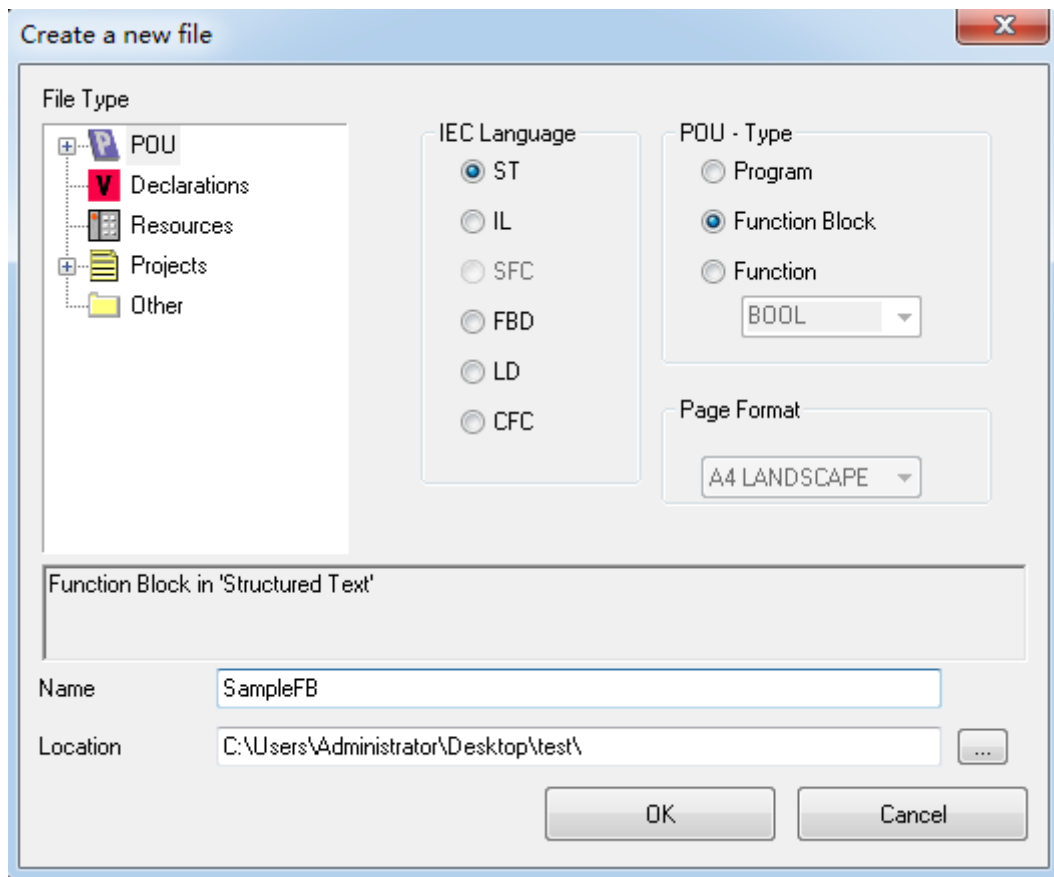


Figure 5.3 Add function block

5.3.3 Programming

First define the variable in the variable area (VAR to END_VAR)

```

VAR
    v1:INT:=0;
    v2:INT:=0;
    oled at%Q0.0:Byte;
END_VAR

```

After the variable is defined, start programming. The following is a simple routine statement written in ST:

LED Marquee routines:

```

IF v1<100 then
    v1:=v1+1;
ELSE
    v1:=0;
    v2:=v2+1;
    if v2>=255 then
        v2:=0;
    end_if;
    oled:=int_to_byte(v2);
end_if;

