

## NA2000 Series PLC 2G/4G Communication

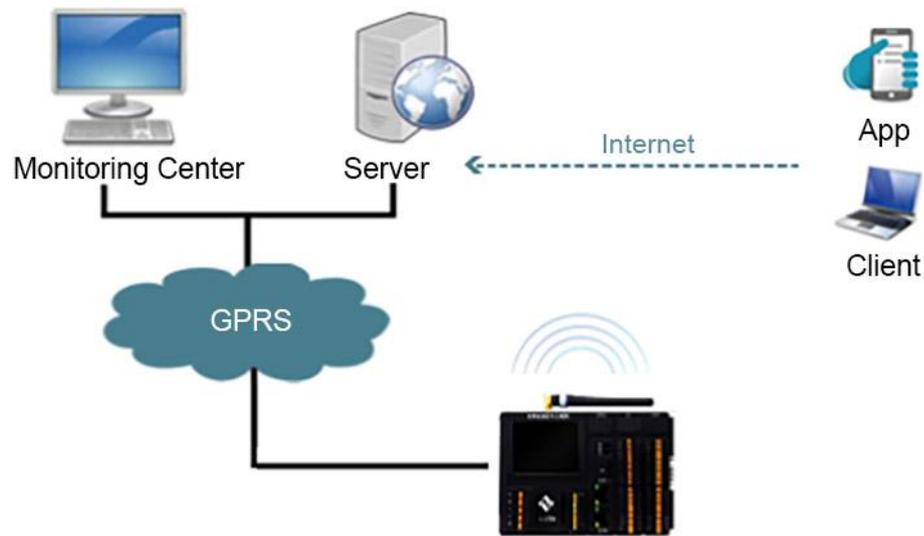


Figure 8-5-1 2G/4G network topology

2G/4G communication process: PLC actively initiates a connection request to the data center, and after the data center detects the connection request, establishes a SOCKET connection. The PLC then sends a registration packet message, and the data center can clarify the identity of the remote PLC device according to the registration packet message. After clarifying the identity of the remote device, the data center enters the normal MODBUS TCP message communication, the data center is the master station, and the PLC is the slave. Heartbeat packets are messages used to monitor the state of network communication. Both the data center and the PLC send a heartbeat packet message, and the content of the letter is the same. When the PLC detects that the heartbeat packet timeout period is not received from the data center, it thinks that the network is interrupted, the data communication connection is closed, and it tries to reconnect.

### 8.5.1 Modbus TCP communication based on 2G/4G

In the PLC configuration of the NAPro development software, for example, double-click the CPU type CPU2001-2401, the following dialog box will pop up, select the "2G/4G" pagination item.

CPU Module Parameter

I | Q | SBD | INT | RET | ETH | COM1 | COM2 | 2G/4G | ZigBee/LoRa | MQTT | COM3 | COM4

	Data Center 1	Data Center 2	Data Center 3	Data Center 4
Protocol	MODBUS TCP	None	None	Remote Debug
IP	0 . 0 . 0 . 0	0 . 0 . 0 . 0	0 . 0 . 0 . 0	0 . 0 . 0 . 0
DNS				
Port	1111	0	0	0

Register Packet	NA2000:00001	Mode	DNS
Heartbeat Packet	NA2000:	APN Name	CMNET
Interval of Heartbeat Packet (s)	60	Login Name	
Timeout of Heartbeat Packet (s)	180	Login Password	

OK Cancel

Figure 8-5-2 2G/4G configuration

1. Data center 1~4 enable: "None" or "MODBUS TCP" option, when "none" will not trigger the communication drive of the data center inside the PLC.
2. Data center 1 ~ 4 address mode: "IP address" or "domain name", 2G/4G communication supports IP address or domain name resolution address access mode.
3. Data Center 1~4 IP Address: IP4 address when ip address mode.
4. Data center 1 to 4 domain names: when the domain name address mode, the string, the maximum length of 55 characters, including the tail '\0'.
5. Data center 1 to 4 port number: numerical value, range 0 ~ 65535.
6. Custom registration package: maximum length 20 characters, including the tail '\0', default, NA2000:00001 (00001 is the ID number). Data messages are transmitted in ASCII codes. The contents of this enrollment package can be changed freely by the user.
7. Custom heartbeat packet: the maximum length is 20 characters, including the tail '\0', and the minimum length must not be less than 5 characters. Default, NA2000: . Data messages are transmitted in ASCII codes. The contents of this enrollment package can be changed freely by the user.
8. Heartbeat packet interval: default 60 seconds, unit: seconds. The value range is 1 to 1800.
9. Heartbeat packet timeout: default 100 seconds, unit: seconds. The value range is 1 to 3600.
10. APN name: String 2G mode input "CMNET", string 4G mode input "CMNET\_4G", empty when not enabled. Maximum length 20 characters, including trailing '\0'.

