

# HART / EtherNet Gateway

## GT200-HT-EI

### User Manual

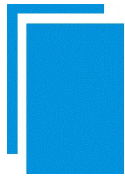
V 3.0



***SST Automation***

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# Important Information

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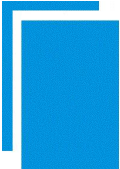
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## Catalog

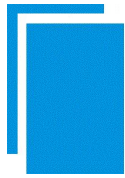
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# 1 Product Overview

## 1.1 Product Function

GT200-HT-EI is a gateway that can provide a seamless connection between HART and EtherNet/IP or Modbus TCP Ethernet protocol. It can connect HART slave devices to an EtherNet/IP network or Modbus TCP network and realize bi-directional data exchange easily. The HART side can be configured as a primary or secondary master, and the EtherNet/IP or Modbus TCP side works as a server.

## 1.2 Product Features

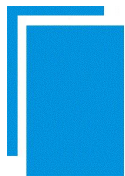
- Easy to use: Users only need to refer to the product manual and application instances and can realize data communication of a gateway in a short time according to the requirements of the configuration.
- Powerful functionality: Support fast acquisition of the HART slave address and modification, point-to-point mode of coexistence of HART communication and 4-20mA data acquisition, HART side supports the primary master and the secondary master.
- Multi debugging functions: The configuration software SST-HI-CFG can provide a visual display of data exchange as well as HART command diagnostics and communication debugging functions that greatly facilitates user communication tests.
- Flexibility: The Ethernet side supports EtherNet/IP or Modbus TCP.

## 1.3 Technical Specifications

- [1] EtherNet network (EtherNet/IP and Modbus TCP) is independent of HART network.
- [2] IP address conflict detection.
- [3] Supports ODVA standard EtherNet/IP communication protocol in adapter mode.
- [4] Used as a primary or a secondary HART master.
- [5] Supports single-point and multi-point mode at the HART side.
- [6] Support for online scanning of HART devices and modification of address functions.
- [7] Under point-to-point mode, supports data burst operation from slave.
- [8] Supports one HART-channel with optional internal or external terminal resistors, under multi-point mode,

supports connecting at most 13 HART slaves with gateway internal resistor and supports connecting 15 HART slaves with an external resistor (250 Ohm).

- [9] Supports all commands of the HART 6 protocol.
- [10] Each HART command can be configured for change-of-state output, polling output, initialization output or disable output.
- [11] HART channels support up to 127 user commands, a mix of basic and advanced modes, with a maximum of 30 commands in advanced mode, HART output data buffers up to 1000 bytes and input data buffers up to 1600 bytes.
- [12] The Ethernet side supports setting static IP or DHCP. the IP will be fixed to 192.168.0.11 after 30s of unsuccessful DHCP assignment.
- [13] Ethernet side can be configured as Modbus TCP server or EtherNet/IP adapter.
- [14] EtherNet/IP supports VendCode modification.
- [15] Max input and output bytes of EtherNet/IP:  
Max input bytes: 256 bytes.  
Max output bytes: 256 bytes.
- [16] Modbus TCP side supports function codes: 03, 04, 06, 16.
- [17] Modbus TCP side supports 03, 04 function codes for data reading.
- [18] The Modbus TCP side supports a maximum input byte count of 1600 bytes and a maximum output byte count of 1000 bytes.
- [19] Up to 4 TCP connections can be established simultaneously on the Modbus TCP side.
- [20] Power: 24VDC (11V-30V), 70mA (24VDC).
- [21] Operating temperature: -40 °F-140 °F (-40 °C-60 °C). Humidity: 5%- 95% (without condensation).
- [22] Dimensions (W\*H\*D): 1.0 in \* 4.0 in \* 3.6 in (25 mm \* 100 mm \* 90 mm).
- [23] Installation: 35mm DIN RAIL.
- [24] Protection Level: IP20.



## 1.4 Related Products

Related products include:

- GT200-HT-RS
- GT200-HT-MT
- GT200-3HT-MT
- GT200-3HT-RS
- GT100-EI-RS
- GT200-EI-2RS485

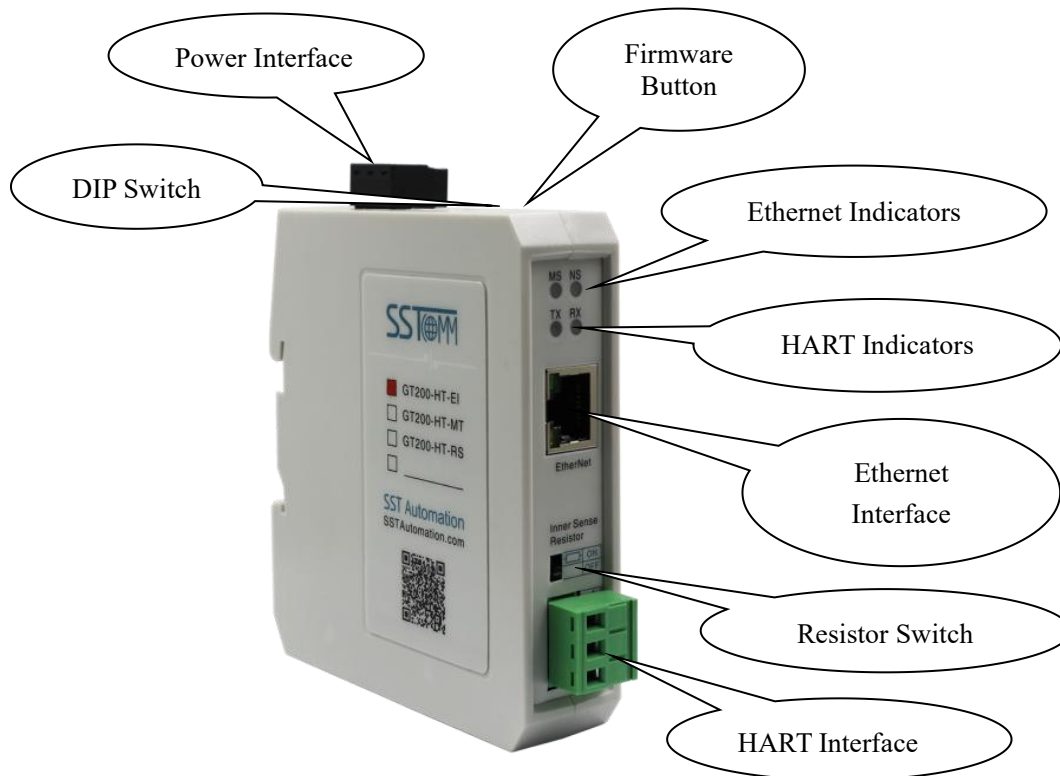
To get more information about related products, please visit SST Automation's website: [www.sstautomation.com](http://www.sstautomation.com).

## 1.5 Revision History

| Revision    | Date       | Chapter                                                                               | Description                                                                   |
|-------------|------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| V3.0        | 10/13/2023 | ALL                                                                                   | Added Modbus TCP functionality.<br>Cleaned up the multi-drop wiring diagrams. |
| V1.3, Rev D | 8/9/2022   | Chapter 1.1, 1.3, 1.4,<br>2.5, 2.7, 4.1, 4.3,<br>5.2.2.3, 5.2.2.4, 5.2.3,<br>6.1, 8.1 | Revised some mistakes. Corrected figure in chapter 2.5.                       |
| V1.3, Rev C | 8/2/2022   | PART                                                                                  | Add two wire and four wire multi-drop wiring and replace software screenshot. |
| V1.3, Rev B | 07/01/2022 | Chapter 5                                                                             | Add HART Common Commands (ID 1 and ID 3) to this section.                     |

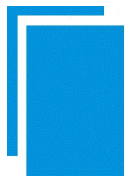
## 2 Hardware Description

### 2.1 Product Appearance



**Note:** This picture is for reference only. The product appearance is subject to the actual product.





## 2.2 LED Indicators

| Indicator | State          |                                            | Description                                                              |
|-----------|----------------|--------------------------------------------|--------------------------------------------------------------------------|
| TX        | Green blinking |                                            | HART data sending                                                        |
|           | Green off      |                                            | No data sending                                                          |
| RX        | Green blinking |                                            | HART data receiving                                                      |
|           | Green off      |                                            | No data receiving                                                        |
| NS        | Green on       |                                            | ModbusTCP/EtherNetIP connection is established. Communication is normal. |
|           | Green blinking |                                            | ModbusTCP/EtherNetIP connection is not established.                      |
| MS        | Static IP      | Red off                                    | Module status: IP address starts normally                                |
|           |                | Red blinks 3 times                         | Module status: Static IP initializing                                    |
|           | DHCP           | Red blinks 5 times and then goes off       | Module status: DHCP allocate address successfully                        |
|           |                | Red light blinks for 30s and then goes out | Module status: DHCP allocation failed, IP address fixed at 192.168.0.11  |

## 2.3 Firmware Button

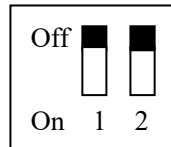
The firmware button is located at the top of the product and used to enter the bootload state to download the firmware .

| Action             | Description                        |
|--------------------|------------------------------------|
| Hold then power on | Bootload state to update firmware. |

**Note:** Under normal circumstances, please do not press the button!

## 2.4 Configuration DIP Switch

The configuration DIP switches are located at the top of the product. Turn Function (Bit 1) to Off and Mode (Bit 2) to Off and power on (or reboot) to make the device work properly in Run Mode.

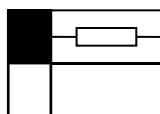


| Function<br>(Bit 1) | Mode<br>(Bit 2) | Mode               | Description                                                                                           |
|---------------------|-----------------|--------------------|-------------------------------------------------------------------------------------------------------|
| Off                 | Off             | Run Mode           | Allows configuration and communication.                                                               |
| On                  | Off             | Debug Mode         | Allows configuration, communication and debugging.                                                    |
| Off                 | On              | Configuration Mode | IP address is fixed at 192.168.0.11. Allows configuration. Prohibits Ethernet and HART communication. |
| On                  | On              | Run Mode           | Allows communication. Prohibits configuration and debugging.                                          |

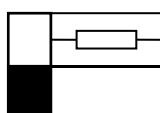
**Note:** To apply mode switching, please restart the gateway.

## 2.5 Internal Series Resistor Switch

The GT200-HT-EI has an internal series resistor (270 Ohm /2 W) required for the HART channel. This allows up to 13 HART instruments to be connected. When the power going through the series resistor is more than 2W, you must use an external series resistor (250 Ohm /3 W) which allows the gateway to be connected to up to 15 HART instruments.



Switch to ON: Using the internal series resistor

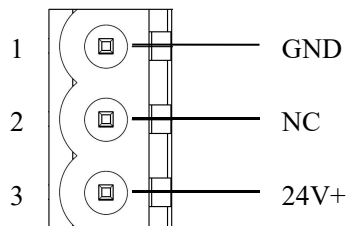


Switch to OFF: Using the external series resistor

## 2.6 Interfaces

### 2.6.1 Power Interface

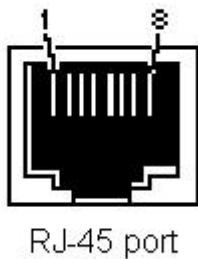
GT200-HT-EI has one power interface, and it is recommended to use a 24V DC power supply.



| Pin | Description        |
|-----|--------------------|
| 1   | Power GND          |
| 2   | NC (Not Connected) |
| 3   | 24V+, DC           |

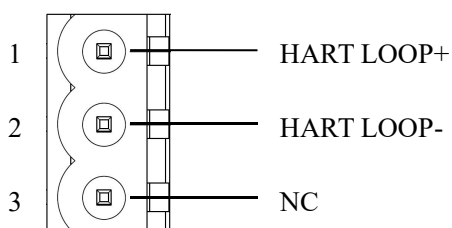
### 2.6.2 Ethernet Interface

The Ethernet interface uses RJ45 interface, follows the IEEE802.3u 100BASE-T standard (10/100M autonegotiation). Its pinout (standard Ethernet signal) is defined as below:

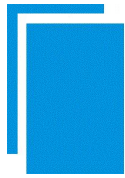


| Pin      | Description                  |
|----------|------------------------------|
| S1       | TXD+, Transmit Data+, Output |
| S2       | TXD-, Transmit Data-, Output |
| S3       | RXD+, Receive Data+, Input   |
| S6       | RXD-, Receive Data-, Input   |
| S4,5,7,8 | Reserved                     |

### 2.6.3 HART Interface



| Pin | Description                |
|-----|----------------------------|
| 1   | Connected to HART signal + |
| 2   | Connected to HART signal - |
| 3   | NC (Not connected)         |



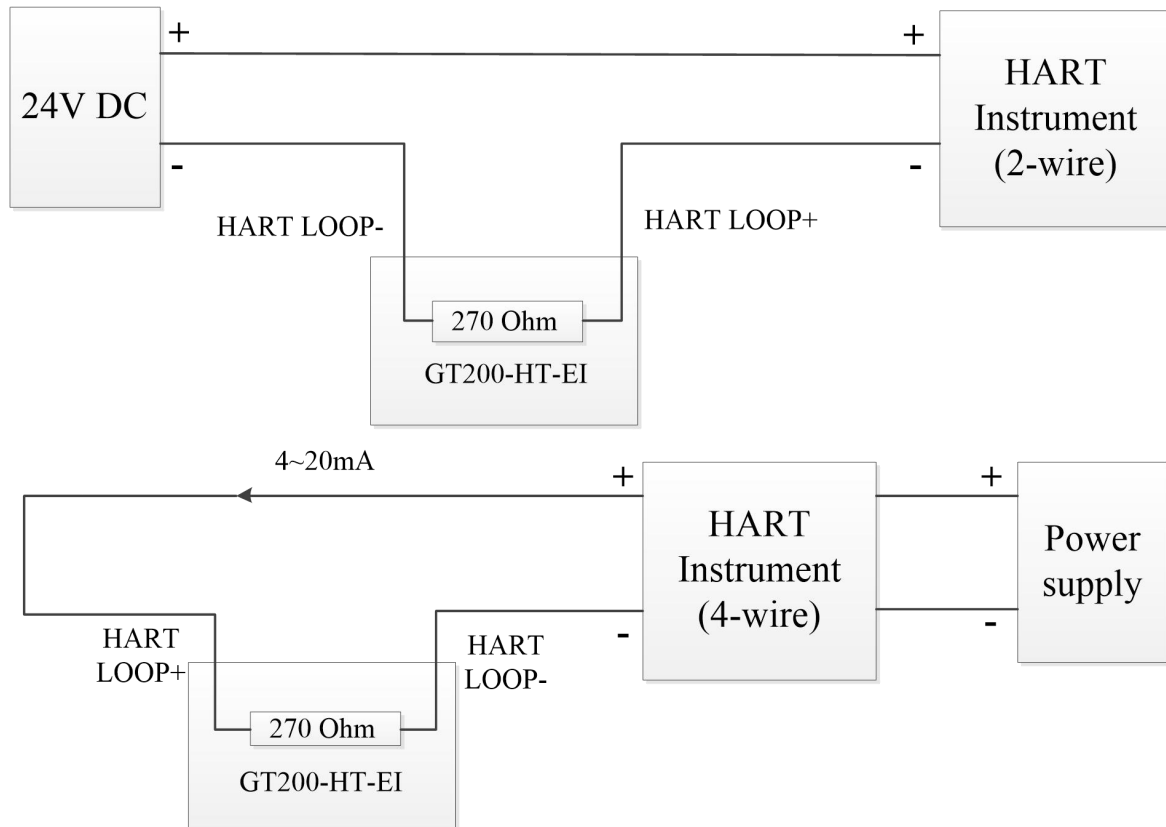
## 2.7 Topology of GT200-HT-EI and HART Instruments