```

5.3.4 Set up debug connection

1. Click “PLC”, then select “Connections..”, as shown in Figure 5.4.

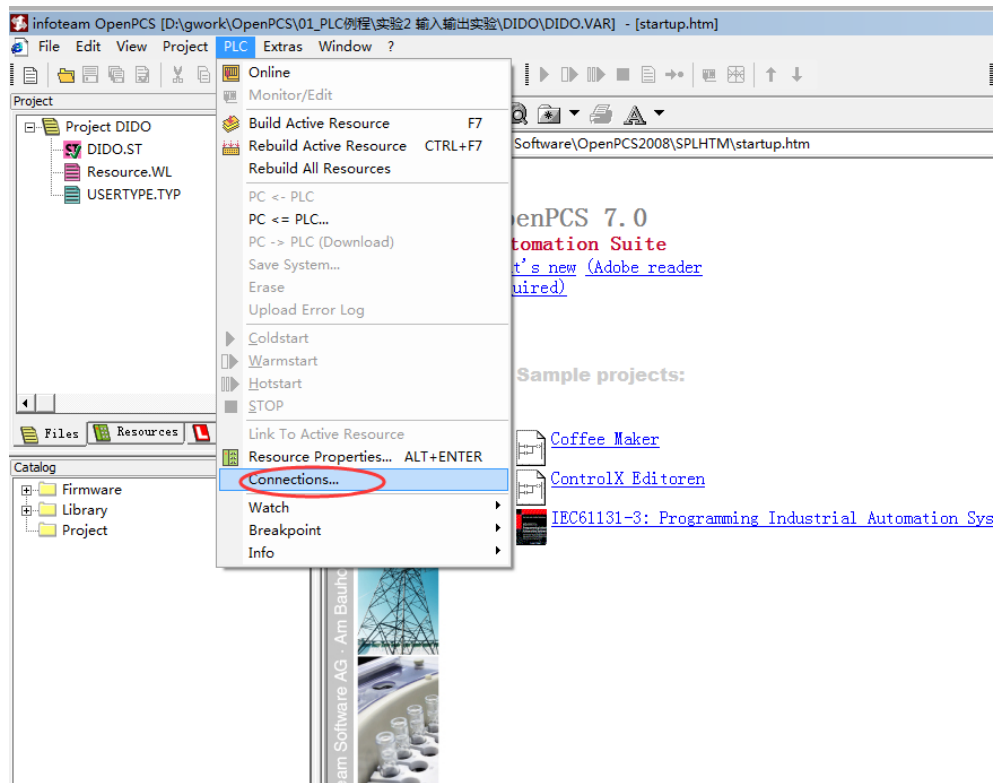


Figure 5.4 Debug connection

2. Click “New” to set up parameters, port number is the actual serial port number of the computer, shown in Figure 5.5.

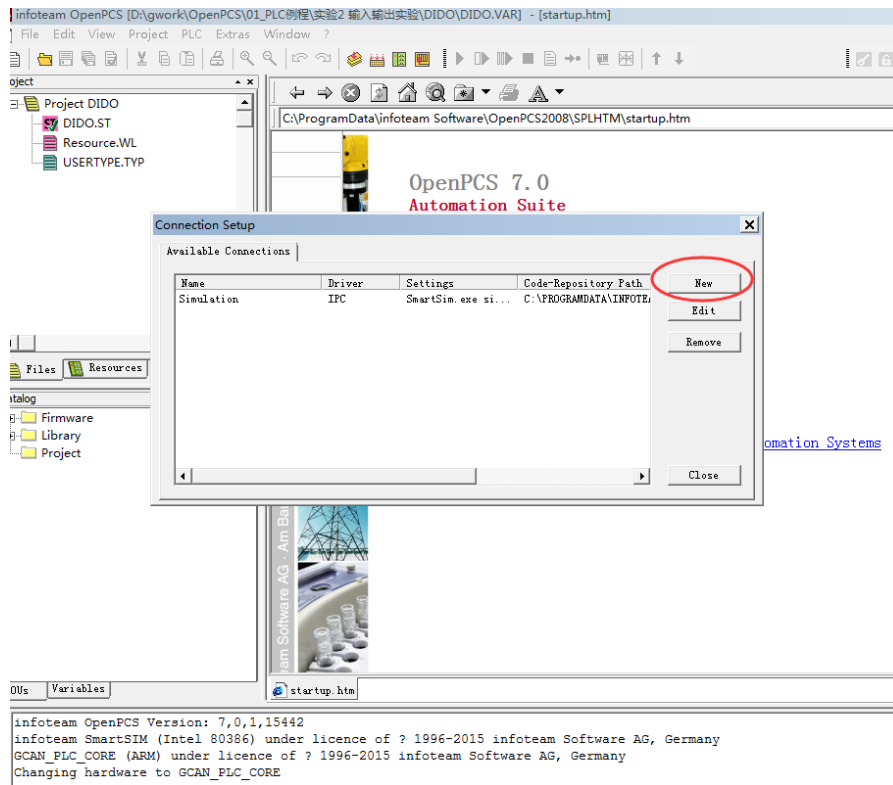


