ELCO

ABSOLUTE ROTARY ENCODER

PROFINET

----User Manual

TIANJIN ELCO AUTOMATION CO., LTD.
11/2024
Version 1.0

Preface

1. **Scope of Application:**

   ELCO's Profinet EAM58-PNOM Multi-turn encoder.
   Visit the information in the manual, you can connect controllers in Profinet mode to run multi-turn encoder products on the Profinet bus.

2. **Basic Knowledge:**

   This manual assumes that you have basic knowledge of electrical and automation engineering.
   This manual describes the components based on valid data at the time of release, new components and parameter adjustments are updated in the new manual.

3. **User Guide:**

   This manual describes the hardware and use of multi-turn encoders under the Profinet protocol, which includes:
   - Installation and wiring
   - Technical characteristics
   - Use examples
   - Technical parameters

4. **Technical Support:**

   This manual describes the product characteristics and usage of multi-turn encoders as comprehensively as possible. If you have any questions or other questions regarding this product, please contact local ELCO office or call the service hotline 400-608-4005.
   You can also visit the ELCO website to learn more about automation products.

   TIANJIN ELCO AUTOMATION CO., LTD. www.elco-holding.com.cn
   ELCO Industrie Automation GmbH www.elco-automation.de

5. **Liability Exemption**
   We have checked the consistency between the contents of manual and the hardware and software.
   However, the possibility of deviation is not ruled out, and the content can not be completely consistent with hardware and software.
   The data parameters have been checked according to the regulations, and the necessary modifications will be included in the new version.

6. **Copyright Declaration**

Contents

Perface.....2

1. Description.....4

2. Technical Features.....4

3. Installation.....5

4. Example.....6

1. Description

1.1 Introduction

The Profinet multi-turn encoders use high-speed Ethernet as the interface communication bus. The application of high-speed Ethernet makes the encoder have higher real-time performance than the traditional fieldbus during operation, and realizes a complete Profinet communication protocol. It can fully support the Profinet master station.

1.2 Description

Profinet multi-turn encoders provide real-time position, real-time speed, direction settings, single-turn resolution settings, total range settings, preset value settings, etc.

1.3 Parameters

- LED and screen status indication, and provide online diagnostics and channel protection
- It has configurable parameters such as rotation direction, single-turn resolution and total range.

1.4 Model

EAM58W10-BF6XTR-4096/8192PNOM

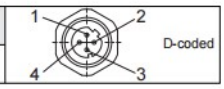
2. Technical Features

2.1 Interface Description

The schematic of Profinet multi-turn encoder as follows:

Data port 1

Signal	T×D+	R×D+	T×D-	R×D-
Pin No.	1	2	3	4

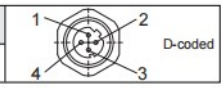


Power interface

Signal	+V	—	-V	—
Pin No.	1	—	3	—

Data port 2

Signal	T×D+	R×D+	T×D-	R×D-
Pin No.	1	2	3	4



The Profinet multi-turn encoders use high-speed Ethernet as the interface communication bus. The application of high-speed Ethernet makes the encoder have higher real-time performance than the traditional fieldbus during operation, and realizes a complete Profinet communication protocol. It can fully support the Profinet master station.

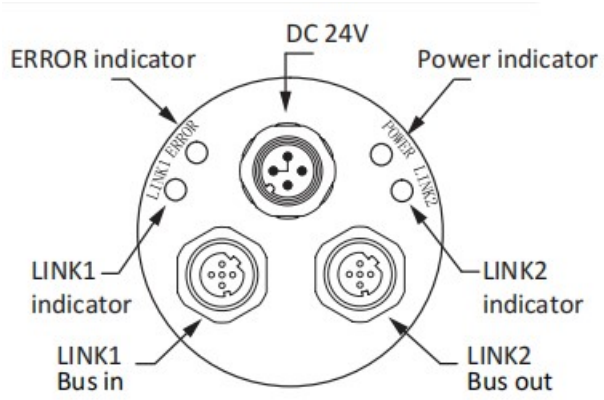
Profinet multi-turn encoders provide real-time position,direction settings, single-turn resolution settings, total range settings, preset value settings, etc.

2.2 Hardware Parameters

Gateway

Item	EAM58W10-BF6XTR-4096/8192PNOM
Power supply	+24 V DC
Input voltage	10 ... 30 V DC
Operating temperature	-40 … 80 ℃
Storage temperature	-45 … 85 ℃
Vibration resistance	10 g, 10 ... 2000 Hz
Shock resistance	50 g, 11 ms
Load capacity of shaft	40 N Axial / 80 N Radial
Protection class	IP65
Service life of bearing	10^9 revolution

2.3 LED Indicator Function

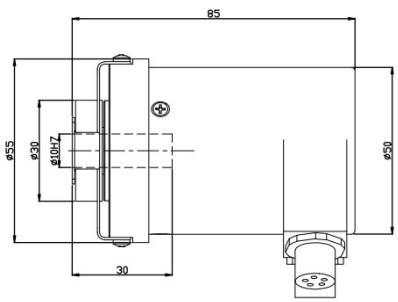


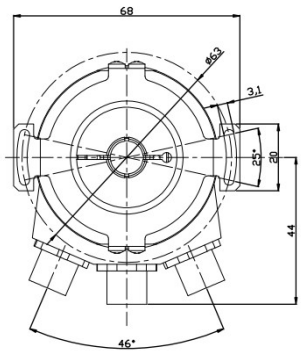
Power indicator	Green light on is normal, red light on is power failure, light off is no power.
Error indicator	Green light on is normal, red light on or off is failure.
Communication indicator	Slow orange flashing indicates normal communication, fast orange flashing indicates data transmission in progress, and off indicates no connection.