### Notes:

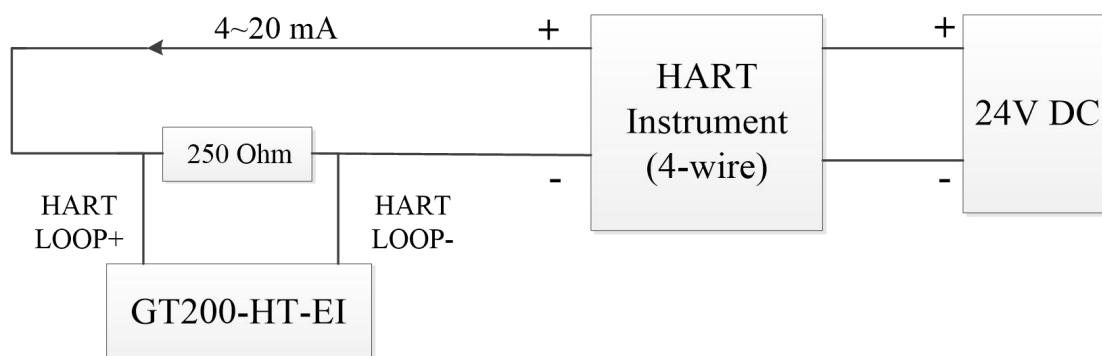
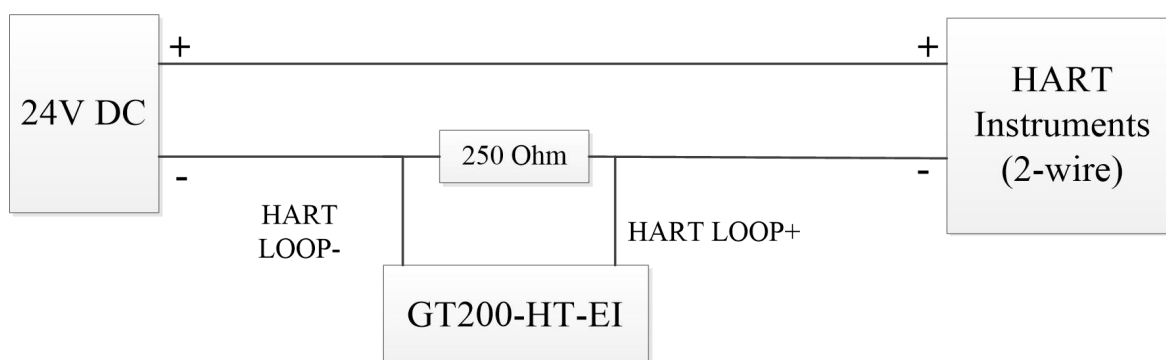
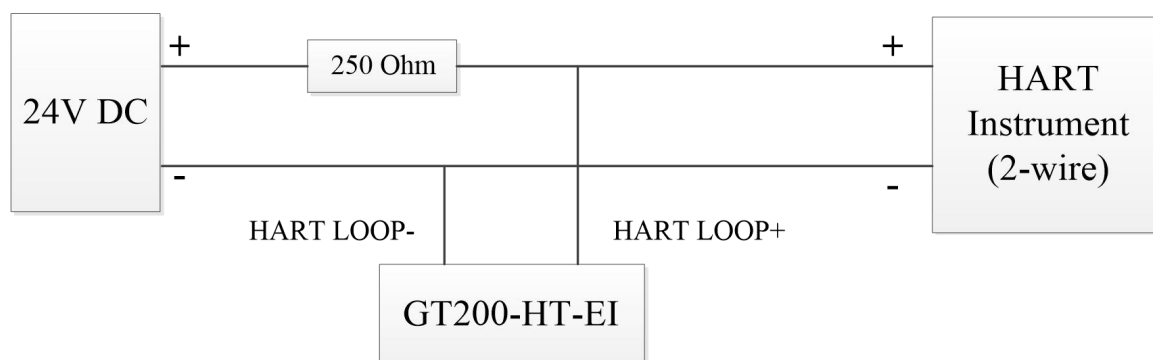
1. Some HART instruments need to perform internal work such as self-test when they are first powered on, and may not communicate with HART at this time. It is recommended to use the separate power supply for the HART instruments and the GT200-HT-EI, to ensure stable communication.
2. To improve the communication efficiency of the field bus, it is recommended not to configure empty nodes or useless commands in the SST-HI-CFG.
3. HART devices are classified into two-wire system and four-wire system. Two-wire system means that HART devices have only two wires both for communication and power supply, and four-wire system means that the power supply and communication lines of HART devices are separated.
4. If there are two or more HART instruments connected in the same network, their HART LOOP wires should be connected parallel with each other.
5. When using Multi-Drop mode, the HART instruments should be configured to Fixed Current mode at 4mA.
6. When connecting more than 13 HART instruments, disable the internal resistor and use an external resistor (250 Ohm /3 W). See [Chapter 2.5](#).

## 2.7.1 Point-to-Point Wiring

The following are the topologies for two wire and four wire point-to-point wiring.



When using the internal resistor

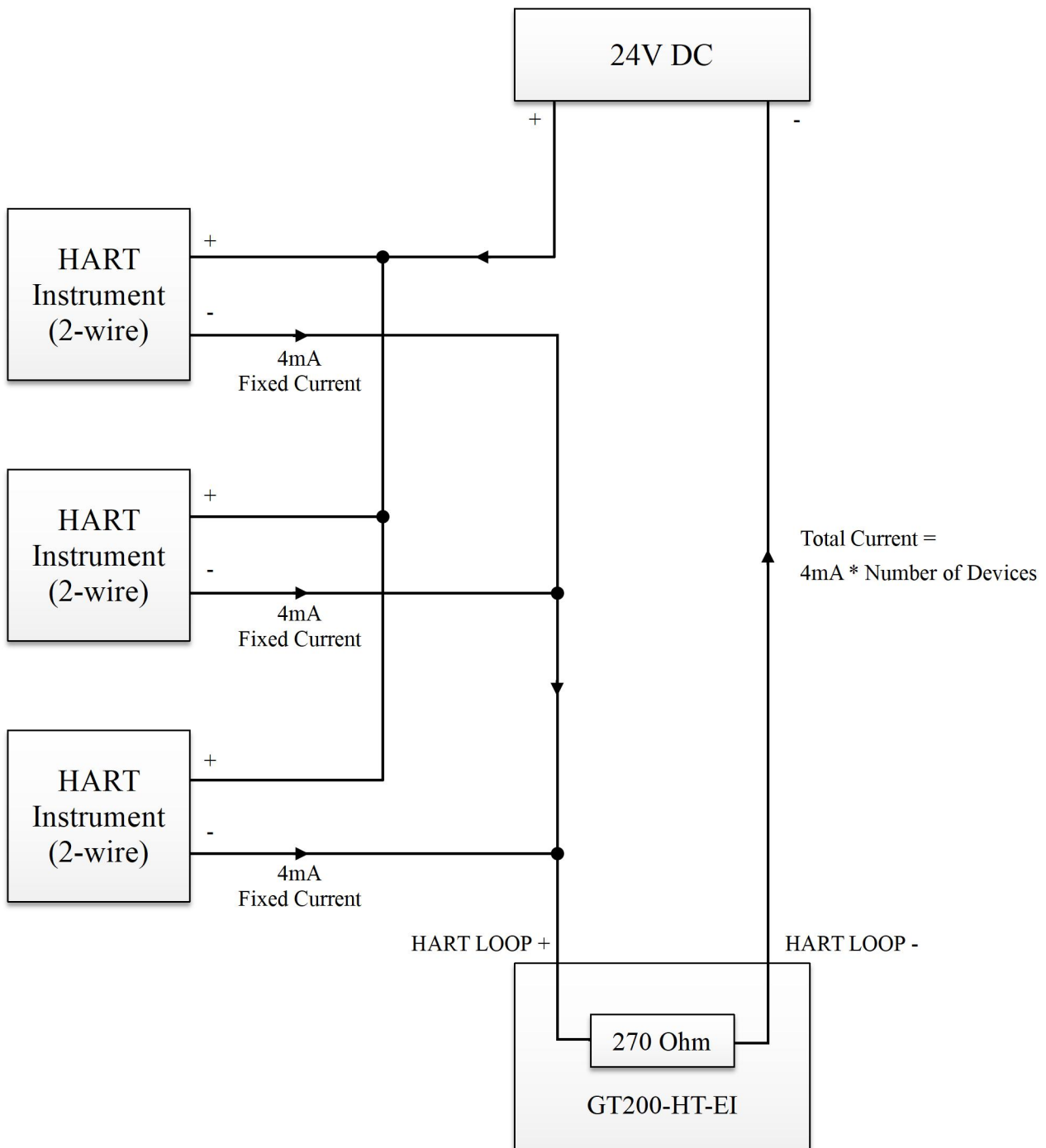


Options when using an external resistor

## 2.7.2 Multi-Drop Wiring

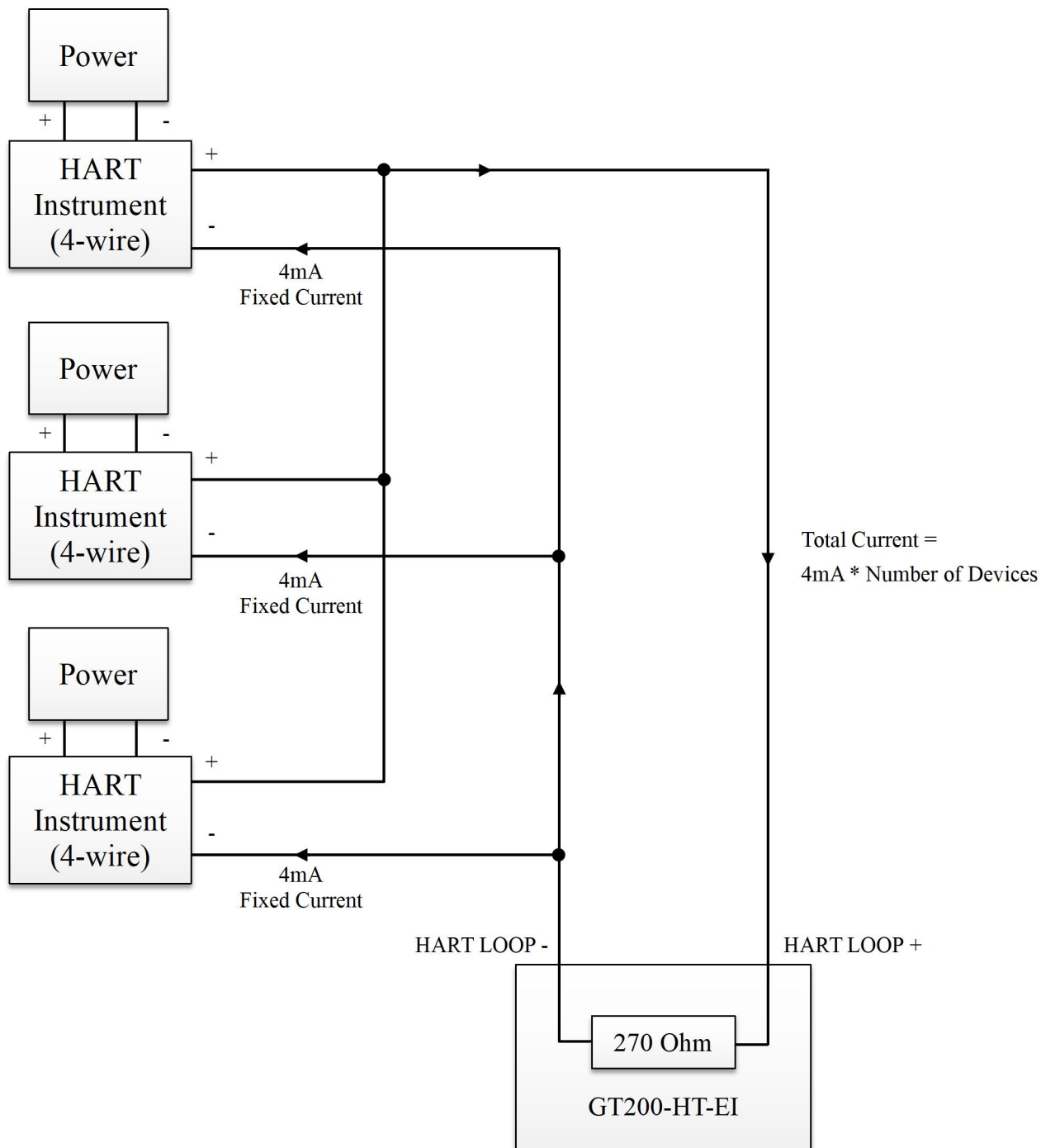
The following are the topologies for two wire and four wire multi-drop wiring.

Two wire:



Maximum Cable Length: 450m for 15 Devices

Four wire:



Maximum Cable Length: 450m for 15 Devices

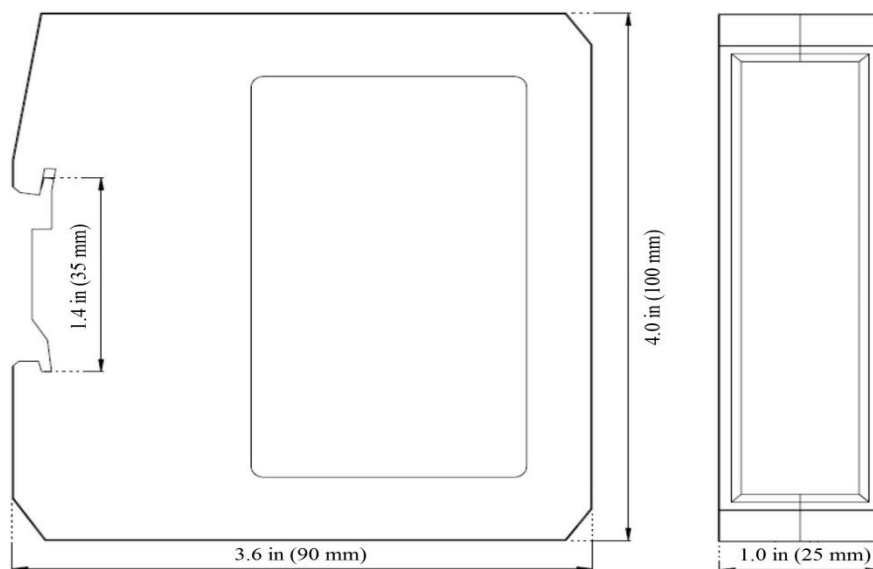


## 3 Hardware Installation

### 3.1 Mechanical Dimensions

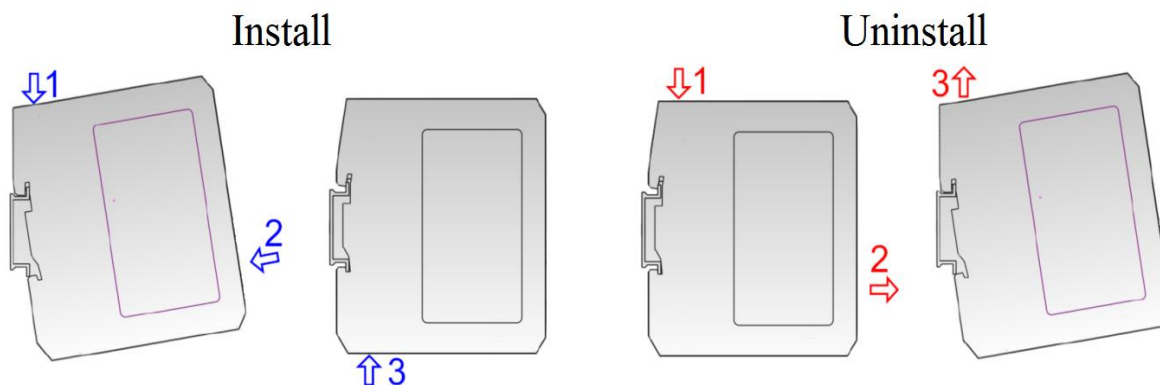
**Size (width \* height \* depth):**

1.0 in \* 4.0 in \* 3.6 in (25 mm \* 100 mm \* 90 mm)



### 3.2 Installation Method

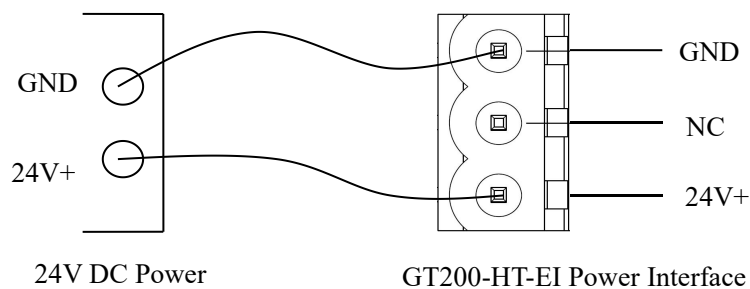
Using 1.4 in (35mm) DIN RAIL.



## 4 Quick Start Guide

### 4.1 Hardware Connection

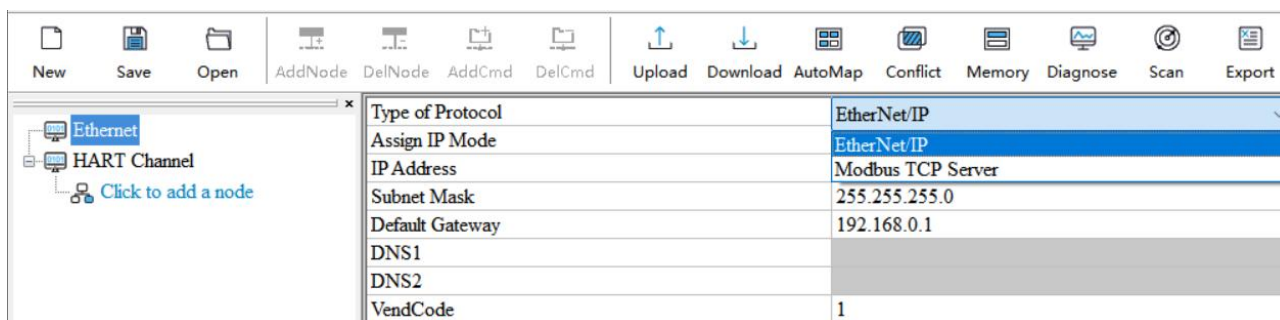
1. Make sure the GT200-HT-RS is in the appropriate operating mode that allows for configuration. Set the gateway to Configuration Mode by settings the DIP switches to 1-OFF, 2-ON while the gateway is powered off.
2. Connect the Ethernet port of the gateway to the network port of the computer with a network cable. Refer to the topology displayed in [Chapter 2.6.2](#).
3. Connect the HART instruments to the GT200-HT-RS. Refer to the wiring diagrams shown in [Chapter 2.7](#).
4. Connect the power supply to the gateway as shown in the figure below.



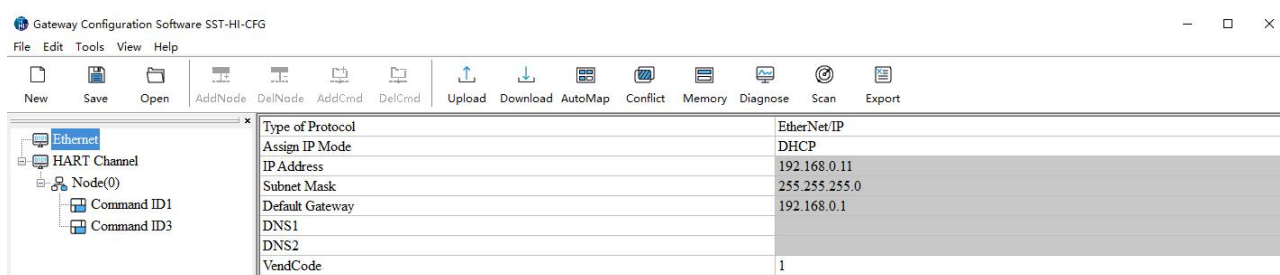
5. Power on the gateway, the gateway will be in Configuration Mode at this time. The IP of the gateway will be fixed to 192.168.0.11, and the IP of the connected computer should be set to a static IP within the 192.168.0.X subnet. Double-click the installed software icon SST-HI-CFG to start the configuration of the gateway.
6. After the gateway has been configured, power off the gateway and set the gateway to Run Mode by setting the DIP switches to 1-OFF, 2-OFF, then power on the gateway.