Figure 5.5 Connection Setup

3. Enter “TCP” in Name and click “Select”.



4. Select “TCP432”  then click “OK”.

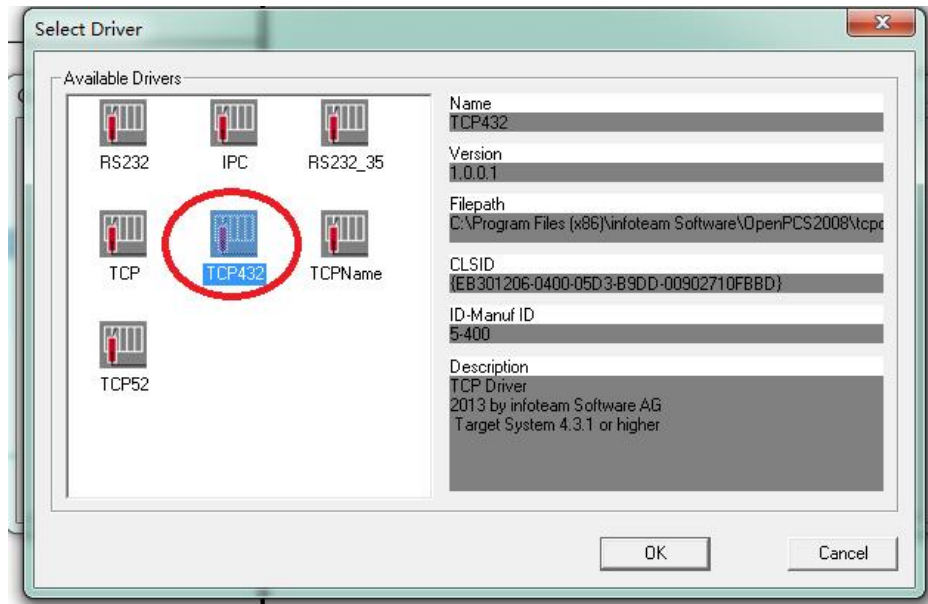


Figure 5.7 Select TCP432

5. There will be "TCP432" in the driver, then click "Settings".

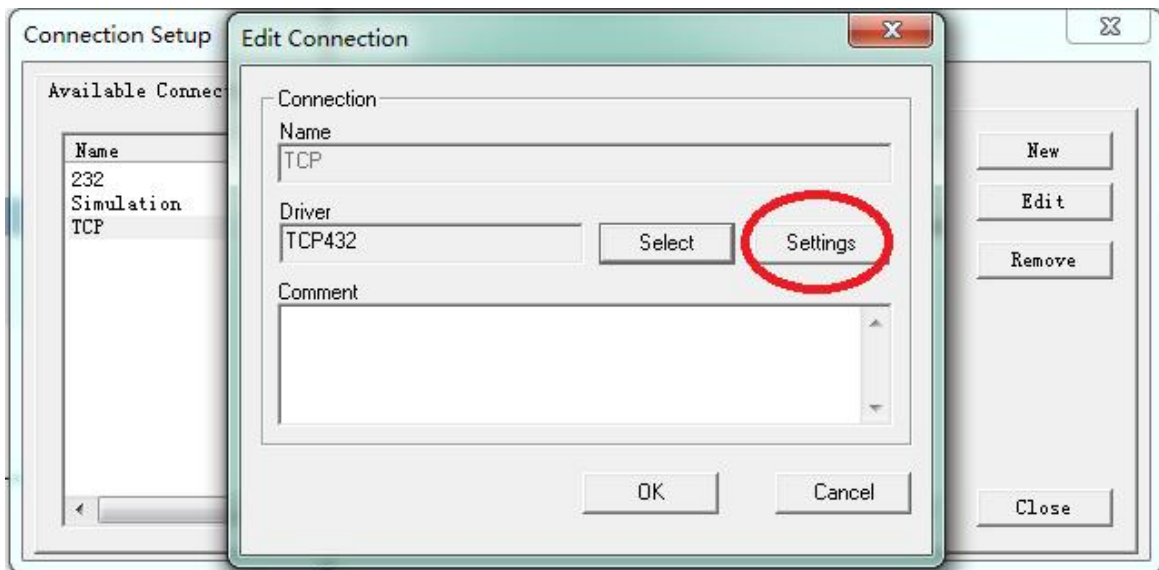


Figure 5.8 Click "Settings"