11. Login Name: String, maximum length 20 characters, including the trailing '\0'.

12. Login password: String, maximum length 20 characters, including the tail '\0'.

### 8.5.2 4G-based MQTT communication

In the PLC configuration of the NAPro development software, for example, double-click the CPU type CPU2001-2401, the following dialog box will pop up, select the "MQTT" pagination item and the "2G/4G" pagination item to configure as follows.

No.	Name	Data	Cycle [s]	RW
1	M1	%M1	10	Read/Write
2	M2	%M2	10	Read/Write
3	M3	%M3	10	Read/Write
4	MW1	EADD[0]	10	Read/Write
5	MW3	EADD[1]	10	Read/Write
6	MW5	EADD[2]	10	Read/Write
7	MW7	EADD[3]	10	Read/Write
8	MW9	EADD[4]	10	Read/Write
9	MW11	EADD[5]	10	Read/Write
10			10	Read Only
11			10	Read Only
12			10	Read Only
13			10	Read Only

Figure 8-5-3 MQTT parameter configuration

1. Cloud service: "None" or "MQTT" option, the communication driver of the cloud service inside the PLC will not be triggered when "None".

2. Service address: The server address pushed by MQTT, and you can also write the domain name. String, with a maximum length of 55 characters, including the trailing '\0'.

3. Port: The port number of the server pushed by MQTT. Numerical value, ranging from 0 to 65535.

4. DNS server: If you pass through the ethernet port of the module and the server is a domain name, you need to configure the DNS server address.

5. Device ID: Used to specify the device ID of the module (such as the module serial number, or user-defined ID); Maximum length 20 characters, including trailing '\0'. Data messages are transmitted in ASCII codes. The contents of this enrollment package can be changed freely by the user.

6. Username: MQTT, the user information authentication required by the module to log in to the server.

7. Password: MQTTPW, the user information authentication required by the module to log in to the server.

8. Heartbeat Pack: Heartbeat Pack Time, Unit: Seconds.

9. Communication mode: 4G or Ethernet mode, the module is connected to the physical channel of cloud services.

Configure data monitoring points on the right side of the cloud service connection parameter configuration, and you can configure up to 64 data monitoring points. 1 monitoring point data consists of 4 parameters:

10. Name: The name of the cloud service matching data, up to 15 characters.

11. Data: The corresponding associated data in the configuration module can be the data of the measurement point table or the variable table.

12. Cycle: The period of data release, divided into fast and slow, fast 10 seconds, slow speed 60 seconds.

13. Read and write: The type of data, which is divided into read-write, read-only and write-only.

	Data Center 1	Data Center 2	Data Center 3	Data Center 4
Protocol	None	None	MQTT	None
IP	0 . 0 . 0 . 0	0 . 0 . 0 . 0	0 . 0 . 0 . 0	0 . 0 . 0 . 0
DNS			1883.dtuip.com	
Port	1111	0	1883	0

Register Packet: NA2000GPRS000002  
Heartbeat Packet: NA2000  
Interval of Heartbeat Packet [s]: 60  
Timeout of Heartbeat Packet [s]: 180  
Mode: DNS  
APN Name: CMNET\_4G  
Login Name:   
Login Password:

Figure 8-5-4 MQTT/4G configuration

Remarks: When using the 2G/4G communication method, you need to configure the parameters of Figure 8-5-3 cloud service, device ID, user name, password, heartbeat packet, data monitoring point, etc., as well as the protocol, IP address (optional), domain name, port number, custom registration package, custom heartbeat packet, heartbeat packet interval, heartbeat packet

timeout, address mode, VPN name and other parameters of Figure 8-5-4 Data Center 3 (refer to Section 8.5.1). When ethernet communication is used, all parameters of Figure 8-5-3 can be configured.

### 8.5.3 Remote debugging based on 4G communication

#### 8.5.3.1 Configuration

In the PLC configuration of the NAPro development software, for example, double-click the CPU type CPU2001-2401, the following dialog box will pop up, select the "2G/4G" pagination item.