## 4.2 Software Configuration

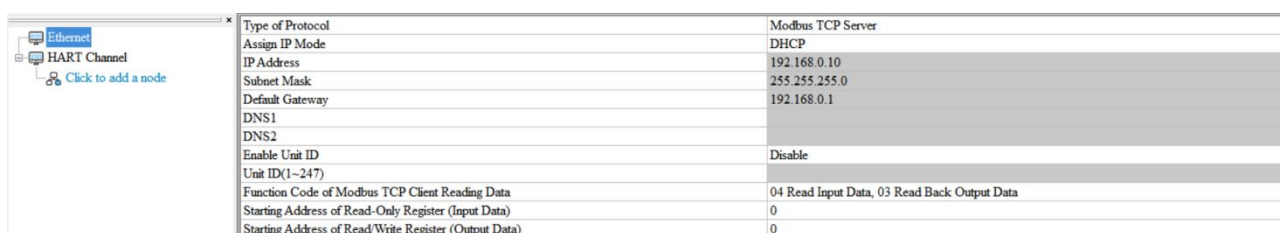
1. Open the SST-HI-CFG software installed in your computer. Click "Ethernet" in the tree view on the left, and the configuration table appears on the right as shown in the figure below, select the Ethernet protocol according to the actual needs.



2. Select "Ethernet" on the left, and set the Ethernet parameters. When EtherNet/IP is selected as the Ethernet protocol, the relevant parameters are configured as follows:



When Modbus TCP Server is selected as the Ethernet protocol, the relevant parameters are configured as follows:

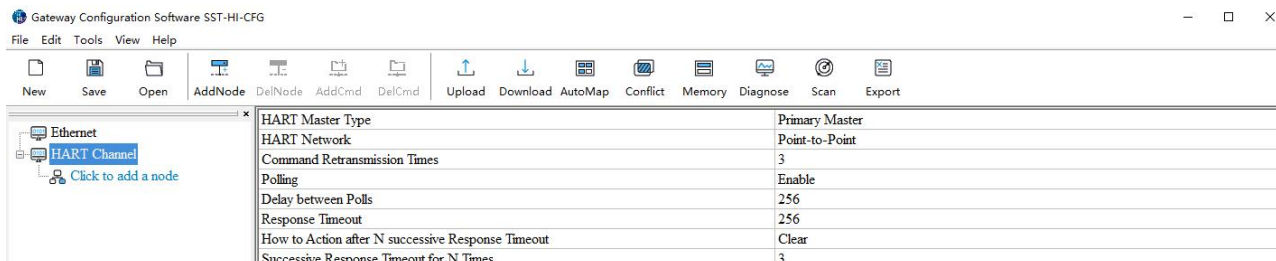


# GT200-HT-EI

## HART/EtherNet Gateway

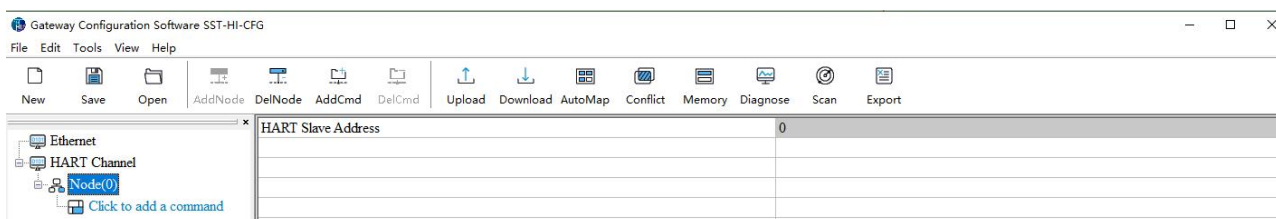
### User Manual

3. Select "HART Channel" on the left and set the HART channel parameters. As shown below, the GT200-HT-EI is configured as the primary master and using the point-to-point mode.

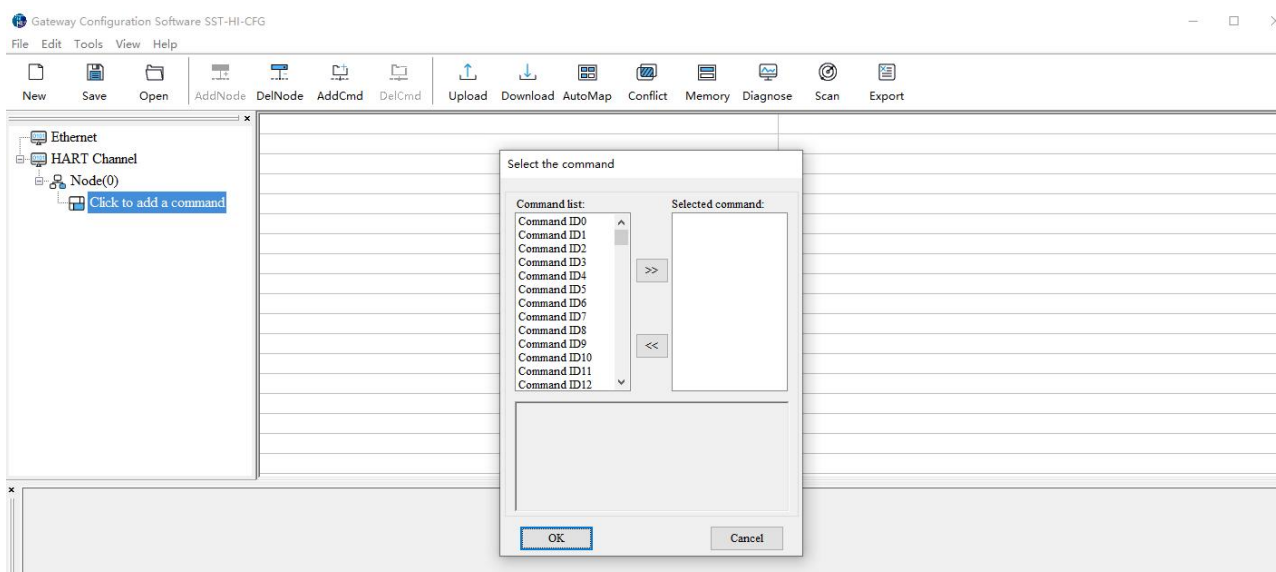


**Note:** The HART protocol specifies that devices with slave address 0 work in point-to-point mode, when HART signals and 4-20mA are allowed to exist at the same time. Devices with slave addresses from 1 to 15 work in multi-drop mode, when the analog output of the device is the minimum value (such as 4mA), and only HART signal communication is allowed. The protocol also specifies that the factory address of the field device is configured to 0 by default.

4. You can either click "Click to add a node", select "HART Channel" and click "Add Node" on the toolbar, or right-click "HART Channel" and click "Add Node" to add a node to the HART channel.



5. You can either click "Click to add a command", select "Node (0)" and click "Add Cmd" in the toolbar, or right-click "Node (0)" and click "Add command" to add a command in the corresponding node. In the pop-up dialog box, add command ID1 by double-clicking or selecting and clicking ">>", and click OK".

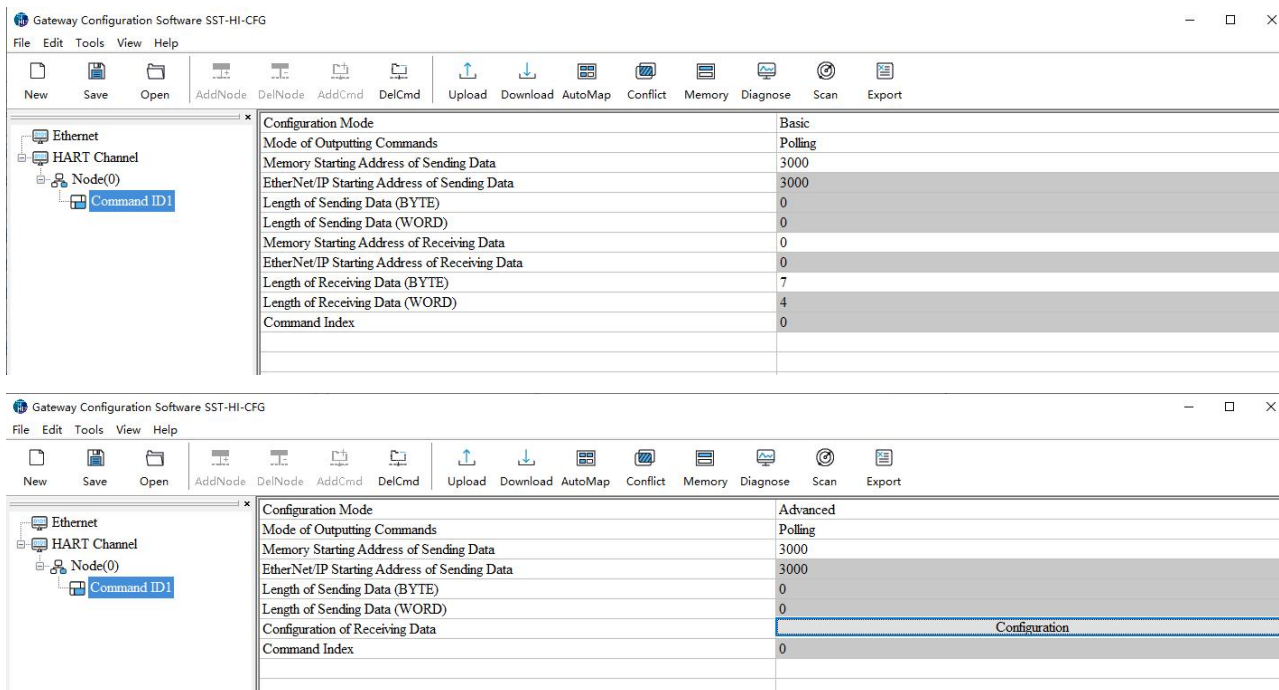


# GT200-HT-EI

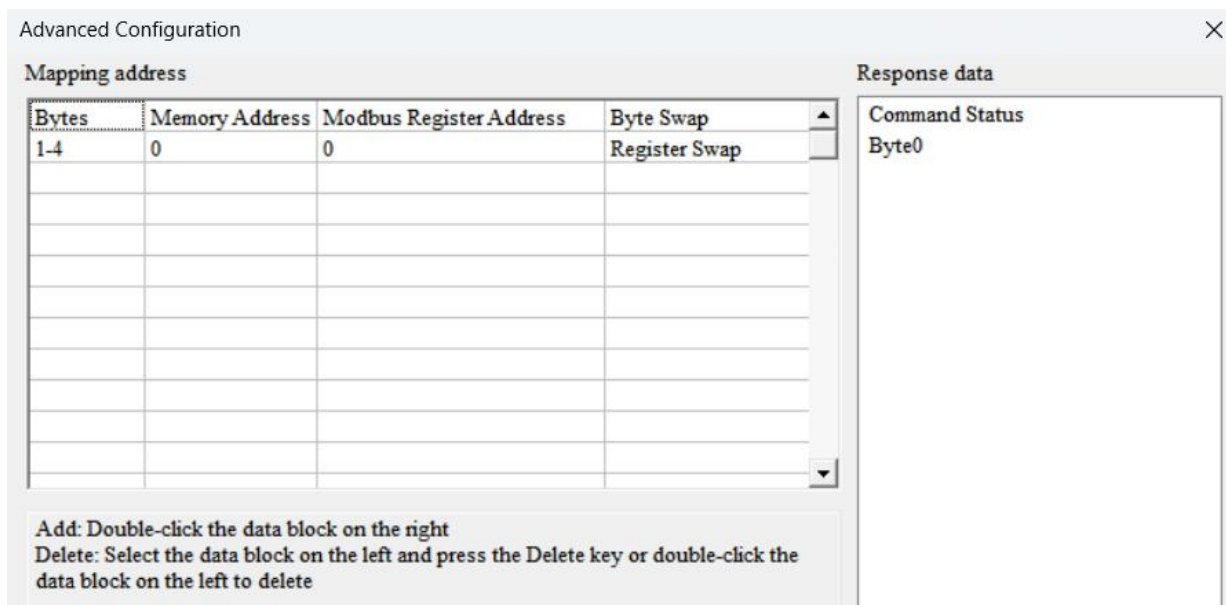
## HART/EtherNet Gateway

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6. Click “Command ID1”. The configuration of the HART commands (Basic and Advanced) are shown below:



Bytes 1-4 (primary variable) are selected at the mapping address, and the received data can be selected for register exchange.

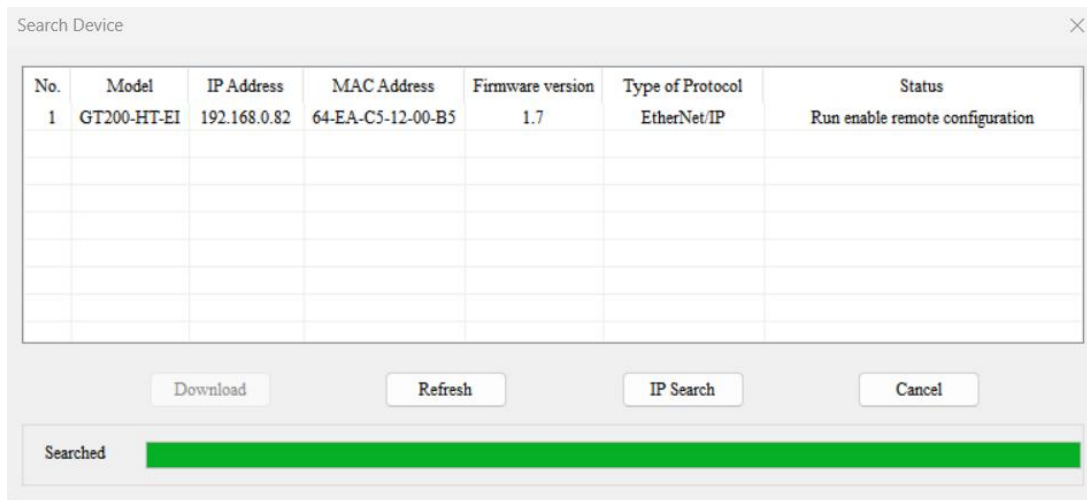


# GT200-HT-EI

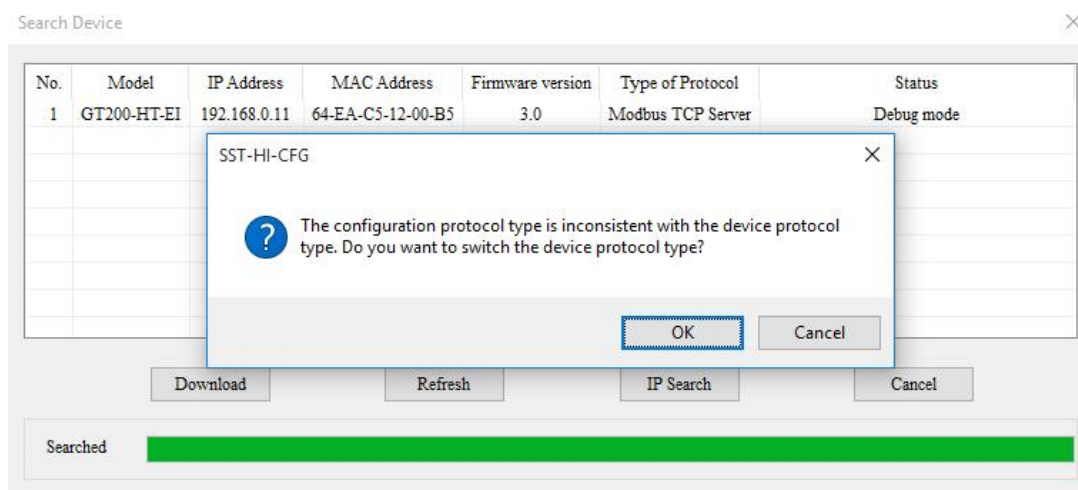
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7. Click on the icon , select the gateway in the pop-up dialog box and click on "Download", then click on "Download Configuration".



If the Ethernet protocol in the configuration is inconsistent with the Ethernet side protocol in the gateway, the download will remind as below. After clicking OK, the device will switch the Ethernet side protocol to match the configuration and reboot, please wait for the device to reboot and click Scan again to download the configuration.





## 4.3 Common HART Commands

The following is a short list of useful HART commands that can be used for common applications of most HART devices. More information about supported commands is available from FieldComm Group at the following link:

<https://library.fieldcommgroup.org/20127/TS20127/7.2/>

**Note:** The front two bytes of the actual response data is the status info of the device. The data after that two bytes is the device response data.

| Command |                                                      | Data in Command |                   | Data in Reply |       |                     |            |
|---------|------------------------------------------------------|-----------------|-------------------|---------------|-------|---------------------|------------|
| #       | Function                                             | Byte            | Data              | Type          | Byte  | Data                | Type       |
| 1       | Read primary variable                                |                 | None              |               | 0     | PV units code       | Enum-8     |
|         |                                                      |                 |                   |               | 1-4   | Primary variable    | Float      |
| 3       | Read current and four (predefined) dynamic variables |                 | None              |               | 0-3   | Current (mA)        | Float      |
|         |                                                      |                 |                   |               | 4     | PV units code       | Enum-8     |
|         |                                                      |                 |                   |               | 5-8   | Primary variable    | Float      |
|         |                                                      |                 |                   |               | 9     | SV units code       | Enum-8     |
|         |                                                      |                 |                   |               | 10-13 | Secondary variable  | Float      |
|         |                                                      |                 |                   |               | 14    | TV units code       | Enum-8     |
|         |                                                      |                 |                   |               | 15-18 | Tertiary variable   | Float      |
|         |                                                      |                 |                   |               | 19    | QV units code       | Enum-8     |
|         |                                                      |                 |                   |               | 20-23 | Quaternary variable | Float      |
| 6       | Write polling address                                | 0               | Polling address   | Unsigned-8    | 0     | Polling address     | Unsigned-8 |
|         |                                                      | 1               | Loop current mode | Enum-8        | 1     | Loop current mode   | Enum-8     |

### **Command 1 (Command ID1): Read Primary Variable**

Returns the primary variable value in float data type.