6. Set the Port: 23042, IP address: 192.168.1.30 and click "ok".

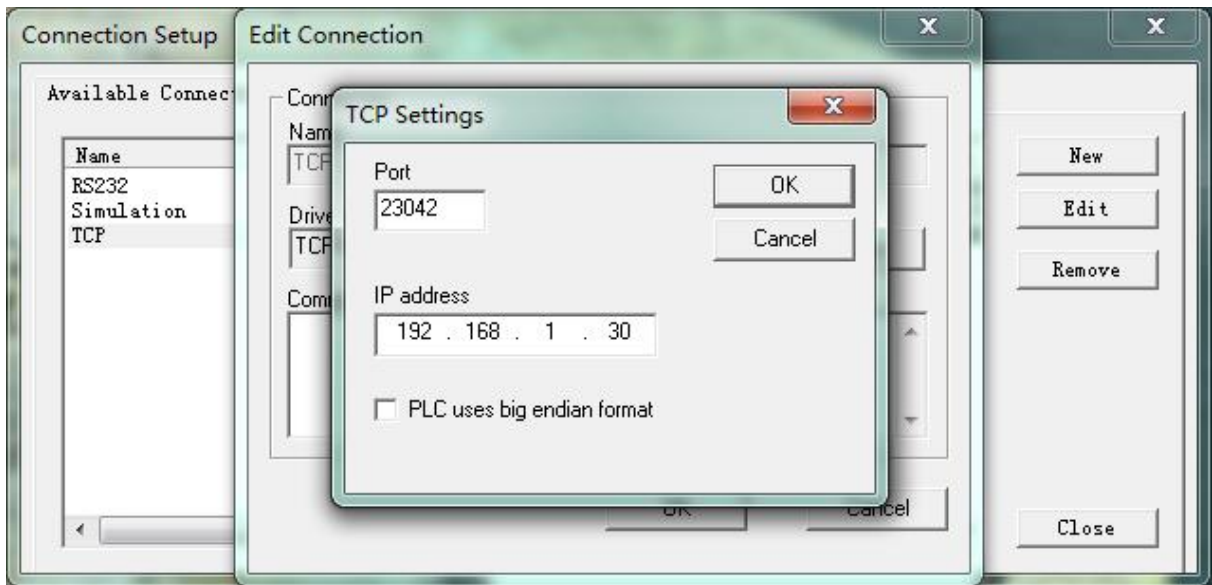


Figure 5.9 Set the “Port” & “IP address”

7. After completing the settings, click "Close"

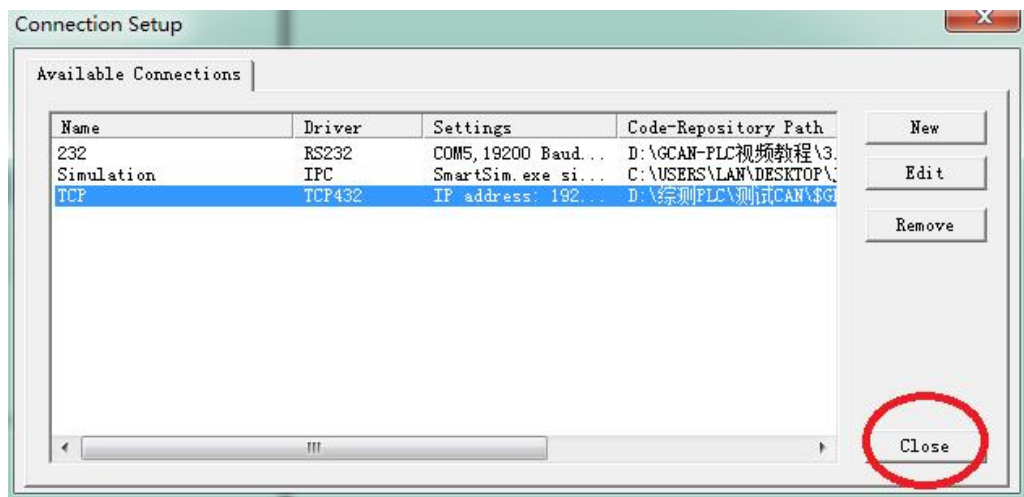


Figure 5.10 Click "Close"