3. Installation

3.1 Dimensions

EAM58W Radial

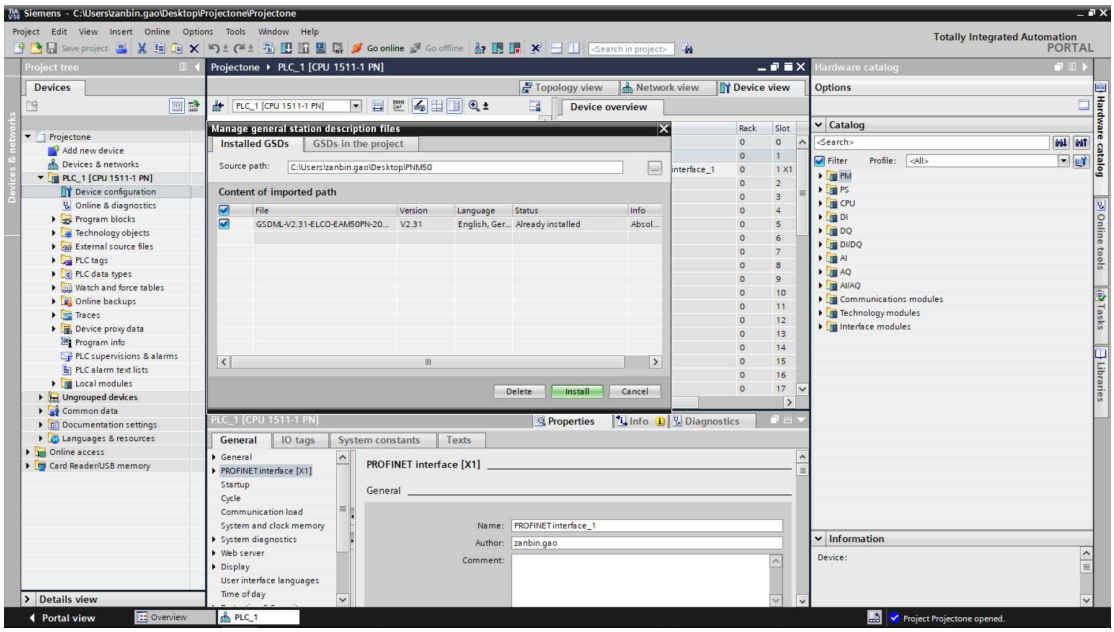




4. Example

4.1 Installing the GSDML File

This section uses the TIA Portal V14 as an example. In the Options drop-down menu of the software, click Manage universal station profile to open the dialog box, find the GSDML file path to install in the source path, select the GSDML file that needs to be installed on the content of the import path, and click the Install button. as follows:



4.2 Encoder configuration

This section provides a complete understanding of the actual use of Profinet encoders visit a practical operation of the configuration connection. This example uses ELCO Profinet encoder as a Profinet IO slave connected to Siemens s7-1500 PLC. To configure and debug TIA Portal V14 on a PC, we will show the specific configuration and debugging process in the form of pictures.

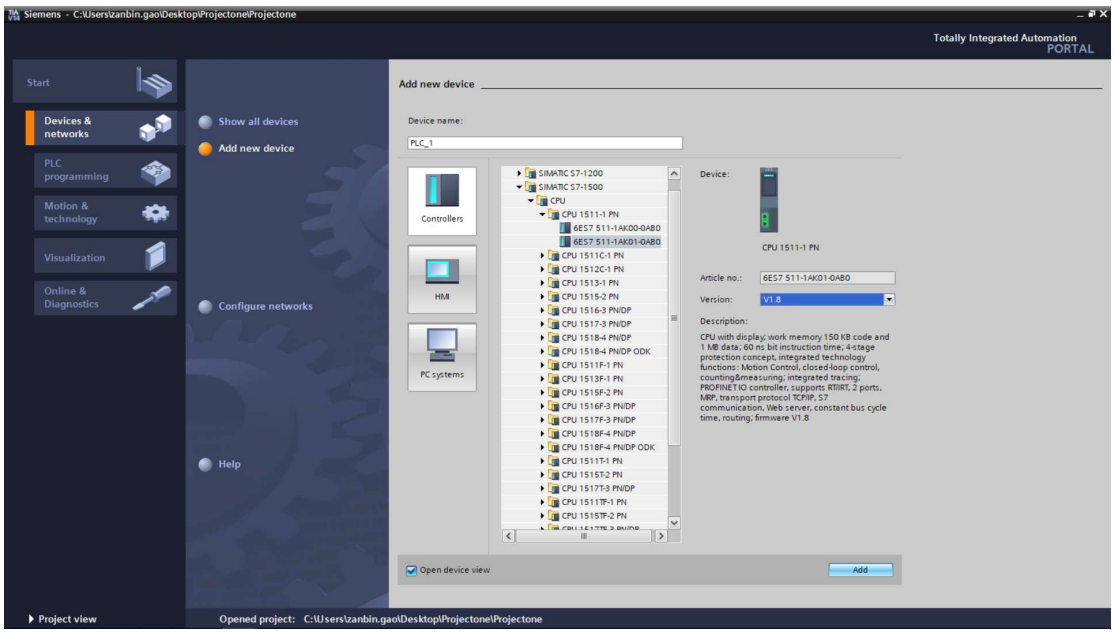
1) Device connection

The Port 1 or Port 2 of the Profinet encoder is connected to a network port of the s7-1500

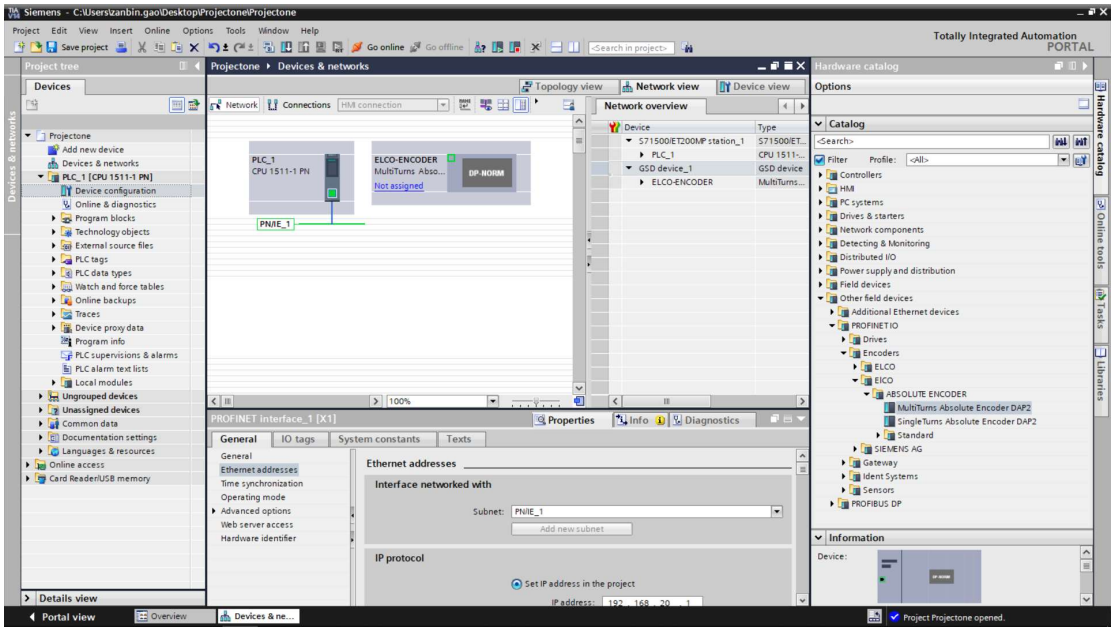
PLC via a standard Profinet network cable, and the other port of the s7-1500 PLC is connected to the PC network port where the TIA Portal V14 is already installed. Connect the encoder and the PLC power cable to the DC +24V power supply.