**Request:** None

**Response:**

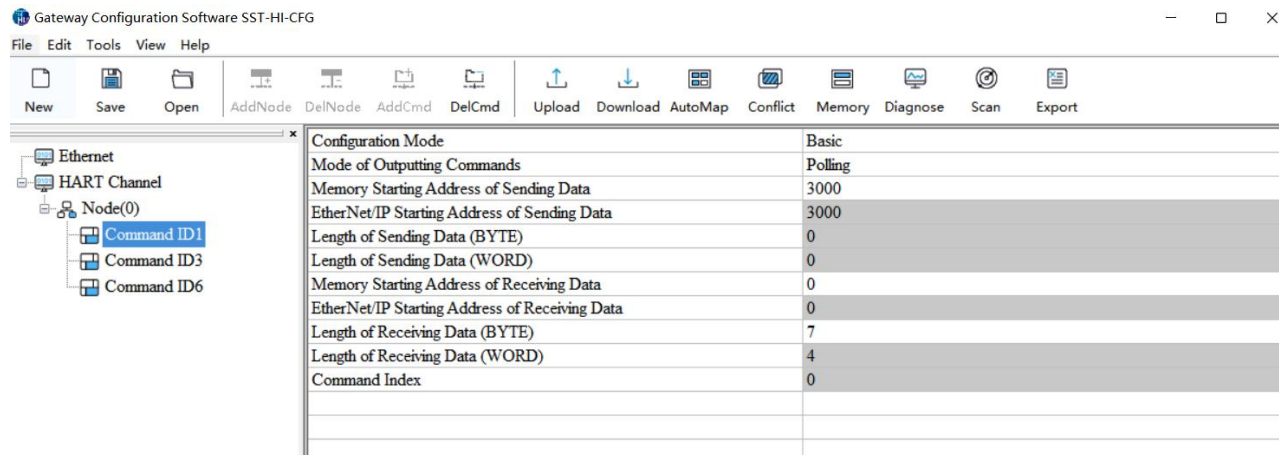
| Byte     | Description            |
|----------|------------------------|
| Byte 0   | Primary Variable Units |
| Byte 1-4 | Primary Variable       |

# GT200-HT-EI

## HART/EtherNet Gateway

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An example of this command in the SST configuration software is shown below:



As the request is “None”, the user should fill “0” for the section “Length of Sending Data (BYTE)”.

The “Length of Receiving Data (BYTE)” will be 7, which is the sum of 2 status bytes and 5 device response bytes.

### Command 3 (Command ID 3): Read Dynamic Variable and Primary Variable Current

Reads the primary variable current and four (at most) pre-defined dynamic variables. The primary variable current always matches the AO output current of the device. A second, third and fourth variable is defined for each device type, E.g. The second variable can be the sensor temperature, etc.

**Request:** None

**Response:**

| Byte       | Description                                            |
|------------|--------------------------------------------------------|
| Byte 0-3   | Primary Variable Loop Current (units of milli-amperes) |
| Byte 4     | Primary Variable Units Code                            |
| Byte 5-8   | Primary Variable                                       |
| Byte 9     | Secondary Variable Units Code                          |
| Byte 10-13 | Secondary Variable                                     |
| Byte 14    | Tertiary Variable Units Code                           |
| Byte 15-18 | Tertiary Variable                                      |
| Byte 19    | Quaternary Variable Units Code                         |
| Byte 20-23 | Quaternary Variable                                    |

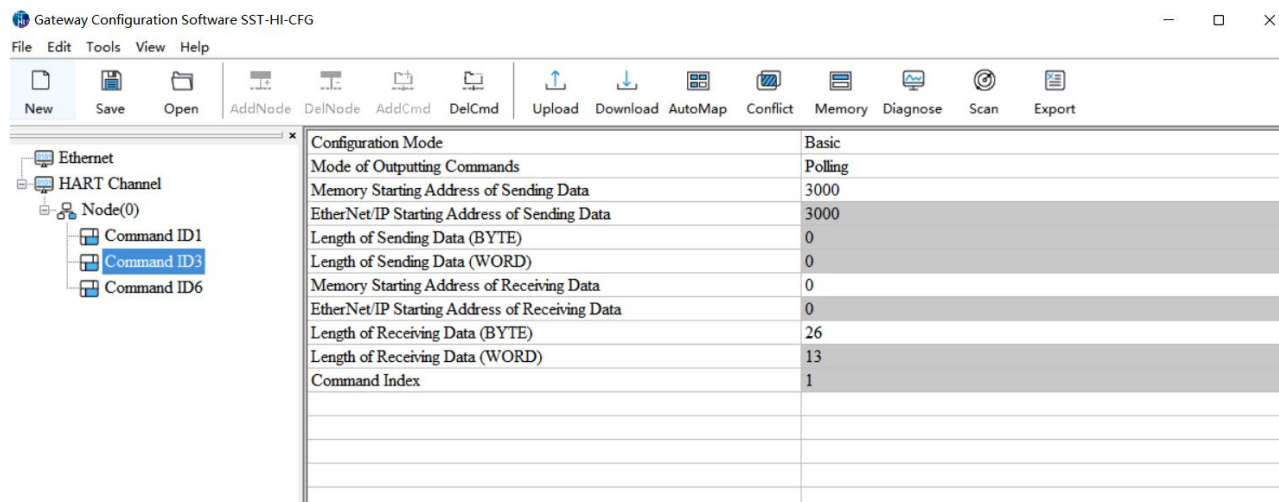


# GT200-HT-EI

## HART/EtherNet Gateway

### User Manual

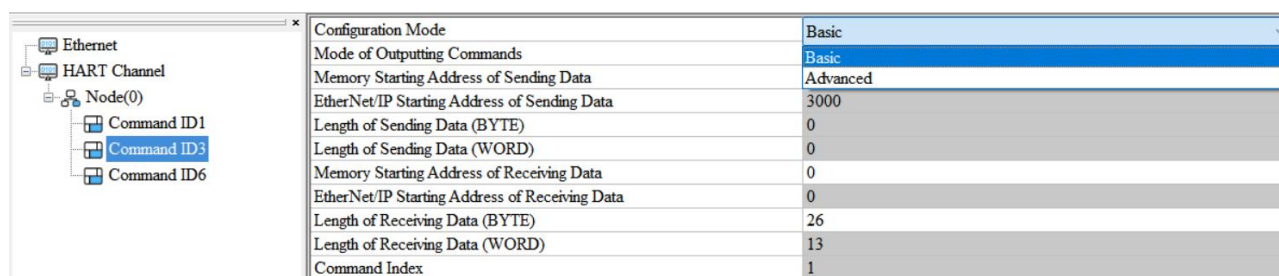
An example of this command in the SST configuration software is shown below:



As the request is “None”, the user should fill “0” for the section “Length of Sending Data (BYTE)”.

The “Length of Receiving Data (BYTE)” will be 26, which is the sum of 2 status bytes and 24 device response bytes.

If the user does not need to map all the variables to the Modbus TCP registers, please follow the guide below. Switch to the “Advanced Configuration Mode”, click the “Configuration” button, and only select the variable(s) needed. In this example, only the “Primary Variable” and the “Secondary Variable” are selected. For more details on Advanced Configuration Mode, please refer to [chapter 5.2.2.7](#).



# GT200-HT-EI

## HART/EtherNet Gateway

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**Note:** Selected variables are listed in the left table. Variables corresponding to the bytes are listed in the beginning of this chapter.

#### Command 6 (Command ID6): Write Polling Address

Writes the polling address (HART slave address) to the field device.

##### Request:

| Byte                                    | Description                               |
|-----------------------------------------|-------------------------------------------|
| Byte 0                                  | Polling Address (Between 0-15)            |
| Byte 1 (Only on supported HART devices) | Loop Current Mode (0=Disabled, 1=Enabled) |

##### Response:

| Byte                                    | Description                               |
|-----------------------------------------|-------------------------------------------|
| Byte 0                                  | Polling Address (Between 0-15)            |
| Byte 1 (Only on supported HART devices) | Loop Current Mode (0=Disabled, 1=Enabled) |

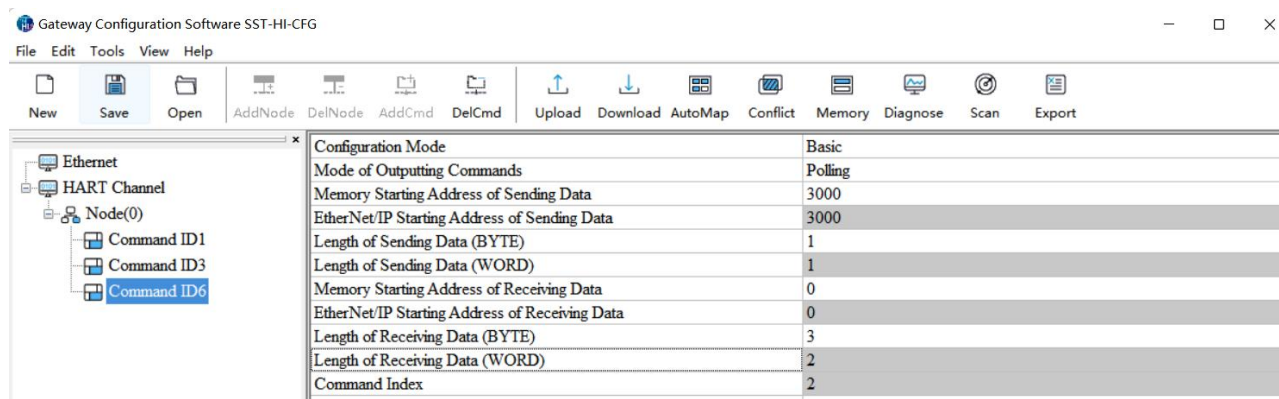
**Note:** Some HART devices do not support configuring the Loop Current Mode. These devices will only expect to receive Byte 0 of the request.

# GT200-HT-EI

## HART/EtherNet Gateway

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An example of this command in the SST configuration software is shown below:



If the HART device does not support configuring the Loop Current Mode, the user should fill “1” for the section “Length of Sending Data (BYTE)”.

The “Length of Receiving Data (BYTE)” will be 3, which is the sum of 2 status bytes and 1 device response bytes.

If the HART device does support configuring the Loop Current Mode, the user should fill “2” for the section “Length of Sending Data (BYTE)”.

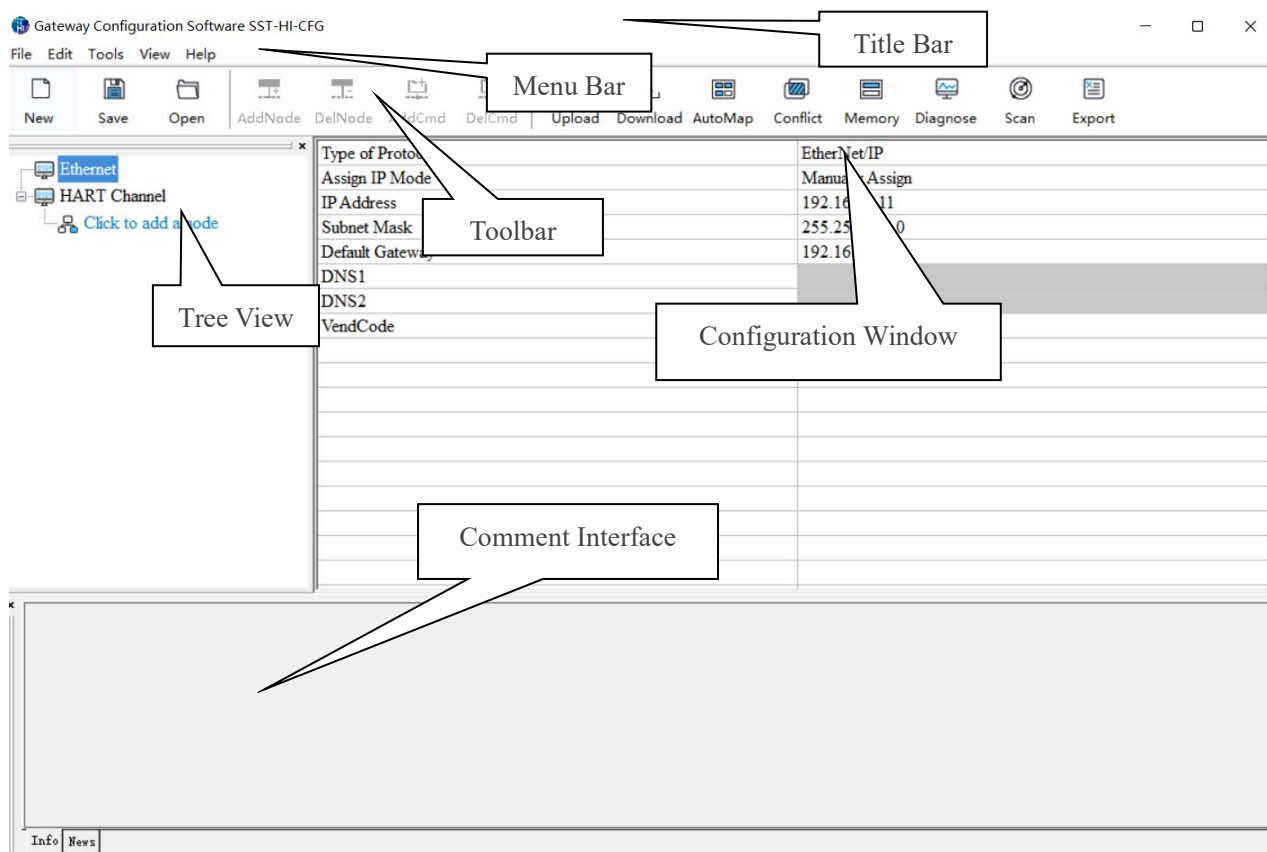
The “Length of Receiving Data (BYTE)” will be 4, which is the sum of 2 status bytes and 2 device response bytes.

## 5 Software Instructions

### 5.1 Main Interface

The software interface includes: Title Bar, Menu Bar, Toolbar, Configuration Window and Tree View.

**Note:** The gray parameters cannot be changed.



## 5.2 Toolbar

The toolbar is shown as below:

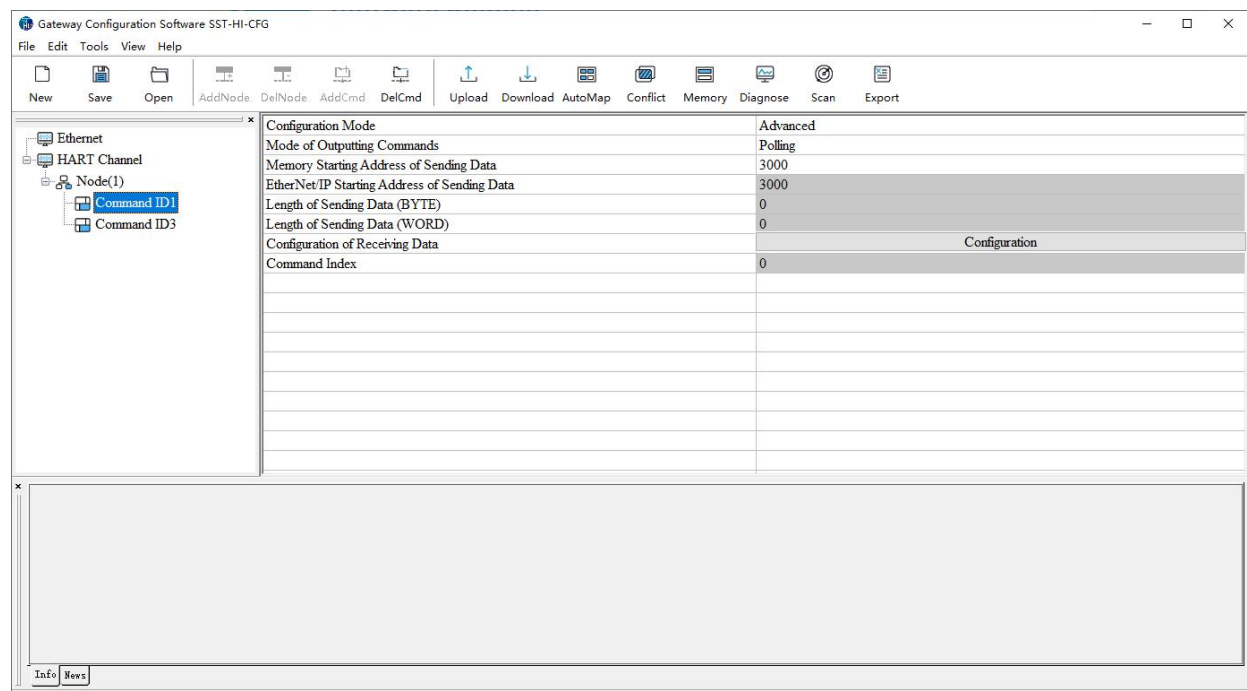


The toolbar provides icon shortcuts to major functions.