8. Set “Resource Properties”

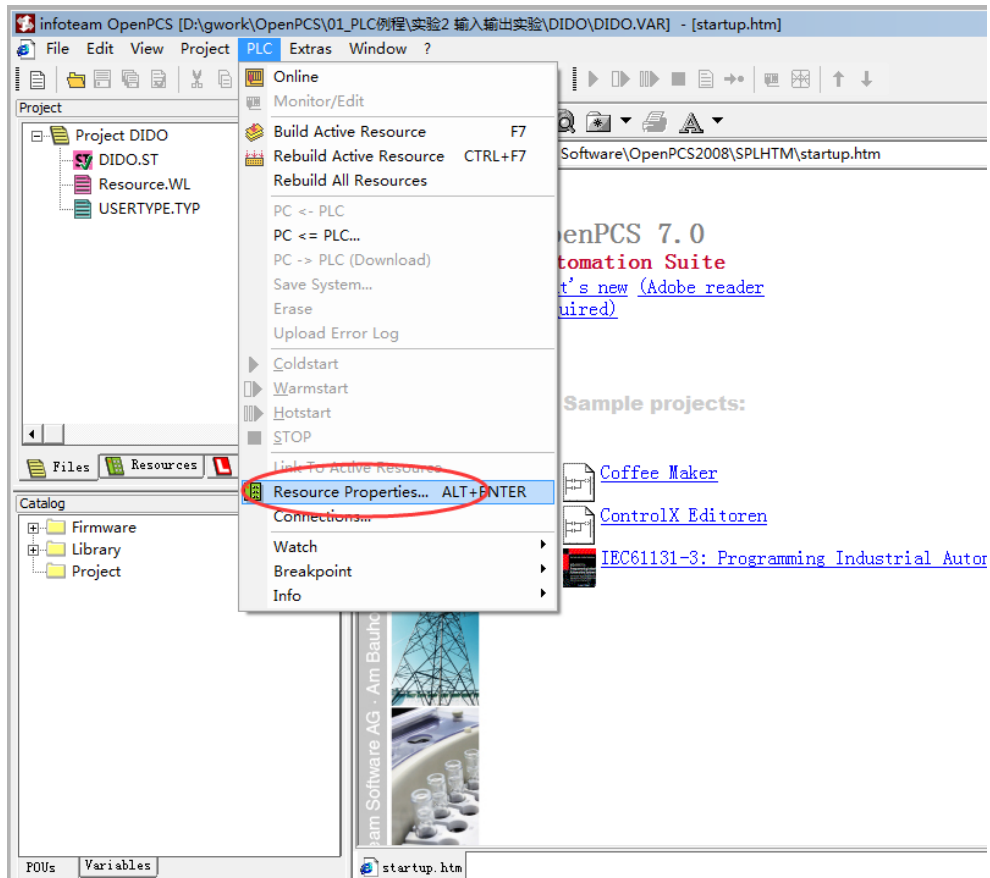


Figure 5.11 Set “Resource Properties”

9. Select "GCAN_PLC" and "TCP", then click "OK" to complete the setting

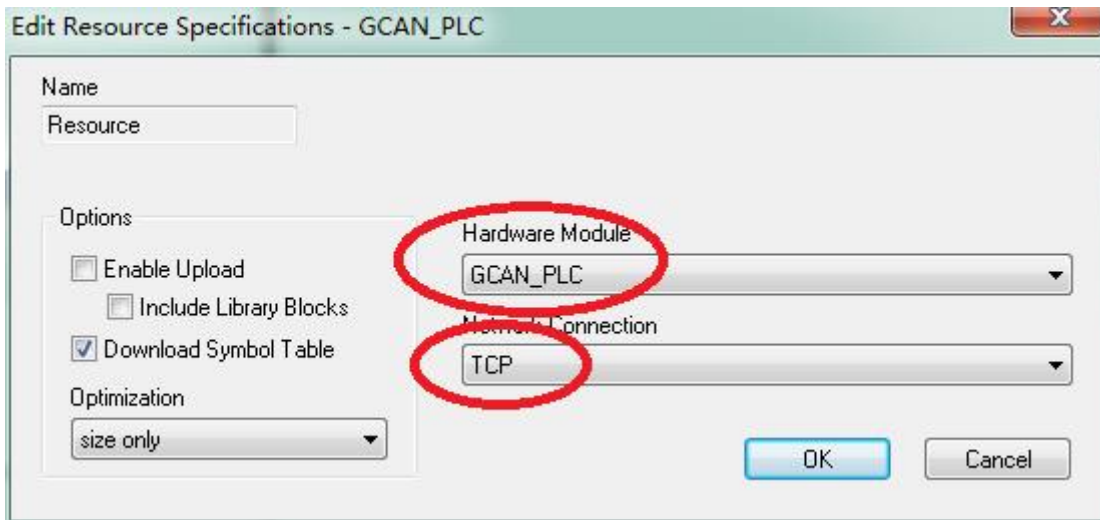


Figure 5.12 Select "GCAN_PLC" and "TCP"