2) Add new device

Double-click Add new device in the Project menu on the left of the TIA Portal V14 to select the PLC with the same type and version, and click the OK button. as follows:

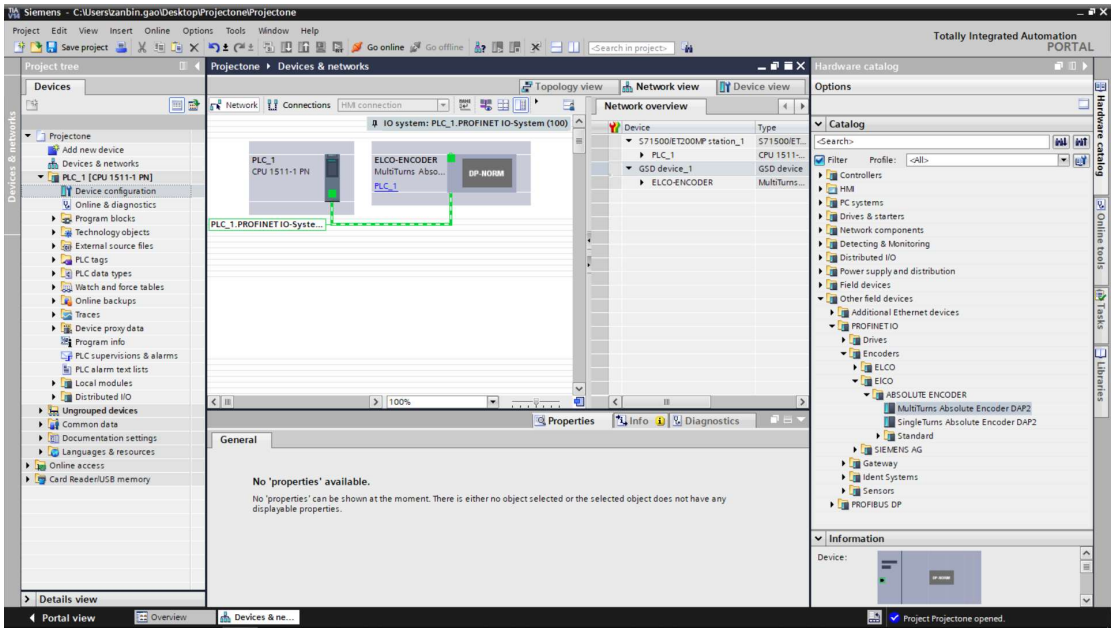


In the Other field devices menu on the right Hardware directory menu of the TIA Portal V14, find the encoder device to be added in Other field devices and drag it to the network view. as follows:

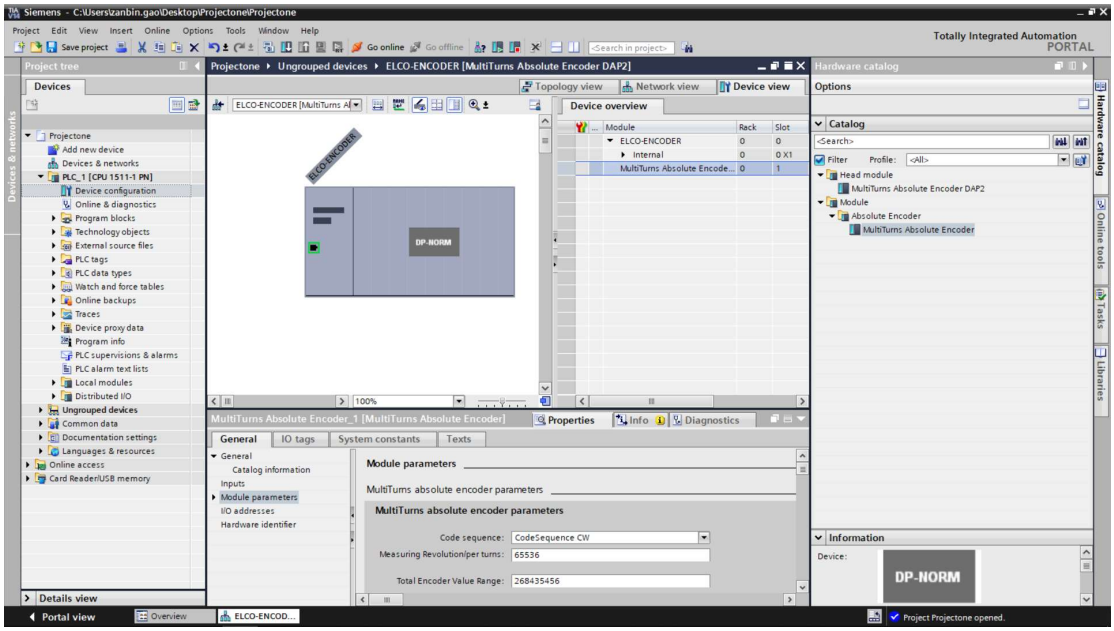


3) Configuration settings

Click the Unassigned button on the encoder device. In the dialog box that pops up, click "PLC_1 PROFINET Interface_1" and the PLC will automatically connect to the encoder. as follows:

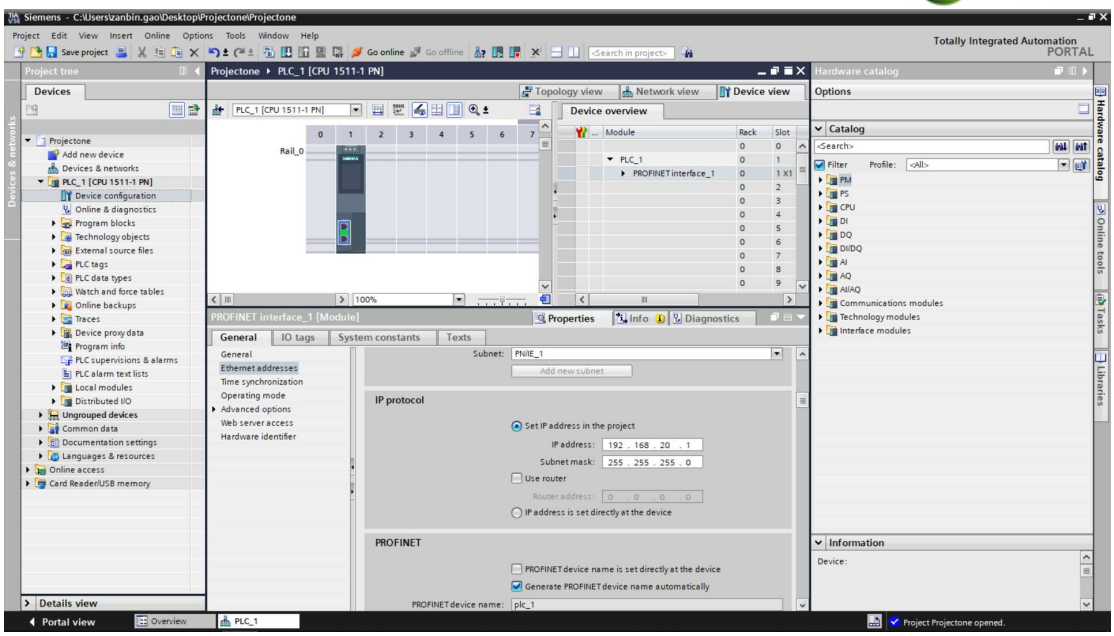


Double-click the encoder device to enter the device view interface. As shown in the following picture, click the module drop-down arrow in the hardware directory on the right side of the software. Then select the required module and drag it to the device overview area. as follows:

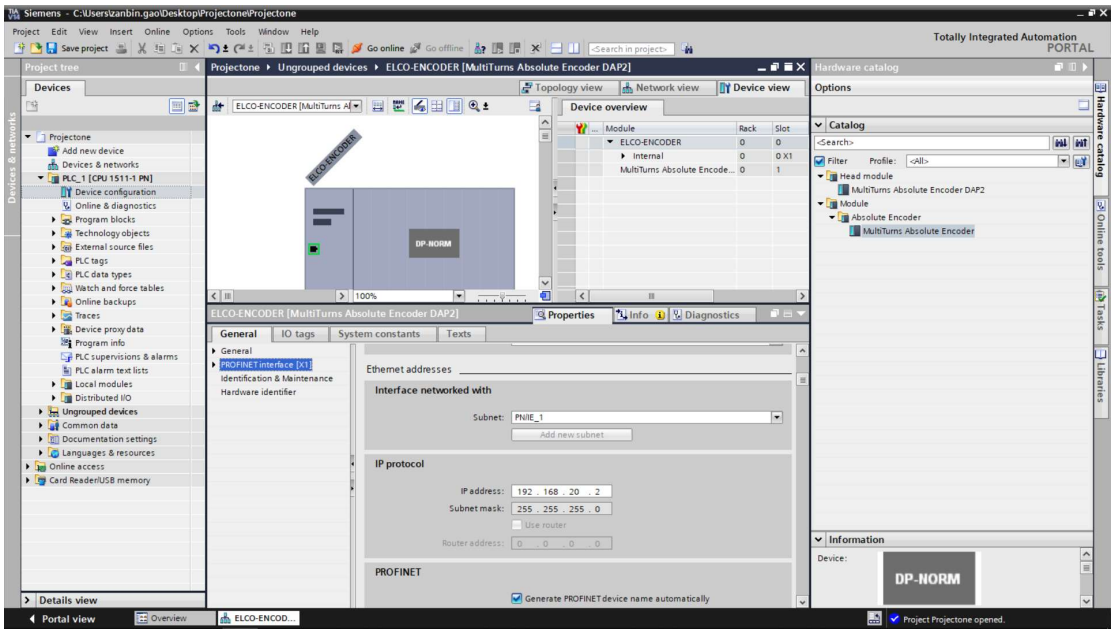


Double-click the PLC, encoder device, and set the IP address and sub-net mask in the regular dialog box. The default IP address of the encoder is 192.168.20.2. Ensure that the PLC, encoder, and PC are in the same LAN.

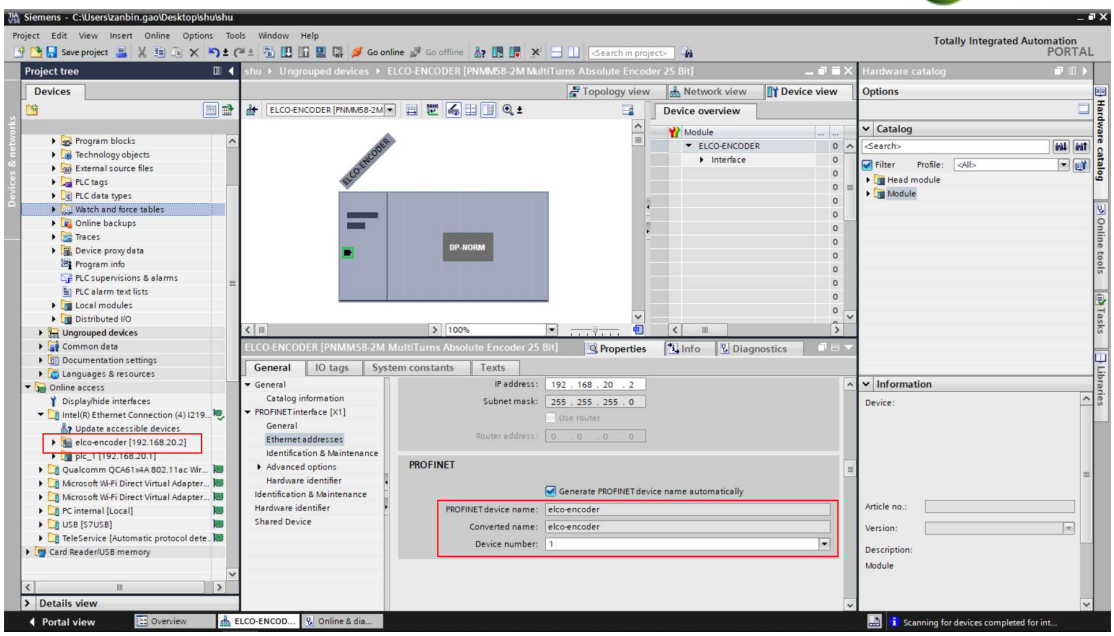
PLC's IP address setting, as follows:



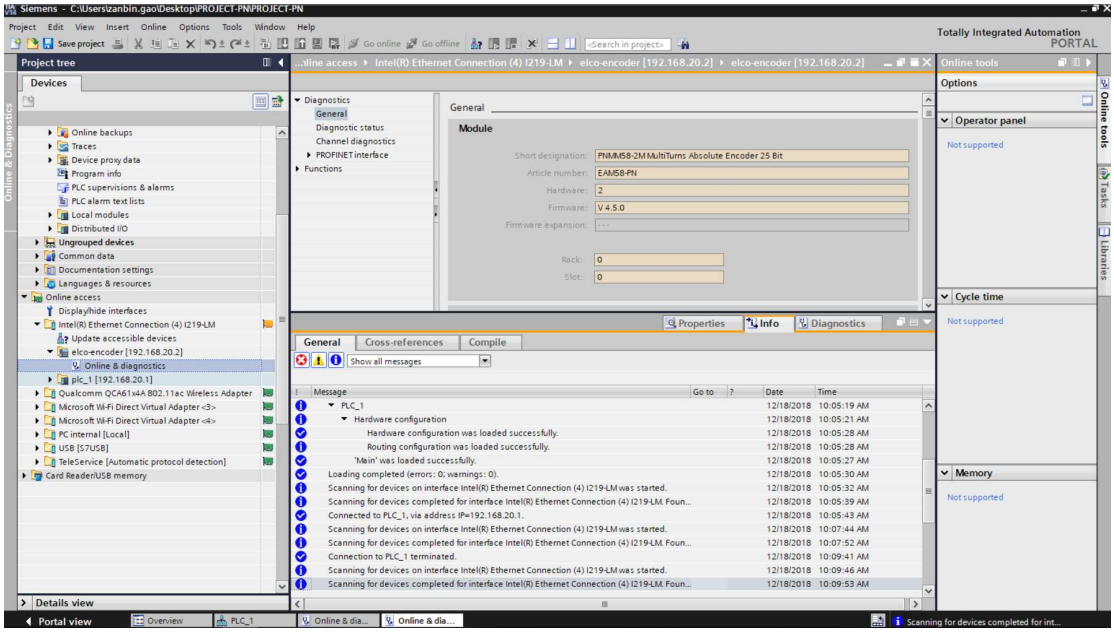
Encoder IP address settings, as follows:



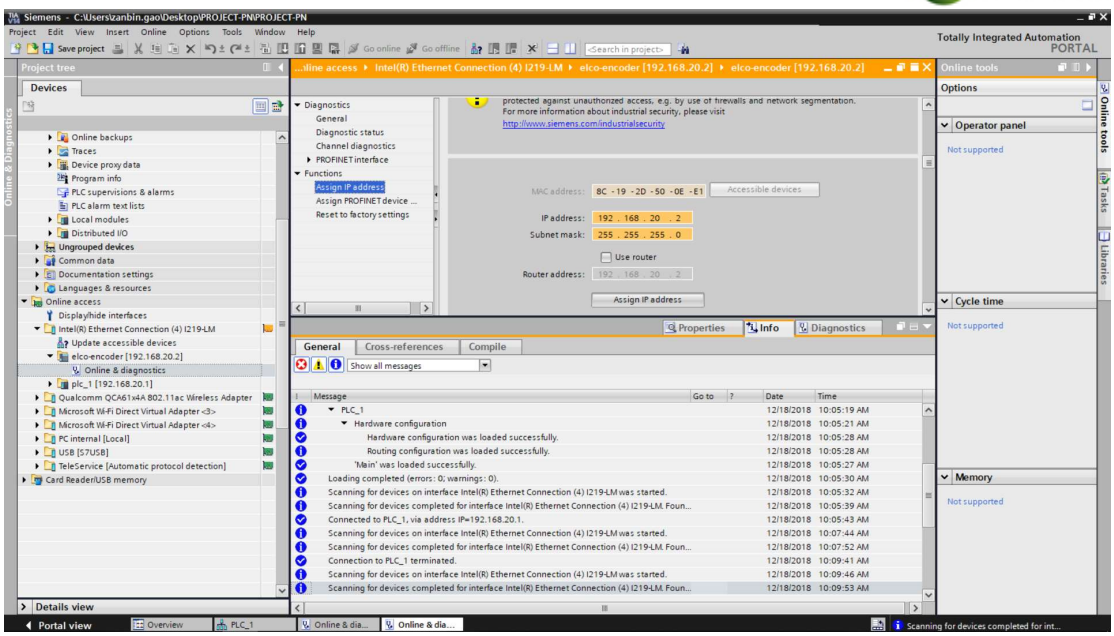
The converted name remains the same as the Profinet device mane.



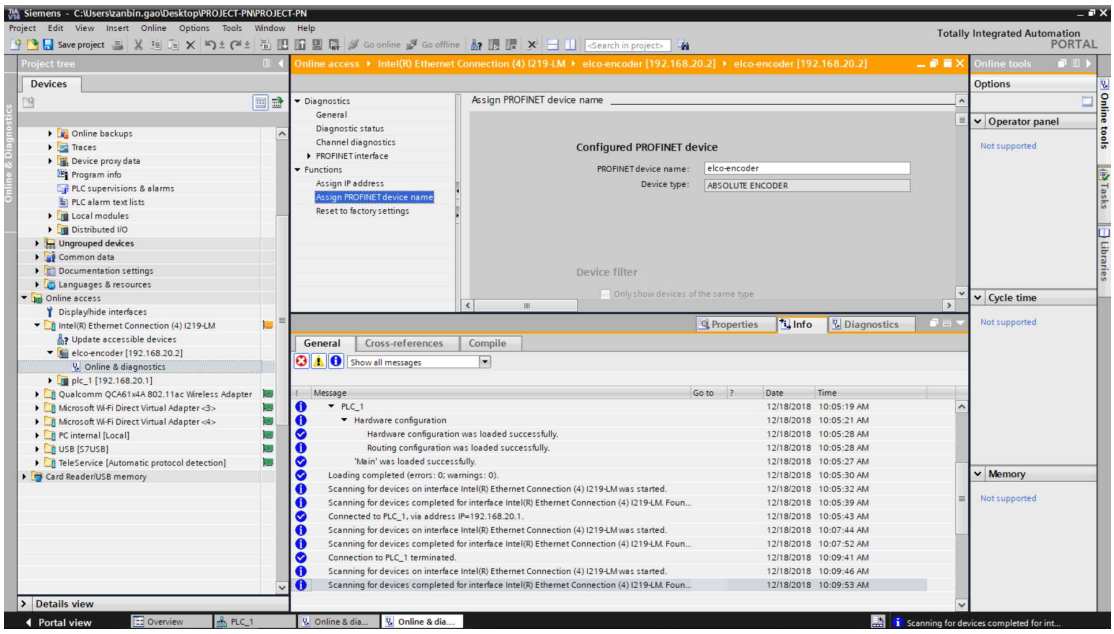
If the names are inconsistent, communication cannot be established. The modification method is as follows. Find the encoder by online access, select "online & diagnostics" in the encoder submenu, and select "Assign IP address" and "Assign PROFINET device name" in Functions.