|                                                                                     |                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <b>New:</b> Create a new configuration project.                                                                                                                                              |
|    | <b>Save:</b> Save the current configuration.                                                                                                                                                 |
|    | <b>Open:</b> Open a configuration project.                                                                                                                                                   |
|    | <b>Add Node:</b> Add a HART node.                                                                                                                                                            |
|    | <b>Delete Node:</b> Delete a HART node.                                                                                                                                                      |
|  | <b>Add Command:</b> Add a HART command.                                                                                                                                                      |
|  | <b>Delete Command:</b> Delete a HART command.                                                                                                                                                |
|  | <b>Upload:</b> Upload the configuration from the gateway.                                                                                                                                    |
|  | <b>Download:</b> Download the configuration to the gateway.                                                                                                                                  |
|  | <b>Auto Map:</b> Automatically calculate the mapped data address of each command.                                                                                                            |
|  | <b>Conflict:</b> Check the mapping address in the Conflict Detection window.                                                                                                                 |
|  | <b>Memory:</b> Show the data exchange inside of the gateway.                                                                                                                                 |
|  | <b>Diagnose:</b> This function analyzes the operating condition of fieldbus devices.                                                                                                         |
|  | <b>Slave Scan:</b> This function can scan and calculate how many slave devices and relevant slave addresses the HART master is connecting with. This also supports changing slave addresses. |
|  | <b>Export Excel:</b> Export current configuration as a table and save it as *.xls file.                                                                                                      |

## 5.3 Comments Interface

The comments interface displays the explanation of the corresponding configuration item. For example, when selecting "Mode of Outputting Commands", the comments interface is as below:

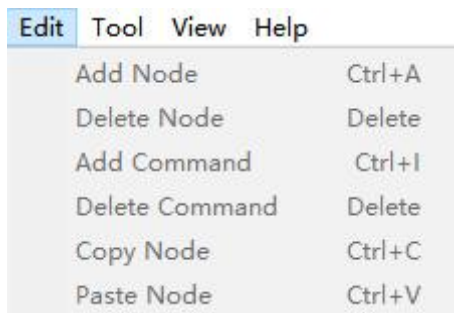


## 5.4 Tree View Operations

### 5.4.1 Edit the Items in the Left Tree View

Users can edit the items in the left tree view three different ways:

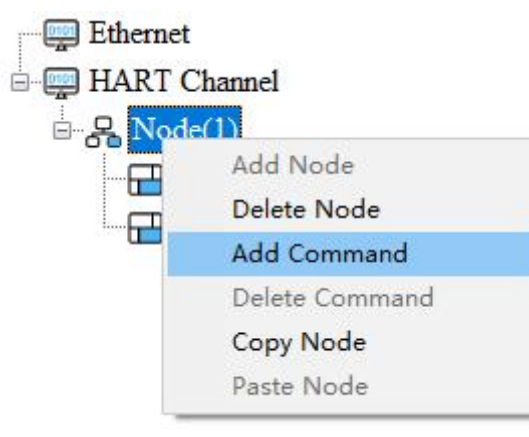
1. Edit with the commands in the menu.



2. Edit with the icon in the toolbar. Please see "[Toolbar](#)" chapter for details.



3. Right click on the item.

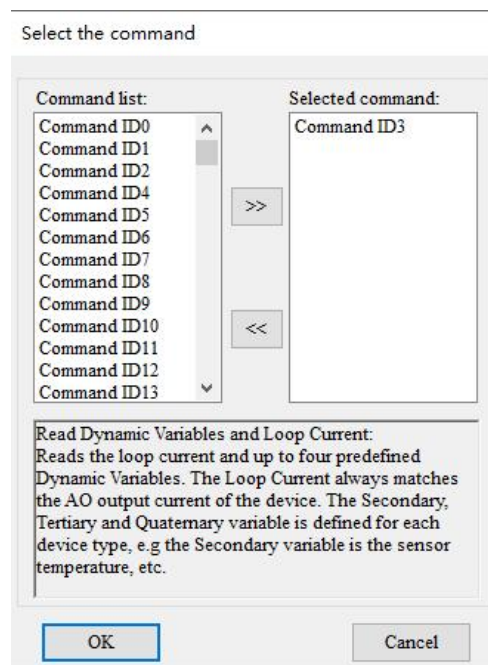




## 5.4.2 HART Node and Command Operations

Users can edit HART nodes and commands by three operation ways in the "[Tree View Operations](#)" chapter.

1. Add node: Select the "HART Channel" and add a new node. A new node named "Node-X" will be added under the HART Channel. The maximum number of nodes is 15 (Multi-drop).
2. Delete node: When deleting a node, all commands under the node will be deleted.
3. Add command: Select a node and add a command. The pop-up window shows the HART command list. Double click on the command and Selected command, click OK the new command will be added under the node.



**Note:** The same command can only be configured once in one node.

4. Delete command: Select a command and then delete it.
5. Copy node: Select an existing node and copy the node. The commands under the node will be copied at the same time.
6. Paste node: Select the HART Channel or an existing node and paste the node. The pasted node has the same parameters with the copied node.





[illegible]

ddmm-- Set the ID of the device

4M-1-S-41-1-4-1-6GT200

[illegible]

**Default Gateway:** Set the gateway address of the device.

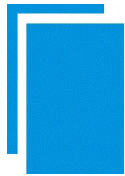
**U. U. : ID. E. 11**

Enabling Azeo Modbus TCP server, devices the system can

Display: The carrier ID address value of the gateway as a Modbus TCP server device is arbitrary and can

### Table 1. Code of Malware TCB Client Reading Data

ibus TCP Client equipment can choose to use 04 or



**Starting Address of Read-Only Register (Input Data):**

The gateway is used as Modbus TCP server to support the client to read the starting address of the input data using the 04/03 function code.

It is necessary to fill in the protocol address (base 0) format here, and displayed in decimal. Range 0-64736.

For example:

04 function code: The PLC address format is 30001, then you need to fill in it as the protocol address format 0.

03 function code: The PLC address format is 40001, then you need to fill in it as the protocol address format 0.

**Starting Address of Read/Write Register (Output Data):**

The gateway is used as Modbus TCP server to support the client to write the starting address of the input data using the 06/16 function code. Using the 03/04 function code to read the starting address of the output data.

It is necessary to fill in the protocol address (base 0) format here, and the decimal number is displayed. Range : 0-65036.

For example:

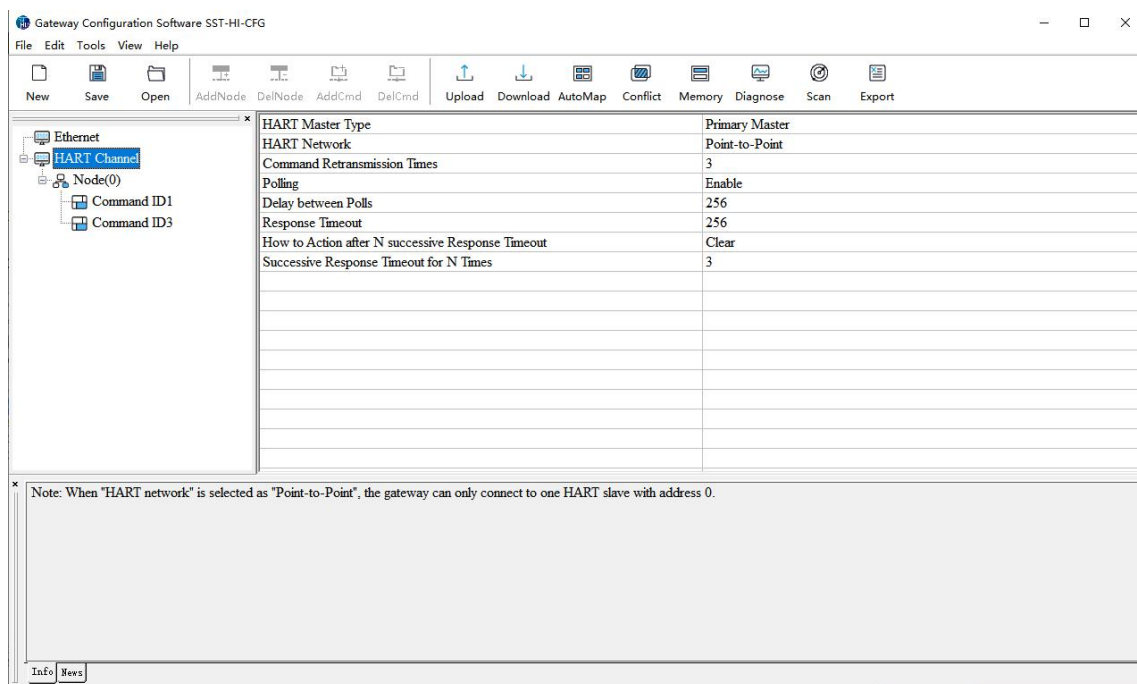
04 function code: The PLC address format is 30001, then you need to fill in it as the protocol address format 0.

03 function code: The PLC address format is 40001, then you need to fill in it as the protocol address format 0.

## 5.5.2 HART Configuration

### 5.5.2.1 HART Channel Configuration View

Click the HART Channel in the equipment view interface, this will display the configuration view interface as follows:



**HART Master Type:** Primary master, Secondary master

**HART Networks:** Supports two HART Network: Point-to-Point and Multi-drop. The gateway can communicate with the HART slave device with 0 as its address in Point-to-Point mode.

**Command Retransmission Times:** Select the number of retransmitting a HART command: 0-5.

**Polling:** Determines if the polling function will be used, "Enable" means that the polling function will be enabled.

**Delay between Polls:** Set the time of the polling command (The time interval from a command to send to start the next command) with the range of 256 - 65535ms.

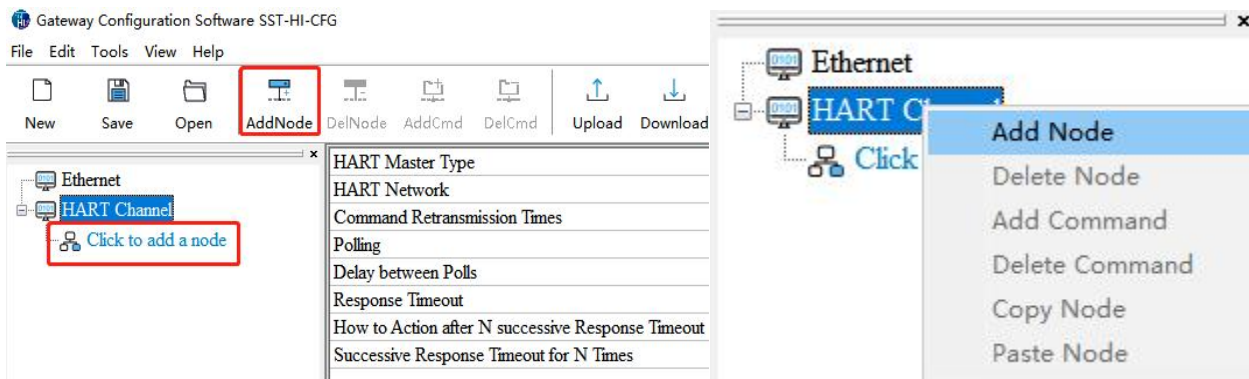
**Response timeout:** Set the maximum time that the gateway waits for the slave device to respond, ranging from 256 to 65535 ms.

**How to Action after N successive Response Timeout:** Clear HART input data or not when number of timeout is more than value of parameter "Successive Response Timeout for N times".

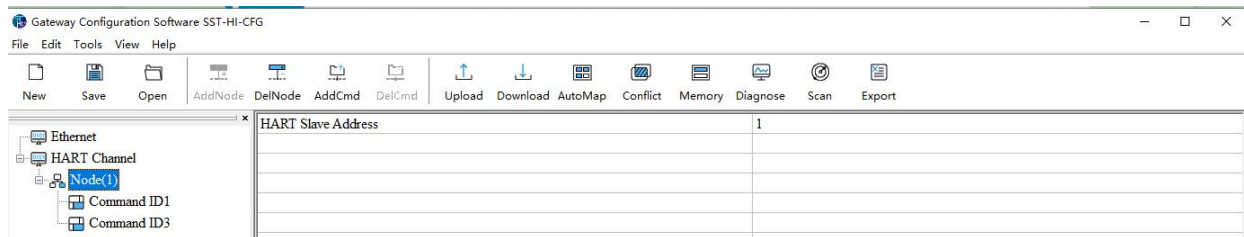
**Successive Response Timeout for N times:** When the value of parameter "How to Action after N successive Response Timeout" is "Clear", the parameter is effective: 1-14.

### 5.5.2.2 Node Configuration

Choose to click "Click to add a node" or select "HART Channel" and click "Add Node" in the toolbar, or right-click "HART Channel" and click "Add Node" to add nodes in the HART channel.



In the HART Channel, after adding a node, select the node:

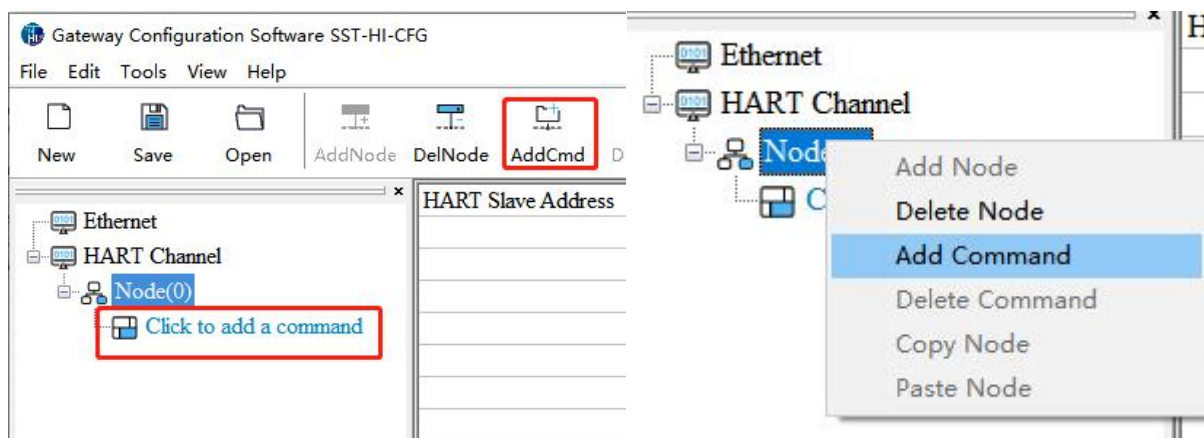


**HART Slave Address:** "Point-to-Point" mode: The slave address can only be 0.

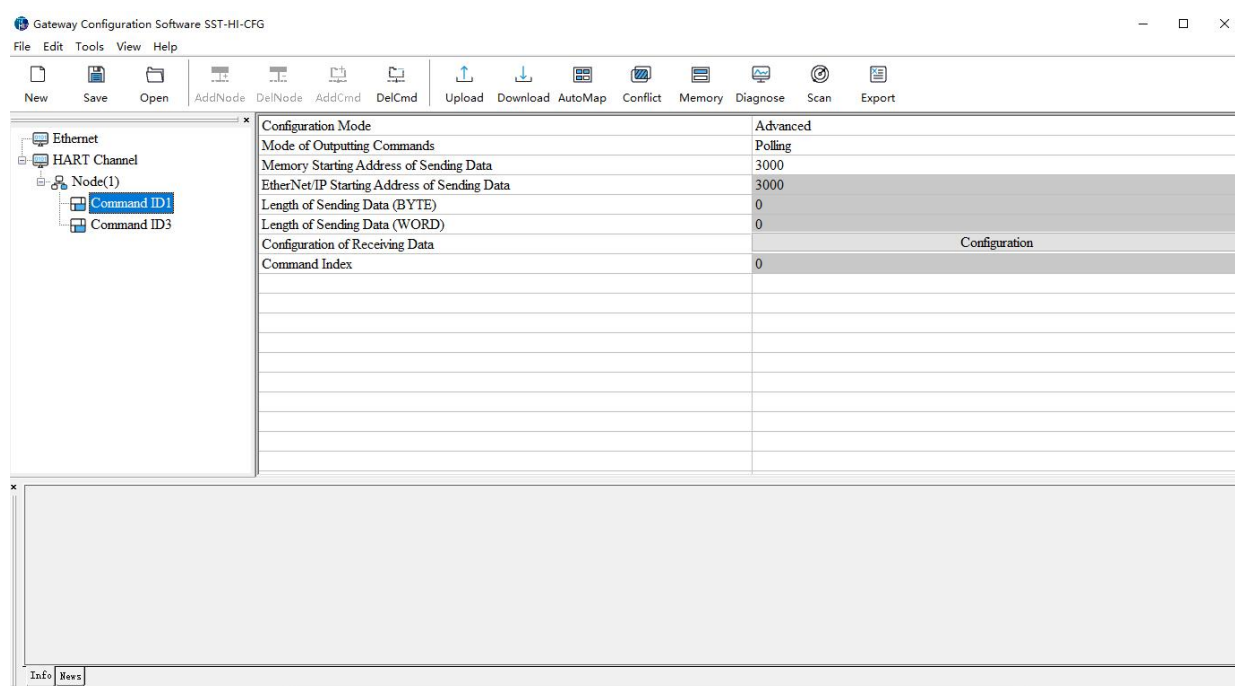
"Multi-drop" mode: The slave address can be 1 to 15.

### 5.5.2.3 Command Configuration

Choose to click "Click to add a node" or select "HART Channel" and click "Add Node" in the toolbar, or right-click "HART Channel" and click "Add Node" to add nodes in the HART channel.



After adding commands under a node, select the command:



**Configuration Mode:** Basic and Advanced (2 available options).

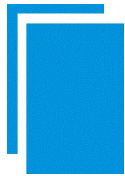
**Mode of Outputting Commands:** Mode of Outputting Command:

Polling: Send the command periodically.

Change of State: Send the command when the data in the output data buffer changes.

Initialization: Send the command only when power on.

Disable: The command will not be sent.



**Memory Starting Address of Sending Data:** Set the memory starting address of output data by this command, the range is 3000-3255.