5.3.5 Download the program and debug

1. After completing the program, click "Build Active Resource".

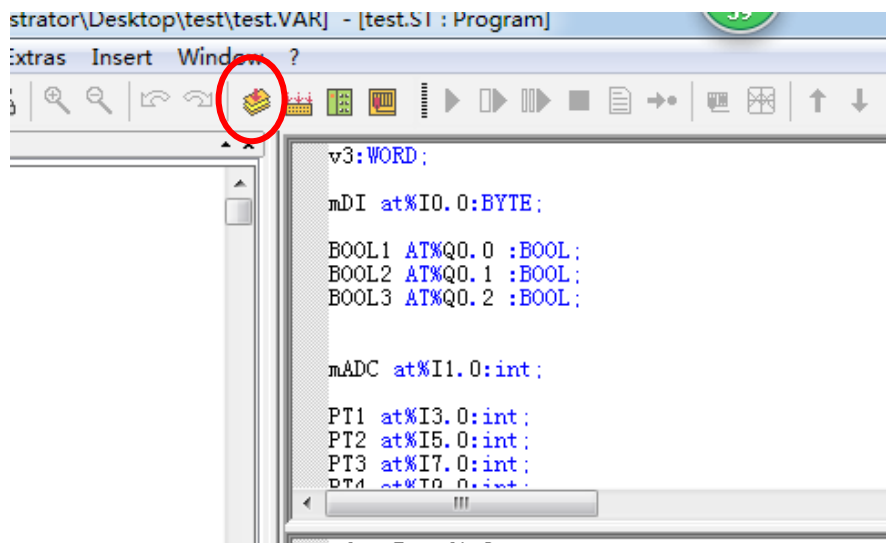


Figure 5.13 Completing the program

2. There is no error/warning after completing the program.

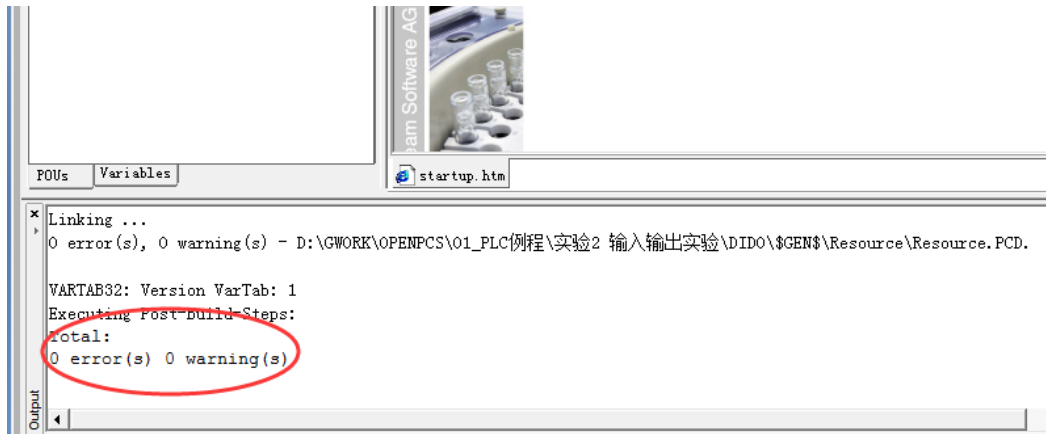


Figure 5.14 Complete program

3. Click “PLC”, then select “Online”.

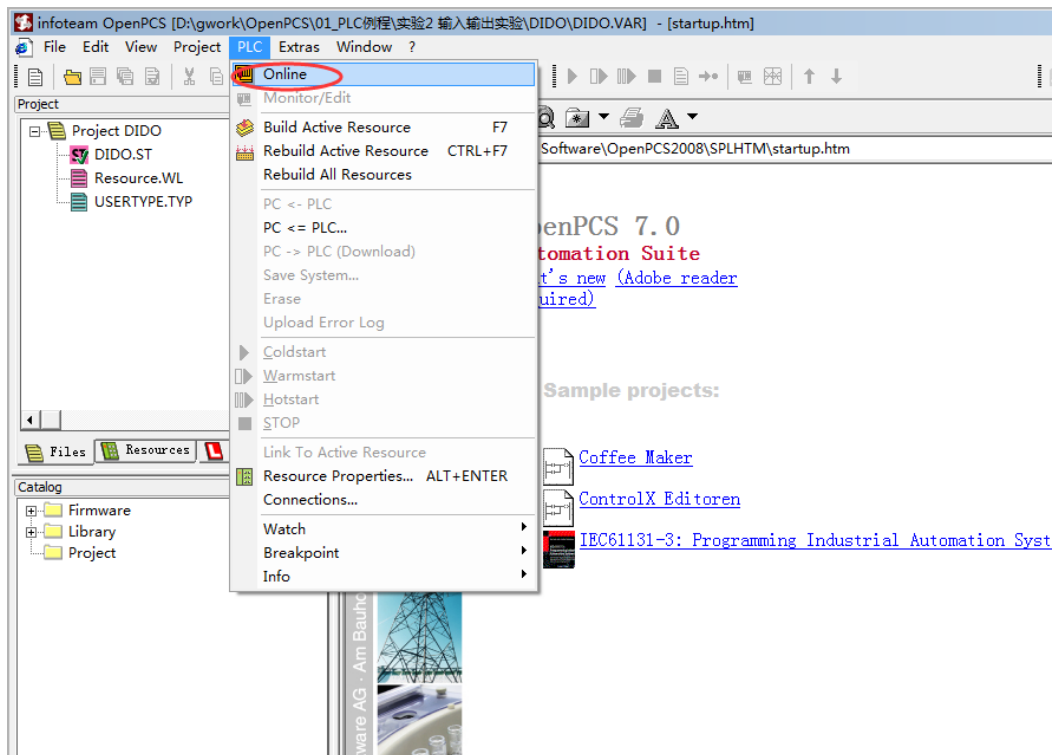


Figure 5.15 Select Online

4. Click “PV->PLC(Download)” to download program

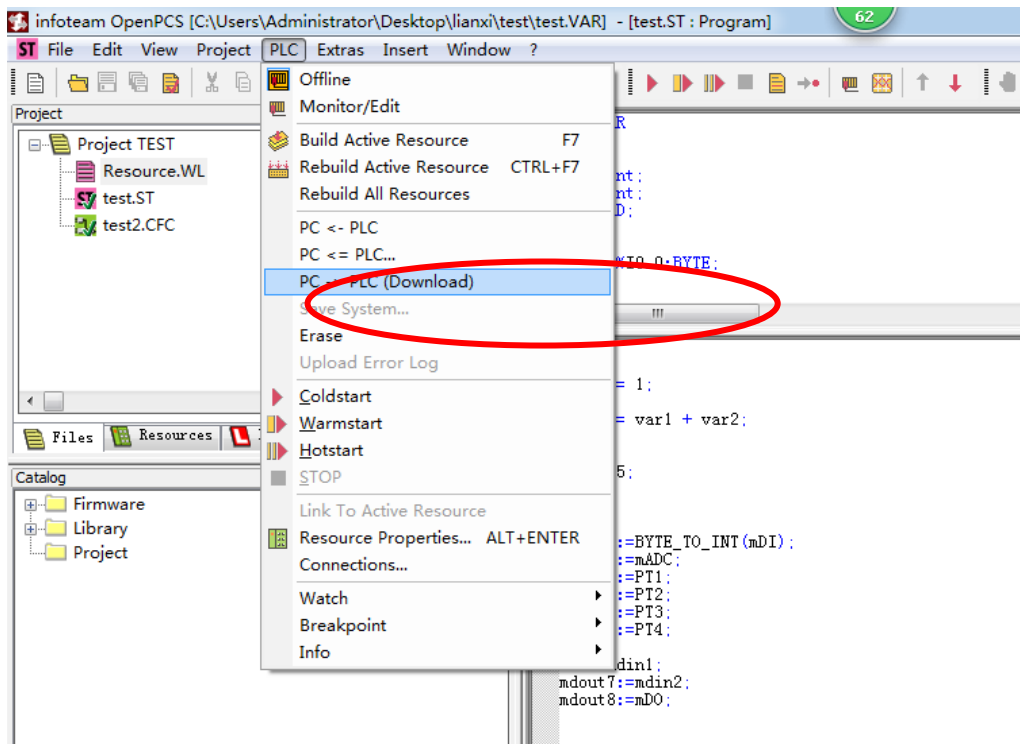


Figure 5.16 Program download

6 Module selection table

I/O	Type	Characteristic	Signal	Channel
CPU	PLC-400	Main frequency: 168M	-	-
	PLC-510	Main frequency: 400M	-	-
Digital input	GC-1008	PNP, filtering 3.0ms	24V DC	8-channel
	GC-1502	Add/Subtract 24V DC, 100kHz	Counter	2-channel
Digital output	GC-2008	PNP, I _{max} =0.5A	24V DC	8-channel
	GC-2204	4-Relay output	230V AC 30V DC	2-channel
	GC-2302	24V DC, 0.1A	PWM	2-channel
Analog input	GC-3604	Voltage input, 16-bit	-5~+5V	4-channel
	GC-3624	Voltage input, 16-bit	-10~+10V	4-channel
	GC-3644	Current input, 16-bit	0-20mA	4-channel
	GC-3654	Current input, 16-bit	4~20mA	4-channel
	GC-3664	Voltage input, 16-bit	0~5V	4-channel
	GC-3674	Voltage input, 16-bit	0~+10V	4-channel
	GC-3804	PT100, 16-bit, 2-wire	PT100	4-channel