	Data Center 1	Data Center 2	Data Center 3	Data Center 4
Protocol	None	None	None	Remote Debug
IP	0 . 0 . 0 . 0	0 . 0 . 0 . 0	0 . 0 . 0 . 0	0 . 0 . 0 . 0
DNS				
Port	1111	0	0	0

Register Packet	NA2000:00001	Mode	DNS
Heartbeat Packet	NA2000:	APN Name	CMNET_4G
Interval of Heartbeat Packet [s]	60	Login Name	
Timeout of Heartbeat Packet [s]	180	Login Password	

1. Data Center 1~3: Select "None".
2. DataCenter 4: Select "Remote Debugging".
3. Data center address mode: "domain name".
4. Custom registration package: maximum length 20 characters, including the tail '\0', default, NA2000:00001 (00001 is the ID number). Data messages are transmitted in ASCII codes. The contents of this enrollment package can be changed freely by the user.
5. Custom heartbeat packet: the maximum length is 20 characters, including the tail '\0', and the minimum length must not be less than 5 characters. Default, NA2000: . Data messages are transmitted in ASCII codes. The contents of this enrollment package can be changed freely by the user.
6. Heartbeat packet interval: default 60 seconds, unit: seconds. The value range is 1 to 1800.

7. Heartbeat packet timeout: Default 100 seconds, unit: seconds. The value range is 1 to 3600.

8. APN Name: Enter "CMNET\_4G" in 4G communication mode.

9. Login name: Empty.

10. Login password: Blank.

Note: When remote debugging of 4G communication, you need to configure parameters such as serial numbers 1, 2, 3, 8, etc., and other parameters can be defaulted.

### 8.5.3.2 Get the 4G module IMEI

IMEI: International Mobile Equipment Identity (*IMEI*), each 4G communication module has a unique IMEI number, using IMEI to address the remote NA2000 when remotely connected.

First of all, after the configuration is completed according to the previous section, in order to obtain the IMEI of the 4G communication module, the first time must be connected to the NA2000 and NAPro through the Ethernet cable, and the IMEI of the 4G communication module can be viewed through the point meter SW %49-%56 as shown below:

%SW0039				0	0000H						
%SW0040				0	0000H						
%SW0041				0	0000H						
%SW0042				0	0000H						
%SW0043				0	0000H						
%SW0044				0	0000H						
%SW0045				0	0000H						
%SW0046				0	0000H						
%SW0047				0	0000H						
%SW0048				0	0000H						
%SW0049				0	3830H						
%SW0050				0	3536H						
%SW0051				0	3035H						
%SW0052				0	3031H						
%SW0053				0	3734H						
%SW0054				0	3930H						
%SW0055				0	3536H						
%SW0056				0	3930H						
%SW0057				0	0000H						
%SW0058				0	0000H						
%SW0059				0	0000H						
%SW0060				0	0000H						
	Q	IW	QW	M	MW	N	NW	S	SW	T	C

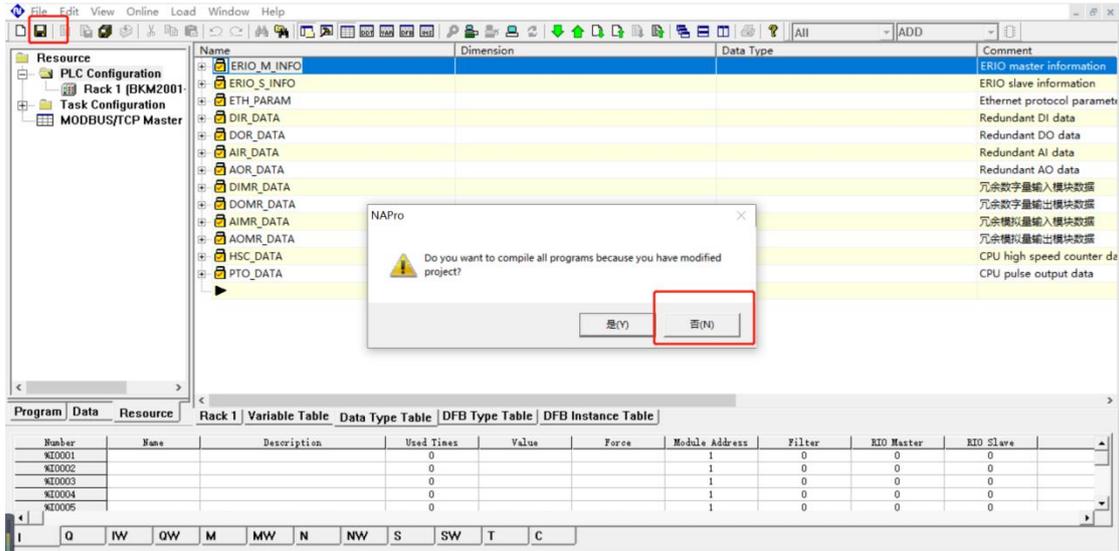
Inside the red box is the IMEI code of the 4G communication module. For example, the IMEI code in the above figure is:

Hexadecimal code: 0x30 0x38 0x36 0x35 0x35 0x30 0x31 0x30 0x34 0x37 0x30 0x39 0x36 0x35 0x30 0x39

ASCII code value: 0865501047096509

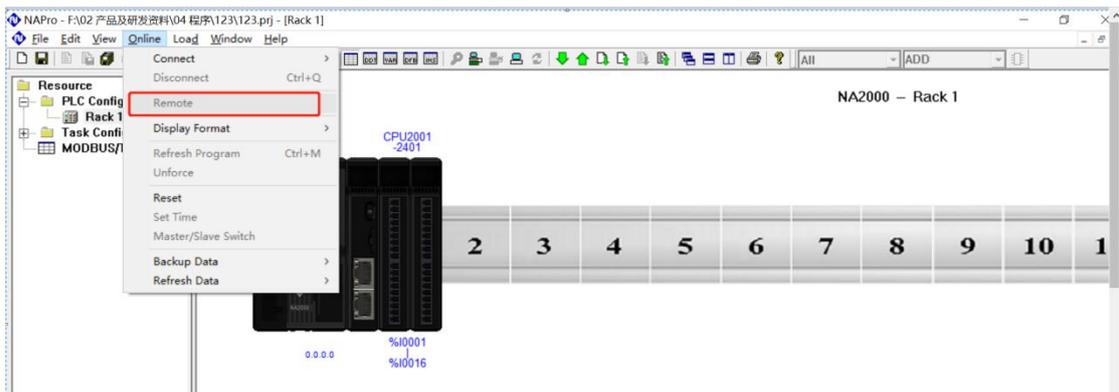
After determining that the IMEI number has been viewed after NAPro and NA2000 are offline, click Save, and click "No" after popping up the following dialog box, as shown in the following figure:

NAPro saves the IMEI of the current 4G communication module.



### 8.5.3.3 Remote mode switching

Click on the online menu to select "Remote", as shown in the figure



### 8.5.3.4 Remote Online

Click the "Online" button on the toolbar, as shown in the figure



### 8.5.3.6 4G module diagnostic information

Monitor the signal strength and channel connection status of the 4G module via the SW point meter:

SW65 : Signal strength (Signal strength between 15-99 indicates that the signal quality is normal, out of range is abnormal may affect data transmission and connection, the smaller the value, the stronger the signal. )

SW66 : Channel 1 connection status code (0: Not enabled, 1: Connecting, 2: Connection successful, 3: Socket closed, 4: Connection to Server failed)

SW67 : Channel 2 connection status code

SW68 : Channel 3 connection status code

SW69 : Channel 4 connection status code

序号	名称	地址	使用点数	值
NSW0037			0	0
NSW0038			0	0
NSW0039			0	0
NSW0040			0	0
NSW0041			0	0
NSW0042			0	0
NSW0043			0	0
NSW0044			0	0
NSW0045			0	0
NSW0046			0	0
NSW0047			0	0
NSW0048			0	0
NSW0049			0	0
NSW0050			0	0
NSW0051			0	0
NSW0052			0	0
NSW0053			0	0
NSW0054			0	0
NSW0055			0	0
NSW0056			0	0
NSW0057			0	0
NSW0058			0	0
NSW0059			0	0
NSW0060			0	0
NSW0061			0	0
NSW0062			0	0
NSW0063			0	0
NSW0064			0	0
NSW0065			0	31
NSW0066			0	1
NSW0067			0	1
NSW0068			0	1
NSW0069			0	1
NSW0070			0	0
NSW0071			0	0
NSW0072			0	0
NSW0073			0	0
NSW0074			0	0
NSW0075			0	0
NSW0076			0	0
NSW0077			0	0
NSW0078			0	0
NSW0079			0	0
NSW0080			0	0
NSW0081			0	0
NSW0082			0	0
NSW0083			0	0
NSW0084			0	0
NSW0085			0	0