**EtherNet/IP Starting Address of Sending Data:** The starting address of the EtherNet/IP master station to send data: 3000-3255.

**Length of Sending Data (BYTE):** Used to set the length of output data by this command.

**Length of Sending Data (WORD):** The property is automatically calculated by the gateway, used for user checking output data length, 1 word=2 byte.

**Memory Starting Address of Receiving Data:** Set the memory address of input data by this command. The response data only includes data area of the HART frame.

**EtherNet/IP Starting Address of Receiving Data:** The property is automatically calculated by the gateway, used for register addressing.

**Length of Receiving Data (BYTE):** Set the length of input data by this command.

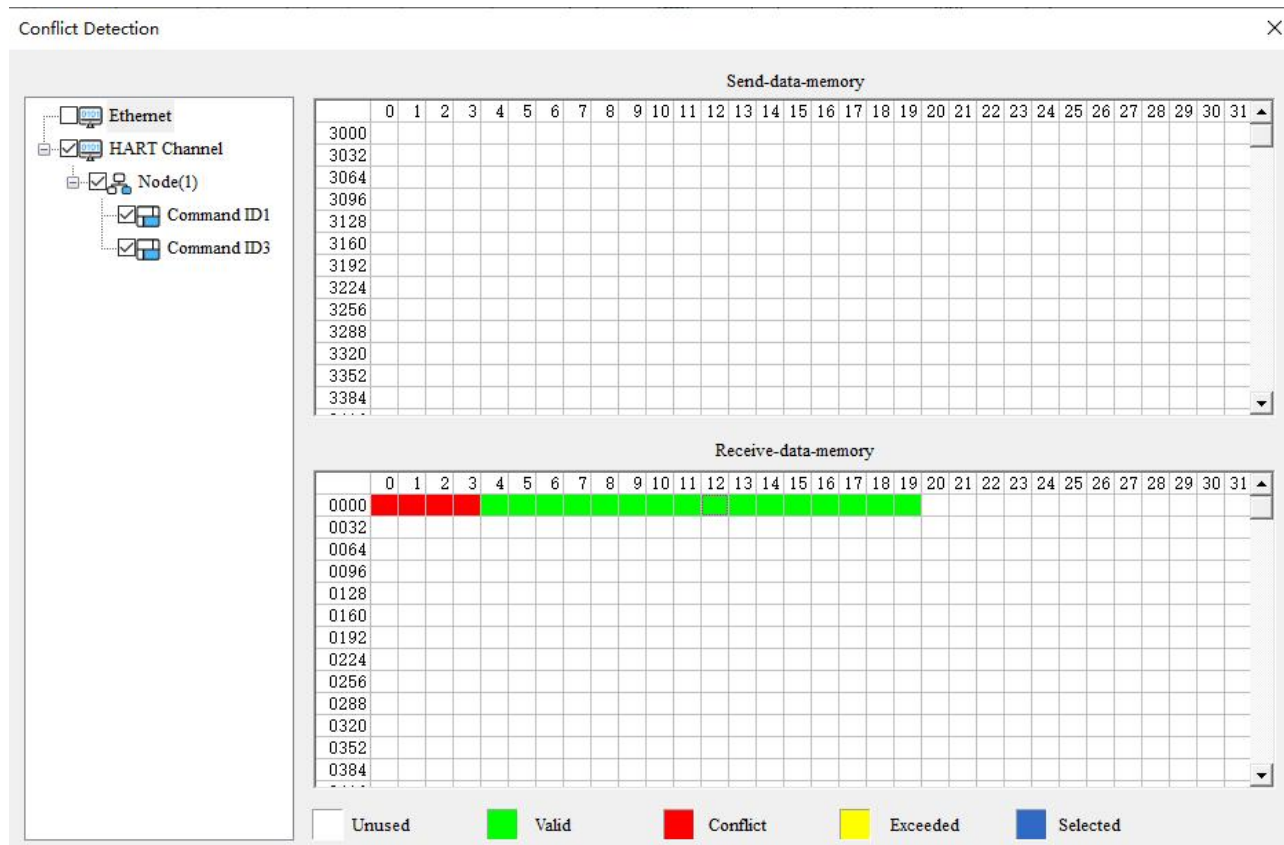
**Length of Receiving Data (WORD):** The property is automatically calculated by the gateway, used for user checking output data length conveniently, 1 word=2 byte.

**Command index:** The property is automatically calculated by the configuration software, it indicates the index in the configured command list this command belongs to.



### 5.5.3 Conflict Detection

The data is stored in the gateway's buffer. To check if there are conflicts in the data mapping address, open the conflict detection window by clicking the "Conflict" icon.



Each grid represents one byte address.

**Green:** Read command is shown in input mapping area, it will be in green without conflict.

**Yellow:** Write command: When the address mapping area is located in the input area, it will be in yellow without conflict.

**Blue:** When the address mapping area is located in the output area, it will be in blue without conflict.

**Red:** In the input area or output area, when different commands occupy the same byte, this byte area will be in red.



## 5.5.4 Show Memory Data

The Memory function in SST-HT-CFG can show the data exchange inside of the gateway. Users can use this function to debug the HART fieldbus without needing an EtherNet/IP device. The operating steps are as follows:

- 1) Ensure that the GT200-HT-EI's function bit of configuration switch is in the ON state and the mode bit of configuration switch is in the OFF state, restart the gateway. Then the GT200-HT-EI is in the debug mode.
- 2) Use a network line to connect the GT200-HT-EI's RJ-45 port and a computer.
- 3) Open the show memory data window by clicking the "Memory" icon.

Memory data
✕

Save

Stop

| Addr | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 |
|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 0000 | BF | F5 | 44 | 69 | BF | F5 | 44 | 69 | FF | FF | 41 | A7 | 00 | 1C | 42 | C8 |
| 0016 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 0032 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 0048 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 0064 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

Save

Load

Send

Stop

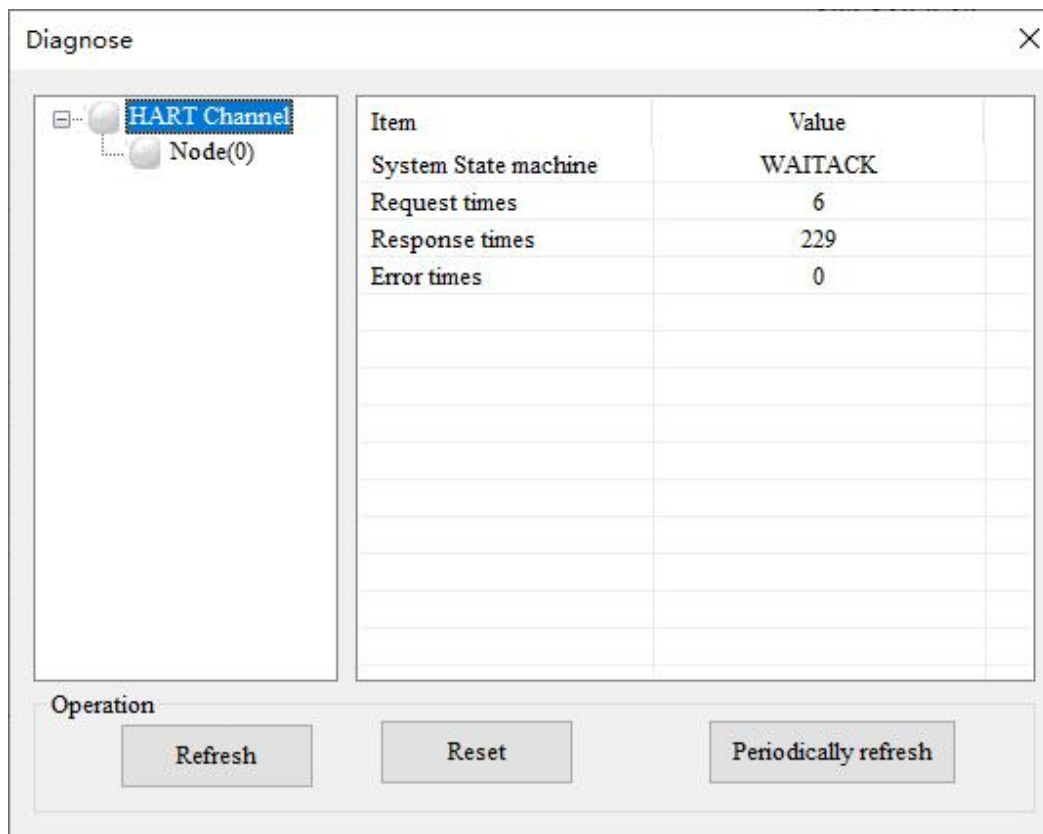
| Addr | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 |
|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 3000 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 3016 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 3032 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 3048 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| 3064 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

## 5.5.5 Diagnose

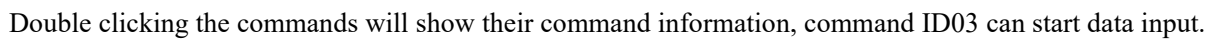
Through this function, users will know which device is not communicating. The execution condition of configured commands, data transmission of the gateway and the displays of certain command's operating. Steps are as follows:

- 1) Ensure that the GT200-HT-EI's function bit of configuration switch is in the ON state and the mode bit of configuration switch is in the OFF state, restart the gateway. GT200-HT-EI is in the debug mode.
- 2) Use a network line to connect the GT200-HT-EI's RJ-45 port and a computer.
- 3) Open the Diagnose window by clicking the "Diagnose" icon.

Click on the "HARTChannel" in this interface, it will show the status of the HART fieldbus part on the right. Press the "Refresh" button, this will update the data once. Click on "Periodically refresh", to have the software update the data every 500ms.



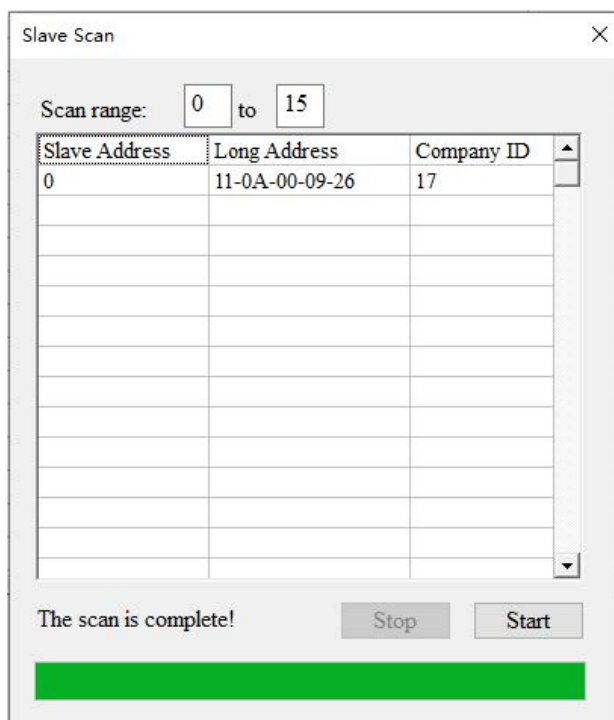
It shows the response status of the configured commands.



## 5.5.6 Scan

The slave scan function can help users to check the HART slave address and modify the slave address. Steps are as follows:

- 1) Set the configuration DIP switch on the GT200-HT-EI to 1-ON 2-OFF, which will set the gateway into debug mode.
- 2) Use a network cable to connect the GT200-HT-EI to a computer.
- 3) Open the slave scan window by clicking the "Scan" icon.



The screenshot shows a 'Slave Scan' window with a title bar and a close button. It features a 'Scan range' section with input boxes for '0' and '15'. Below this is a table with three columns: 'Slave Address', 'Long Address', and 'Company ID'. The first row contains the values '0', '11-0A-00-09-26', and '17'. The table has 16 rows in total. At the bottom, there is a status bar that says 'The scan is complete!' and two buttons, 'Stop' and 'Start'. A green progress bar is visible at the very bottom.

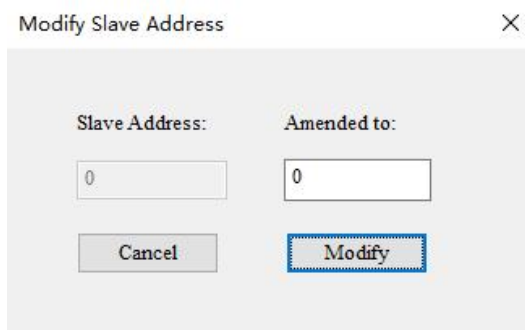
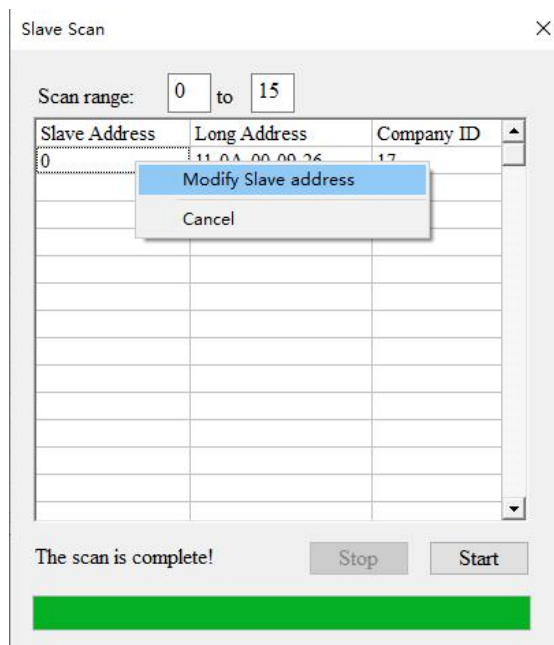
| Slave Address | Long Address   | Company ID |
|---------------|----------------|------------|
| 0             | 11-0A-00-09-26 | 17         |
|               |                |            |
|               |                |            |
|               |                |            |
|               |                |            |
|               |                |            |
|               |                |            |
|               |                |            |
|               |                |            |
|               |                |            |
|               |                |            |
|               |                |            |
|               |                |            |
|               |                |            |
|               |                |            |
|               |                |            |

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Click "Start" in "Slave Scan" interface, it will show the short address, long address and ID of HART slave devices which are connected to the gateway.

Move to the relevant device and right click it, and click "Modify Slave Address" will show the "Modify slave address" interface, input the address you want to change in the "Modified to" text.



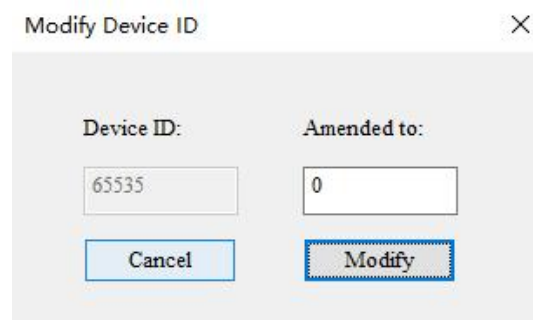
After modification, the HART slave address has been modified, the gateway must be restarted.



## 5.5.7 Modify Device ID

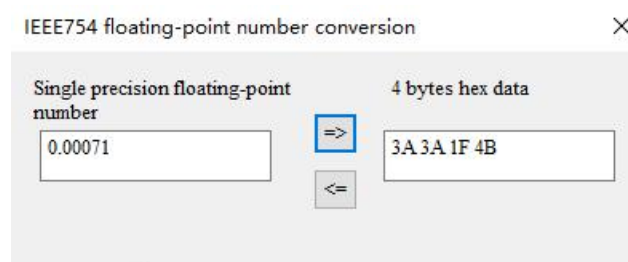
The modify device ID function can help users to check the Device ID, let the user know the currently selected GT200-HT-EI device ID value, and can modify the value. Steps are as follows:

- 1) Turn the GT200-HT-EI configuration (operation) DIP switch to "ON", and then power on again. At this point the GT200-HT-EI is running in configuration (run) mode.
- 2) Connect the network card interface of GT200-HT-EI to the computer.
- 3) Click "Tools -> Modify Device ID", and the device search interface will pop up.



## 5.5.8 Conversion Tools

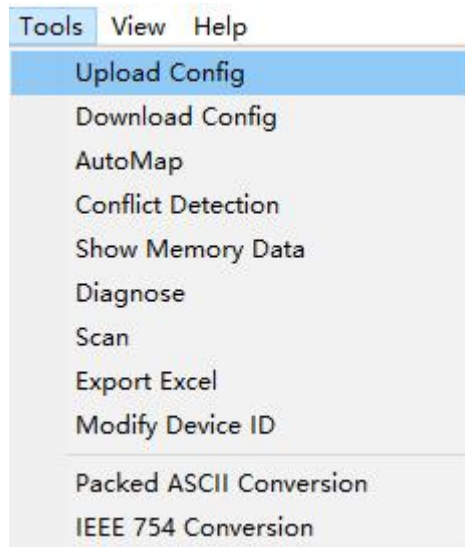
In the "Tools" menu, there are two practical tools: They are used to switch between IEEE754 and PACKED ASCII conveniently.