	GC-3822	PT100, 16-bit, 3-wire	PT100	2-channel
	GC-3844 / 3854 / 3864	K / S / T type	Thermocouple	4-channel
Analog output	GC-4602	Voltage output, 16-bit	-5~+5V	2-channel
	GC-4622	Voltage output, 16-bit	-10~+10V	2-channel
	GC-4642	Current output, 16-bit	0-20mA	2-channel

	GC-4652	Current output, 16-bit	4~20mA	2-channel
	GC-4662	Voltage output, 16-bit	0~5V	2-channel
	GC-4672	Voltage output, 16-bit	0~10V	2-channel
Communication expansion module	GC-6101	RS232/485 expansion		
	GC-6201	GPRS expansion		
	GC-6221	4G expansion		
	GC-6301	Bluetooth 2.0 expansion		
	GC-6321	Bluetooth 5.0 expansion		
	GC-6401	Zigbee expansion		
	GC-6501	Wifi expansion		

7 Technical specifications

PLC Parameters	
Programming environment	OpenPCS software
Flash (Program storage)	16M bytes
SRAM (Data storage)	512k bytes
User data store	2k bytes
Run-Time system	A PLC mission
PLC cycle time	1000 instructions need about 3ms (ignore I/O circulation and GC-bus)
Programming modified online	Not support
Programming language implementation standard	IEC 61131-3
Programming language	SFC(Sequential function chart)、LD(Ladder diagram)、FBD (Function block)、ST (Structured text)、IL (Instruction List)
Local I/O	None, need extend GC series module
Extend terminal module quantity	Up to 32 modules
Digital I/O signal	256 input/output