The IP address is modified as follows:



The PROFINET device name is modified as follows:

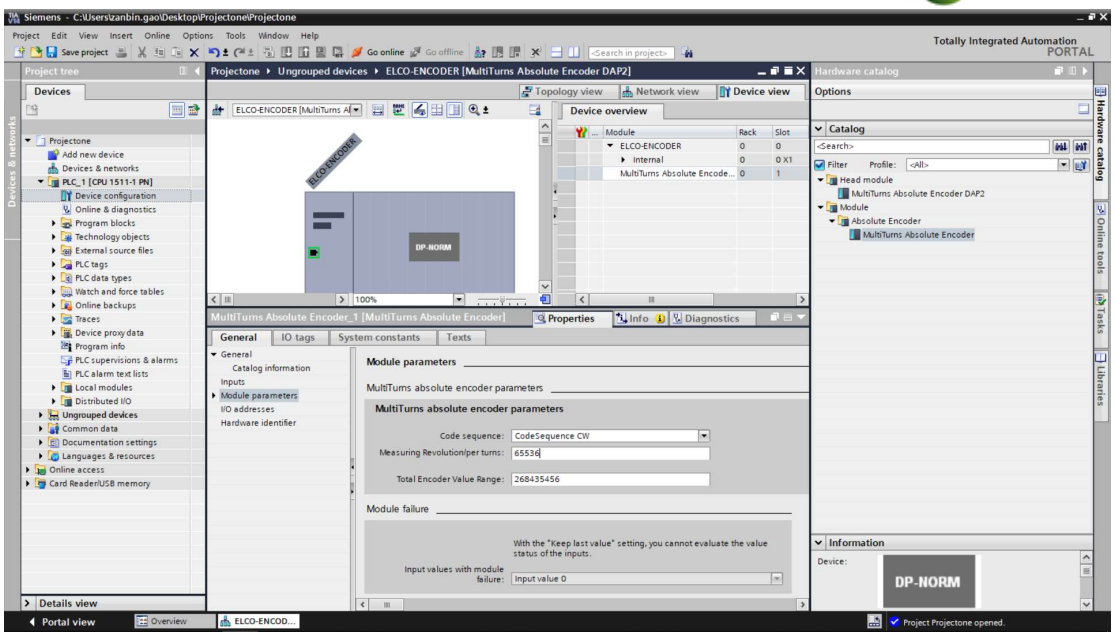


4.3 Encoder settings

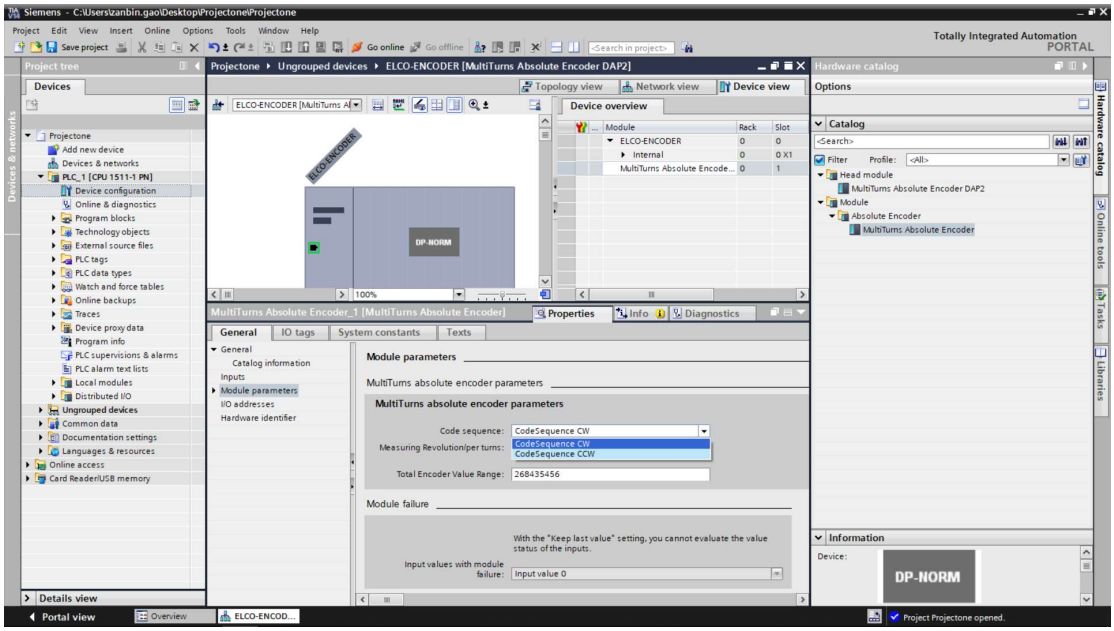
The encoder provides multiple settable items including rotation direction, single-turn resolution, total measurement range, preset value setting, rotation speed and so on.

1) Rotation direction setting:

In the Encoder device overview view, click Parameter access point. In the dialog box, click Module parameter to enter the parameter setting interface. as follows:

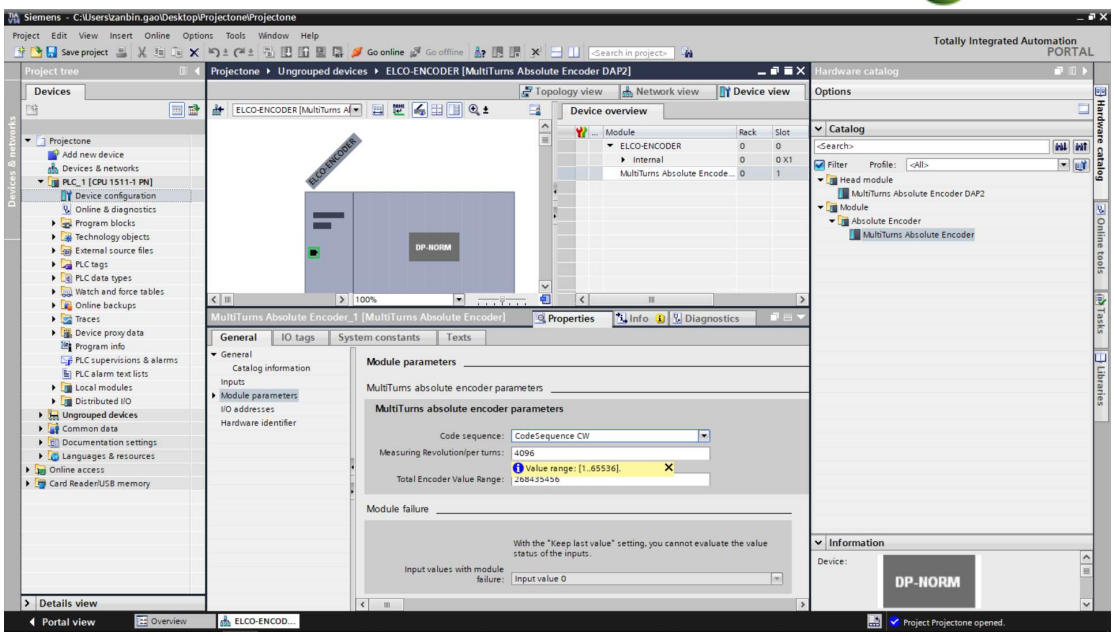


In the drop-down menu of Code sequence, select the rotation direction of the encoder, CW: Forward, CCW: Reverse. as follows:



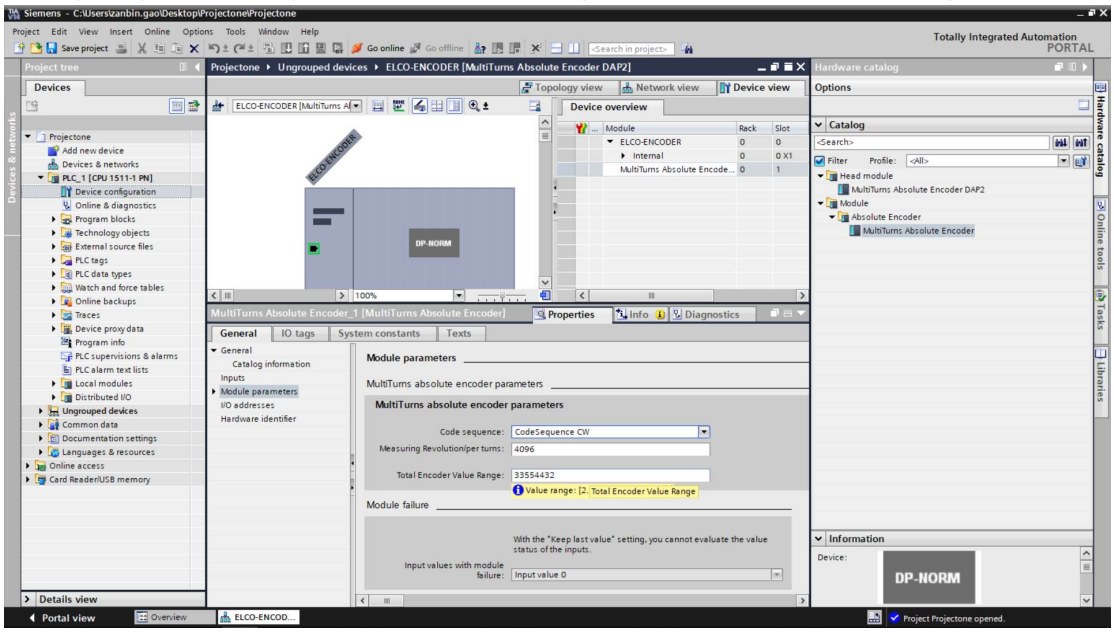
2) Single-turn resolution setting:

Set the single-turn resolution in the Measuring Revolution/per turns window, and the data setting range is an integer from 1 to 8192. as follows:



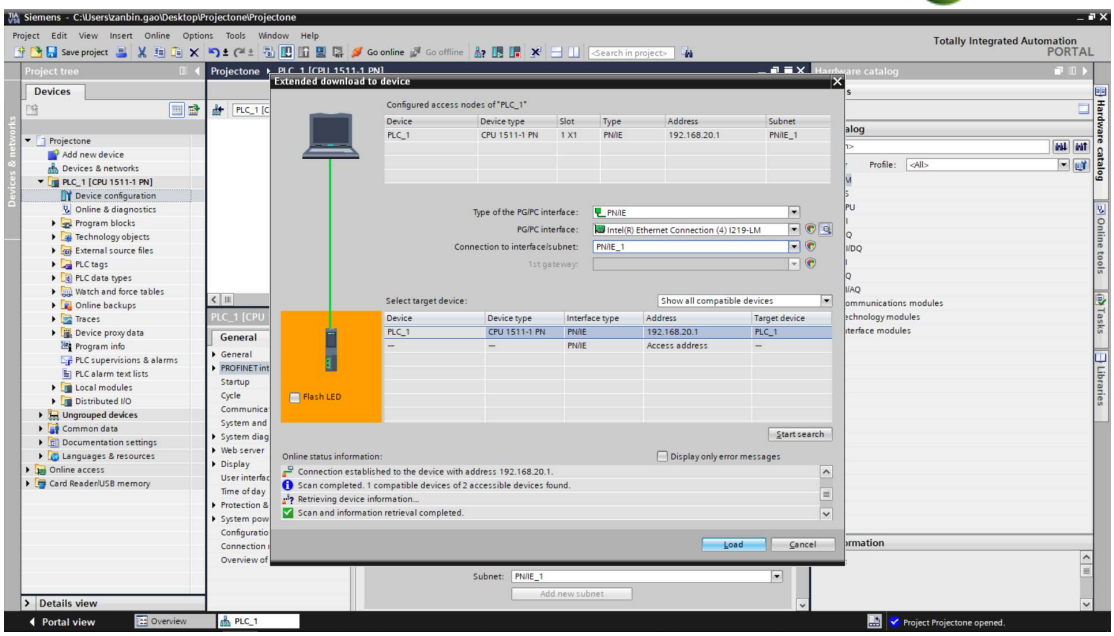
3) Total measurement setting:

Set the total measured value in the window of the Total measuring range, and the data setting range is an integer from 1 to 35534432(4096 turns * 8192 Resolution). as follows:



4) Compile and download:

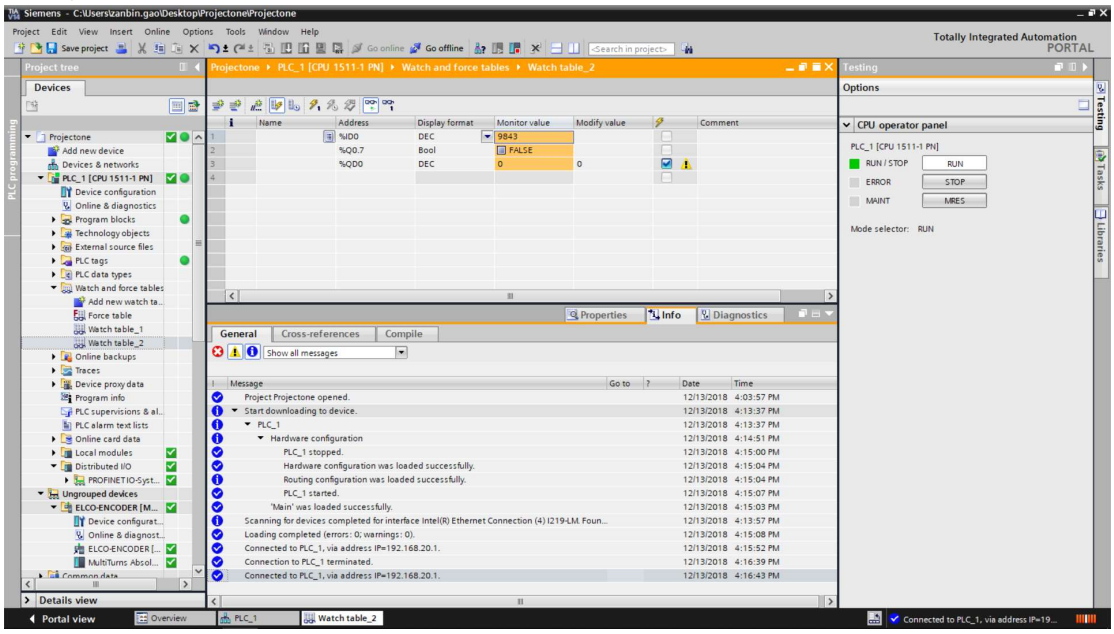
Click the Compile button on the menu to compile the current configuration . After successfully compilation, click the Download button on the menu to download the compiled program to the corresponding PLC. as follows:



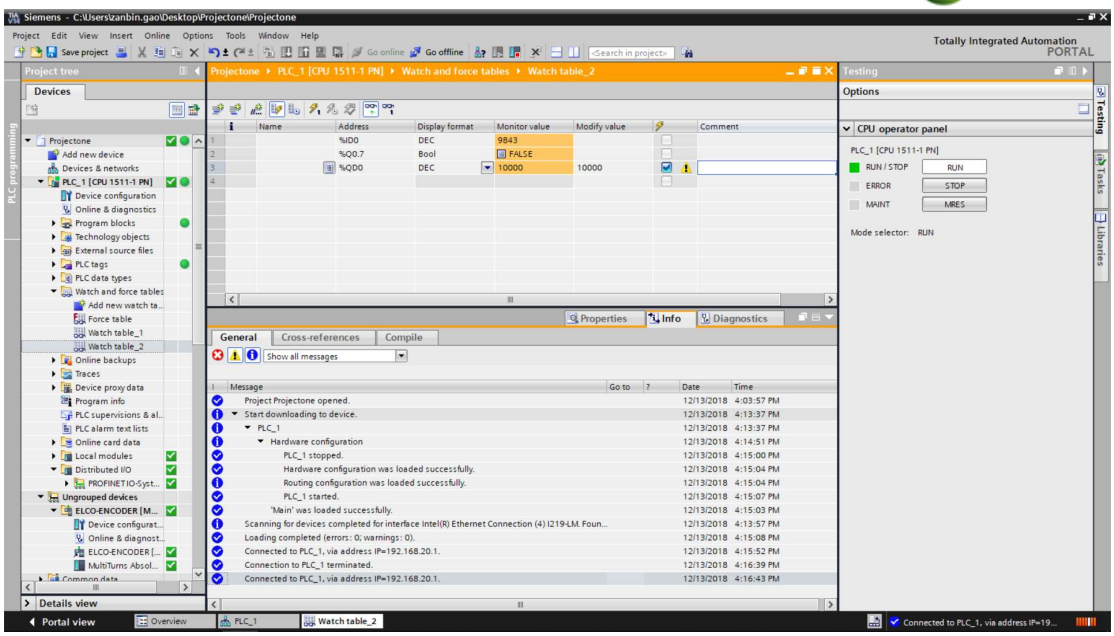
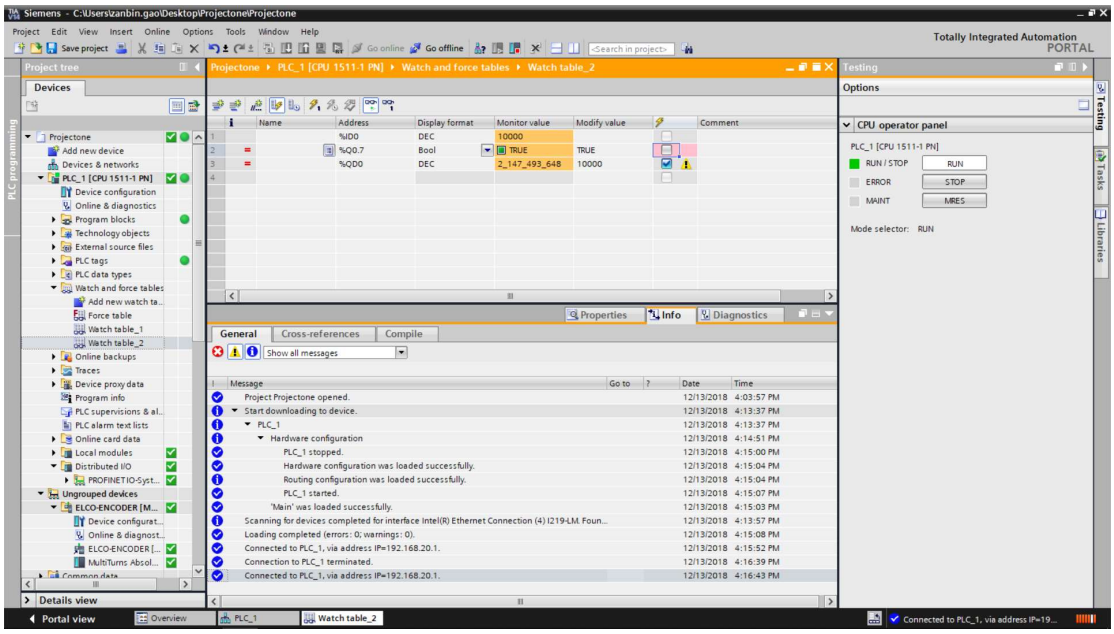
4.4 Monitoring table

On the left side of the TIA Portal V14 software, in the "Watch and Force tables" , double-click add a new “monitor table”to monitor the encoder data.

When both input and output addresses are from 0, the current speed monitoring address is ID0, the set zero address is Q0.7, and the preset value set address is QD0, as shown in the figure below: as follows:



The preset value can be setted by QD0;eg,preset value setted 10000.



Setting bit Q0.7, Modify to 1, and set the encoder to set preset value.