## 5.5.9 Hardware Communication

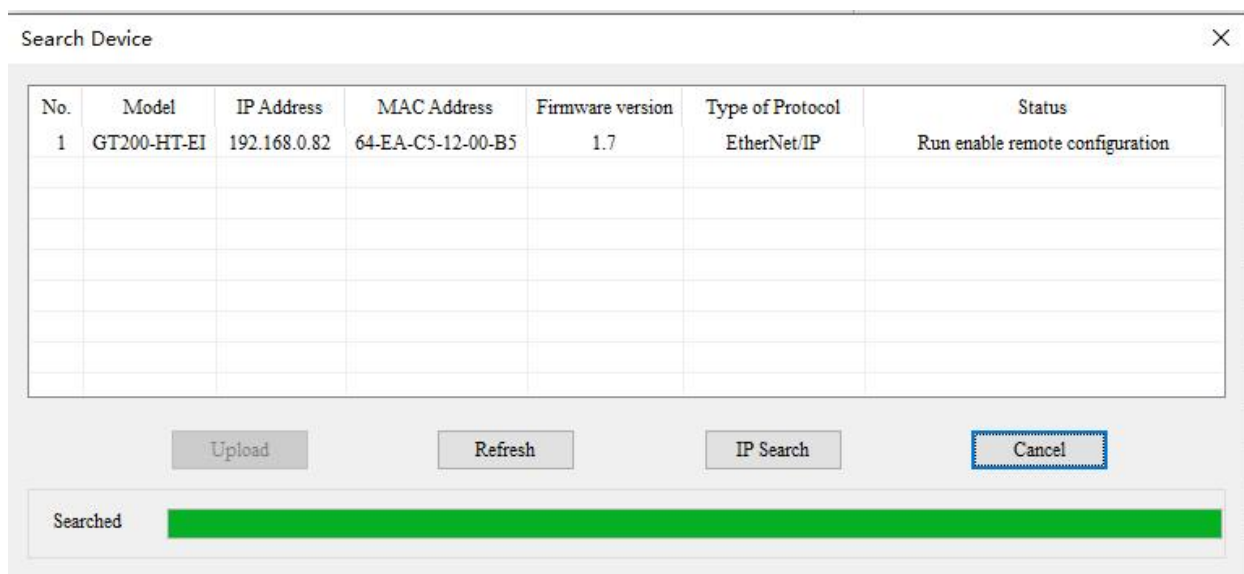
### 5.5.9.1 Ethernet Configuration

The hardware communication menu items are as follows:



### 5.5.9.2 Upload Configuration

Choose upload configuration, it will pop up the dialog box of searching equipment:

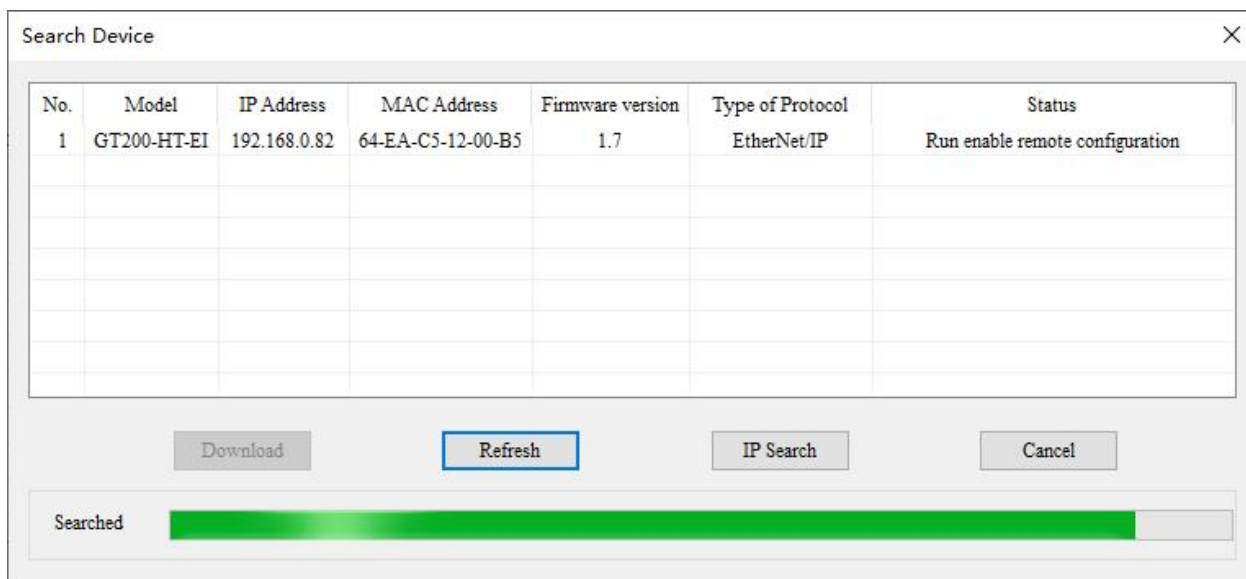


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Select the equipment you want to configure and click "Sign In" to enter into the upload dialog box. Upload the configuration information from the equipment to the software as shown below:

## 5.5.9.3 Download Configuration

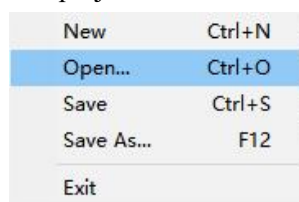
The operation of download configuration is the same as upload configuration:



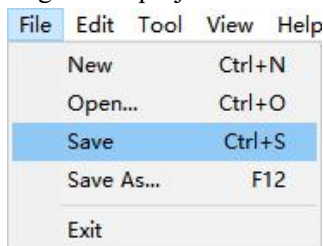
**Note:** Before downloading, please confirm all configurations have been completed and right.

## 5.5.10 Open/Save Project

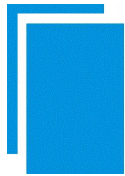
Select "Open" to open an existing configuration project:



Select "Save" or "Save As..." to save the configuration project as a \*.xml file.



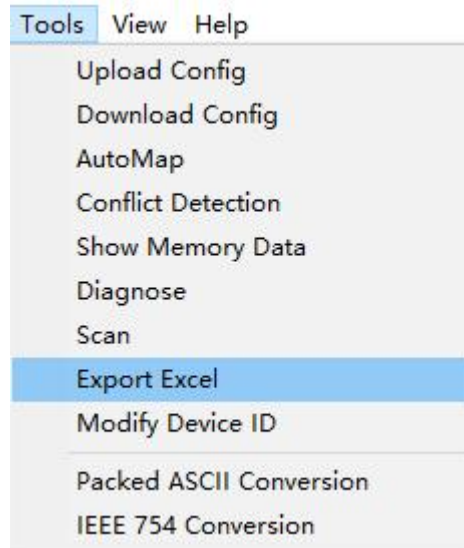




## 5.5.11 Export Excel

The configuration can be exported as a table.

Please confirm that Microsoft Excel is installed on your computer before using this function.

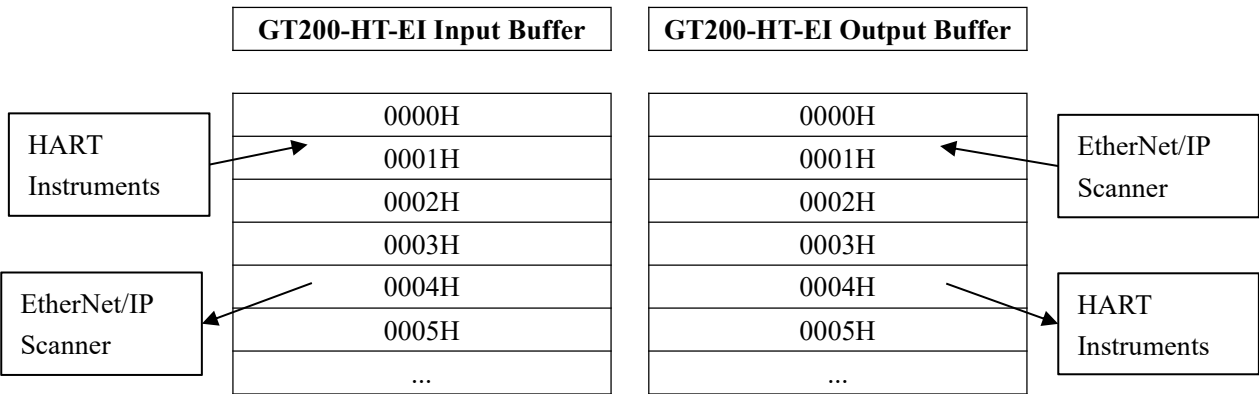


# 6 Working Principle

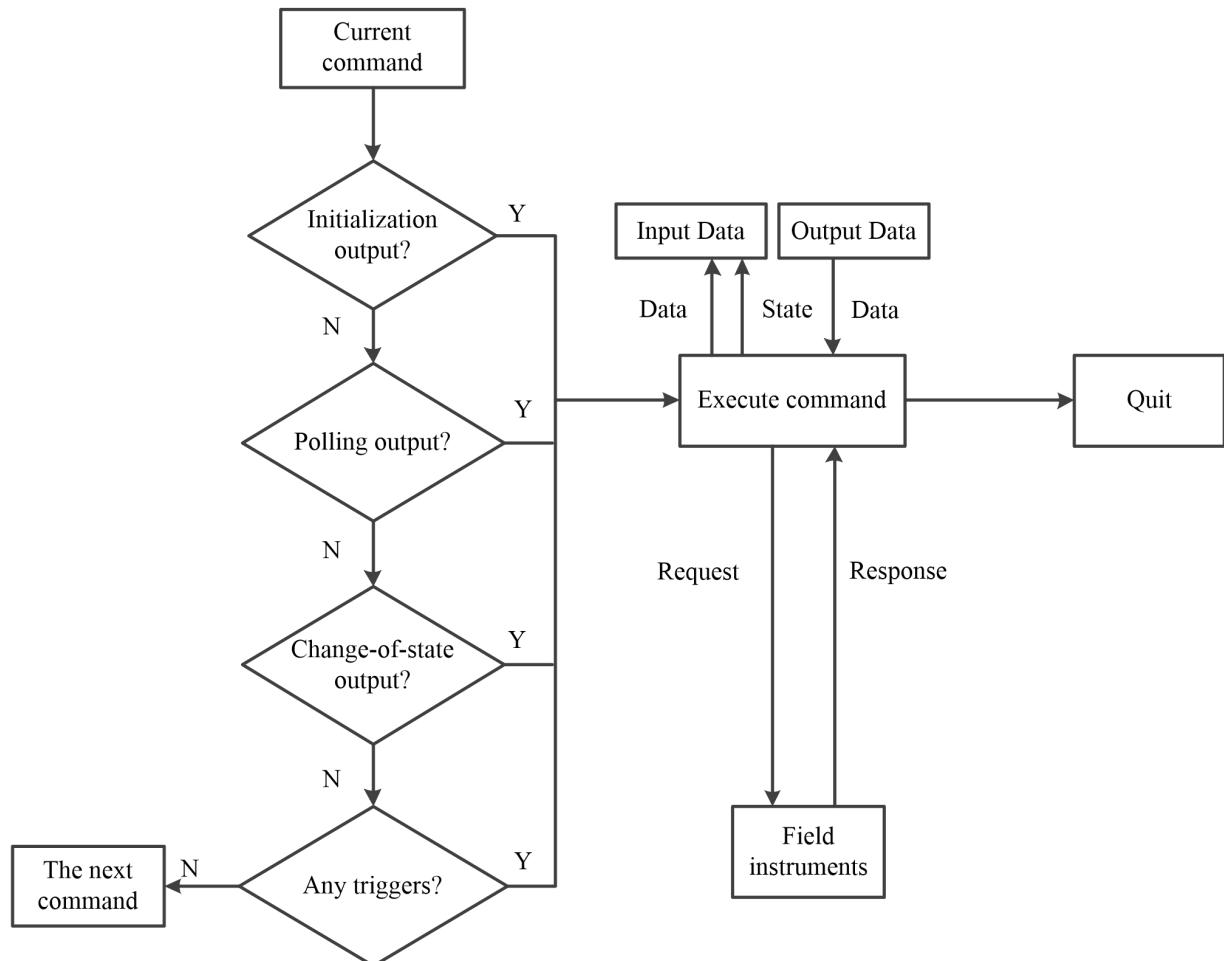
## 6.1 Data Exchange

Data exchange between HART and EtherNet/IP via GT200-HT-EI is established based on “mapping”. There are two data buffer areas in the GT200-HT-EI: One is the EtherNet/IP network input buffer and the other is the EtherNet/IP network output buffer. The received data from the HART instruments will be mapped to the input buffer for the EtherNet/IP scanner reading. The output data from EtherNet/IP scanner will be mapped to the output buffer, then the GT200-HT-EI will write the output data to the HART instruments.

For more details and examples, please refer to [Chapter 5.5.3](#).



## 6.2 Flowchart of Executing One HART Command



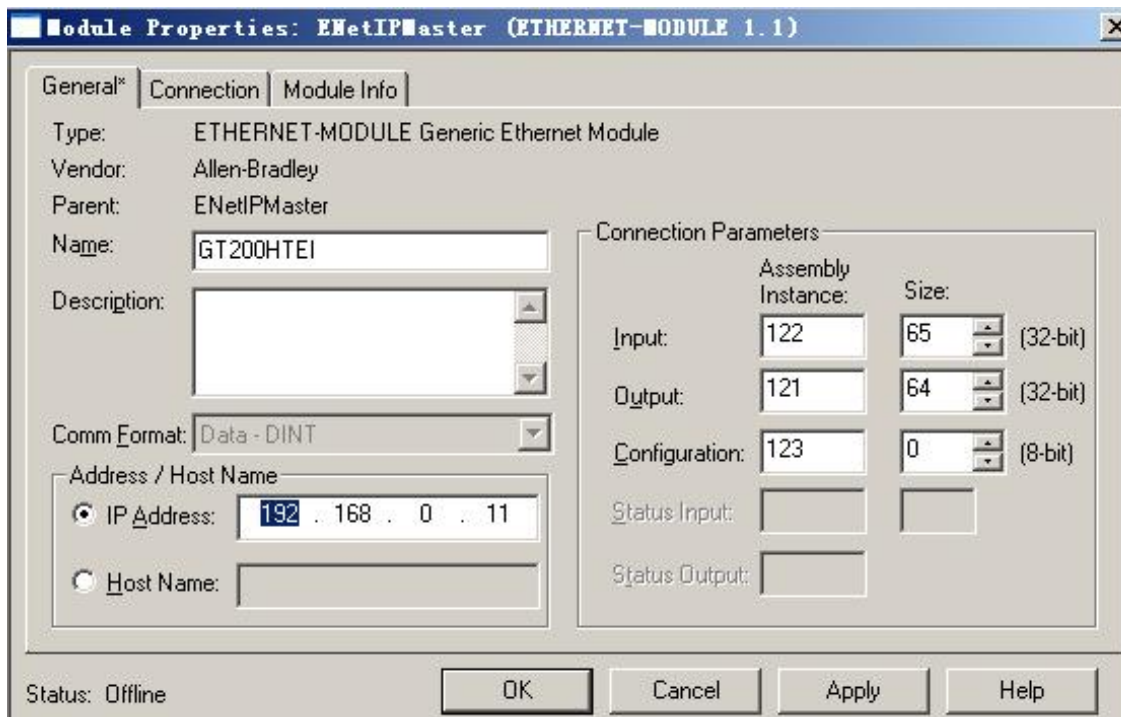
## 7 EtherNet/IP Connection Parameters

Connection parameters the adapter provides are as below:

| Parameters \ Data Size | 64 Bytes | 128 Bytes | 256 Bytes |
|------------------------|----------|-----------|-----------|
| Input Instance         | 102      | 112       | 122       |
| Output Instance        | 101      | 111       | 121       |
| Configuration Instance | 103      | 113       | 123       |

Notes: The Input data size should include a 4-byte status. For example, when using the 256-byte parameters, the input size should be 260 bytes.

Take configuration parameters of RSLogix5000 as an example:

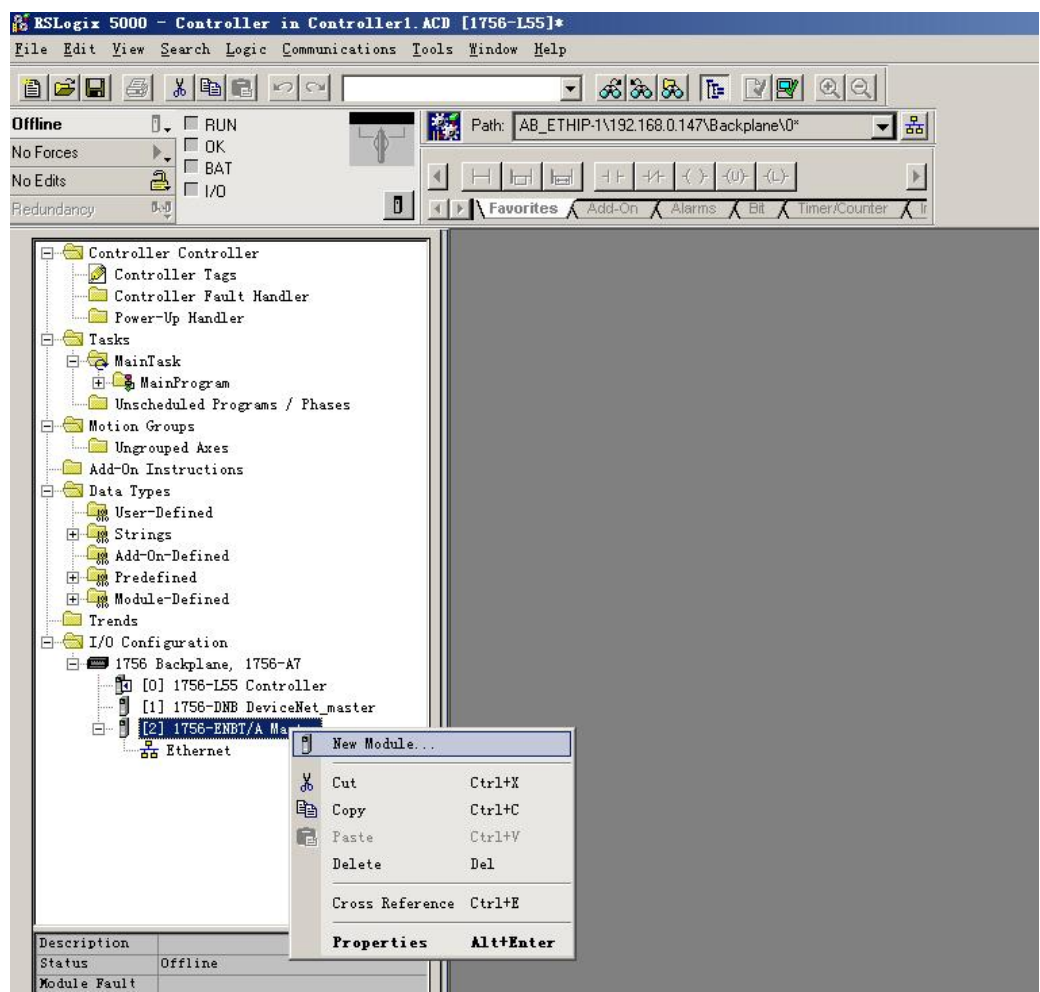


## 8 How to Read/Write I/O Data

The following RSLogix 5000 example will describe how to read/write I/O data.