Analog I/O signal	64 input/output
Configuration mode	automatic configuration
Real-time clock	Built-in
Floating point operations	Support
Communication interface	
Communication interface	One-channel CAN interface, one-channel Ethernet interface, one-channel RS232 interface
CANopen protocol master/slave function	Support
Modbus RTU/TCP protocol master/slave function	Support
CAN-Bus interface	One OPEN terminal interface, 4Pin
Electrical parameters	
Power	24V DC (-15%/+20%)
Input current	70mA+ (total GC-bus current) /maximum2.5A
Starting current	About 2.5 times continuous current
Fuse capacity	≤10A
Power contacts	Maximum 24V DC/maximum 10A
Electrical isolation	1500 Vrms
Environmental testing	
Working temperature	-40℃~+85℃

Working humidness	95%RH, without condensation
EMC test	EN 55024:2011-09 EN 55022:2011-12
Anti-vibration / impact resistance performance	EN 60068-2-6/EN 60068-2-27/29
Anti-electromagnetic interference/radiation performance	EN 61000-6-2 /EN 61000-6-4
IP grade	IP 20
Basic information	
Dimension	100mm *69mm *48mm
Weight	100g

Sales and service

GCAN[®]

Shenyang Guangcheng Technology Co., Ltd.

Address: F/5 No. 135-21, Changqing Street, Shenyang, Liaoning, 110168, China.

QQ: 2881884596

E-mail: sygckj@gmail.com

Tel: +86-13644001762

Website: www1.gcanbox.com

Whatsapp: +86-13840170070