### 8.1 Read/Write Data by IO Messaging (Recommend)

Right click on EtherNet/IP scanner module, click "New Module", as shown below:

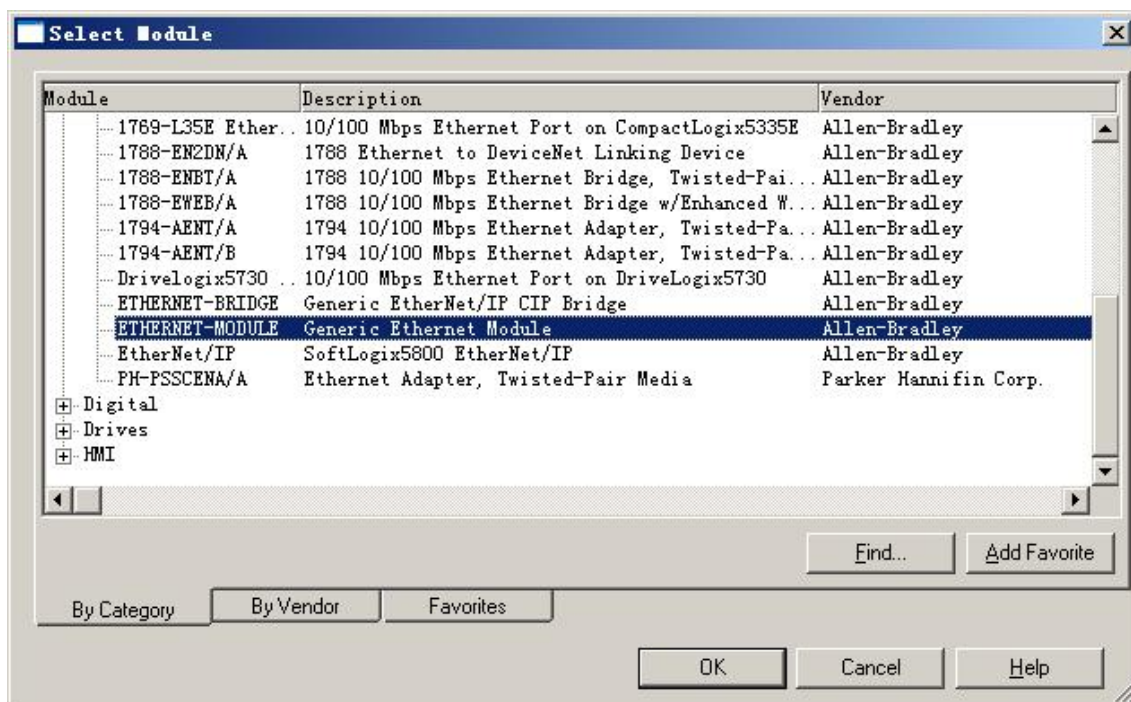


# GT200-HT-EI

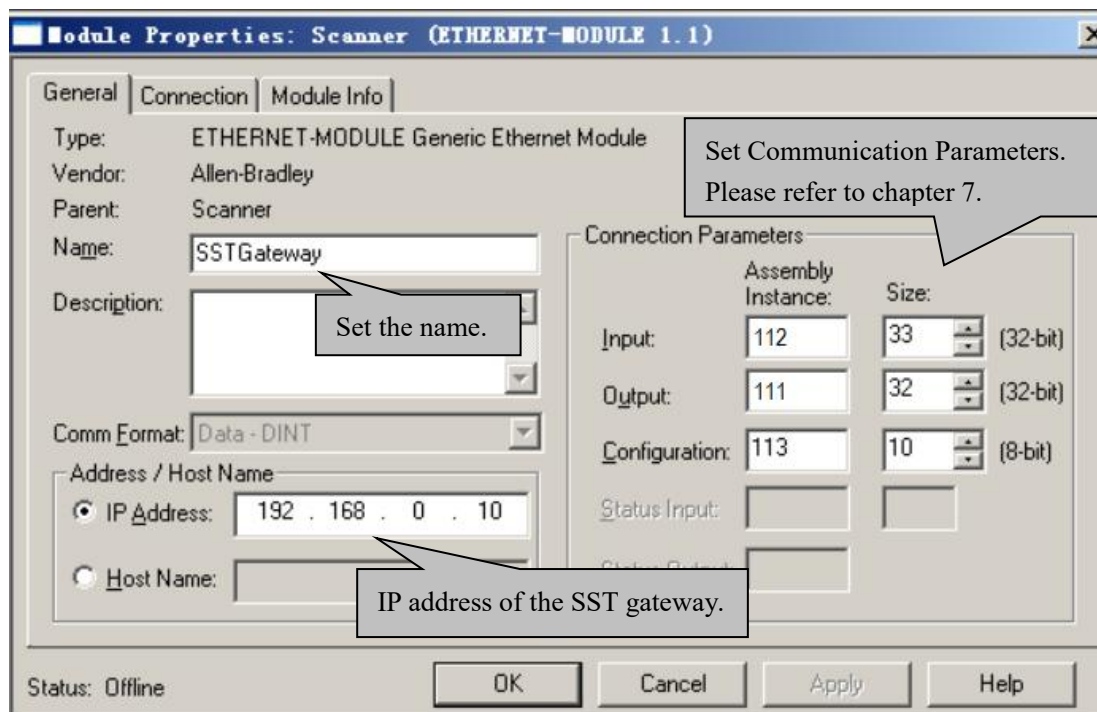
## HART/EtherNet Gateway

### User Manual

In the pop-up dialog box, unfold "+" before "Communications", choose "ETHERNET-MODULE", click "OK", as shown below:



Configure relevant information in the pop-up window, as shown below:



In the above picture, the module information needs to be configured includes:

# GT200-HT-EI

## HART/EtherNet Gateway

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**Name:** Name the added EtherNet/IP adapter module

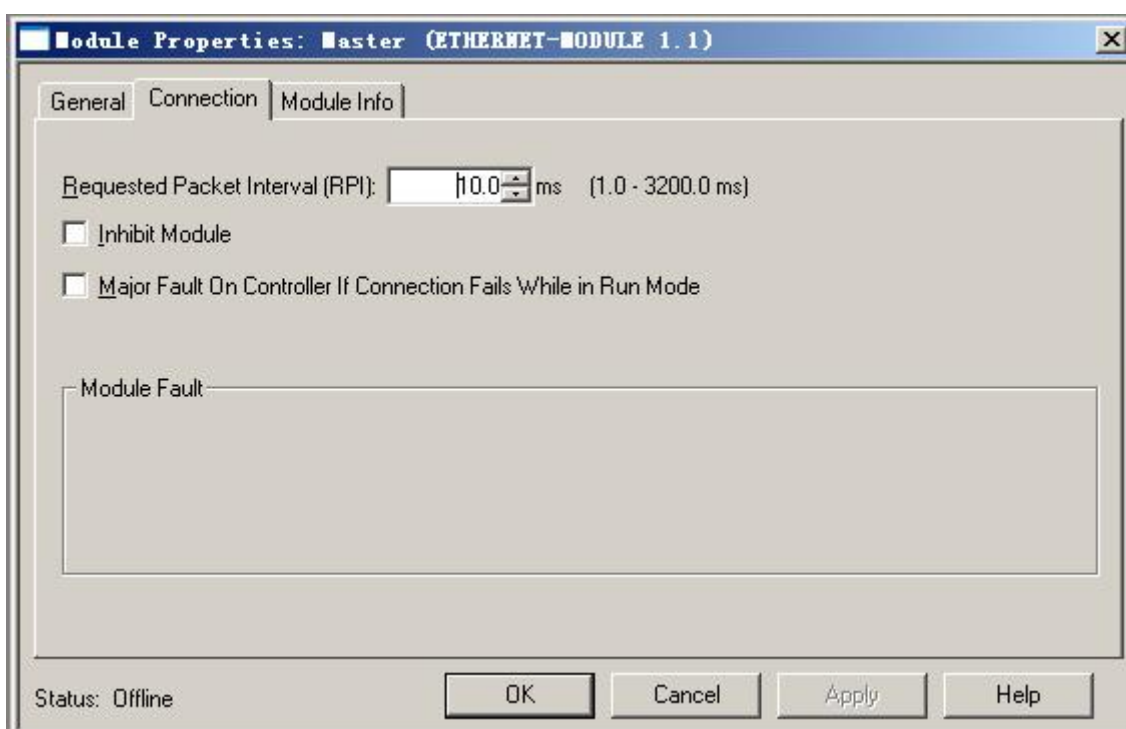
**Comm Format:** Configure data types. Users can choose data types as DINT, INT, SINT and REAL, etc. After confirmation, this cannot be changed. If you want to change data types, you can create a new module.

**IP Address:** Set the IP address of the EtherNet/IP adapter module (IP address of GT200-HT-EI, configured by the software SST-HI-CFG).

**Connection Parameters:** Set Connection parameters during communication. Please refer to [Chapter 7](#).

**Note:** "Size" (configured bytes) in the above picture should be consistent with the relevant input and output bytes of Instance in the above chapter.

Click "OK", set the scanner polling time interval in the pop-up dialog box, the default is 10ms, as shown below:



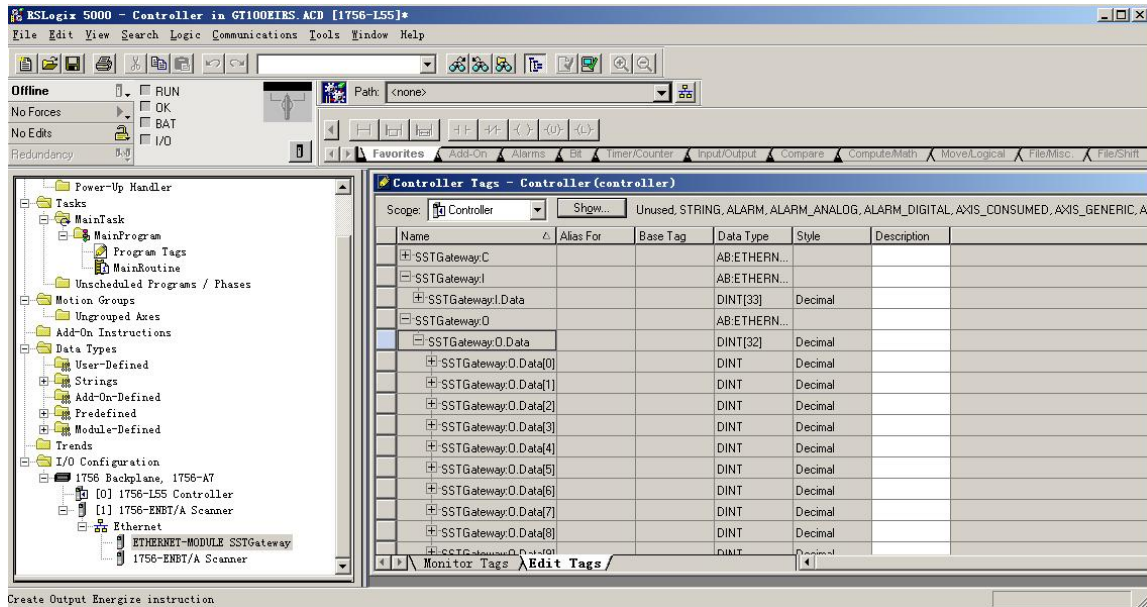


# GT200-HT-EI

## HART/EtherNet Gateway

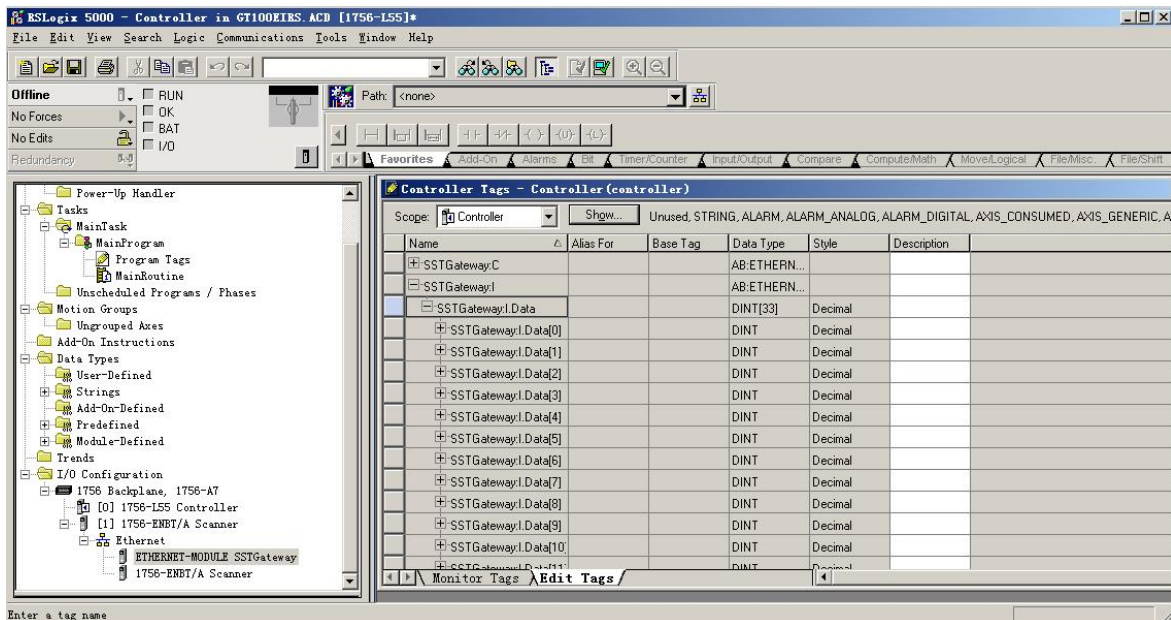
### User Manual

After setting this interval, click "OK" to save. Double click "Controller Tags", unfold "SSTGateway: O", as shown below:



In the picture above, SSTGateway:O.Data [0] - SSTGateway:O.Data [31] is the corresponding output data address of the SST Gateway module in scanner.

Unfold "SSTGateway: I", as shown below:



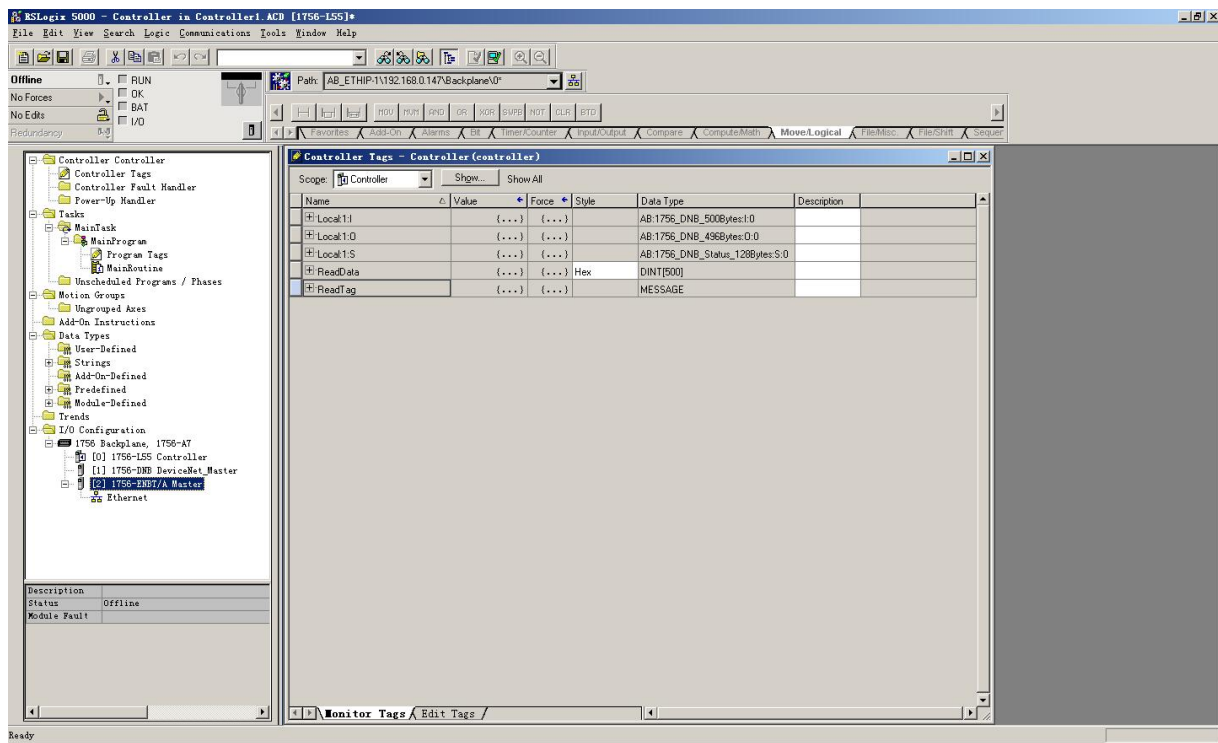
In the above picture, the first 4 bytes of SSTGateway: I. Data [0] are the status bytes. SSTGateway:I.Data [1] - SSTGateway: I. Data [32] are the input data from the SST Gateway.



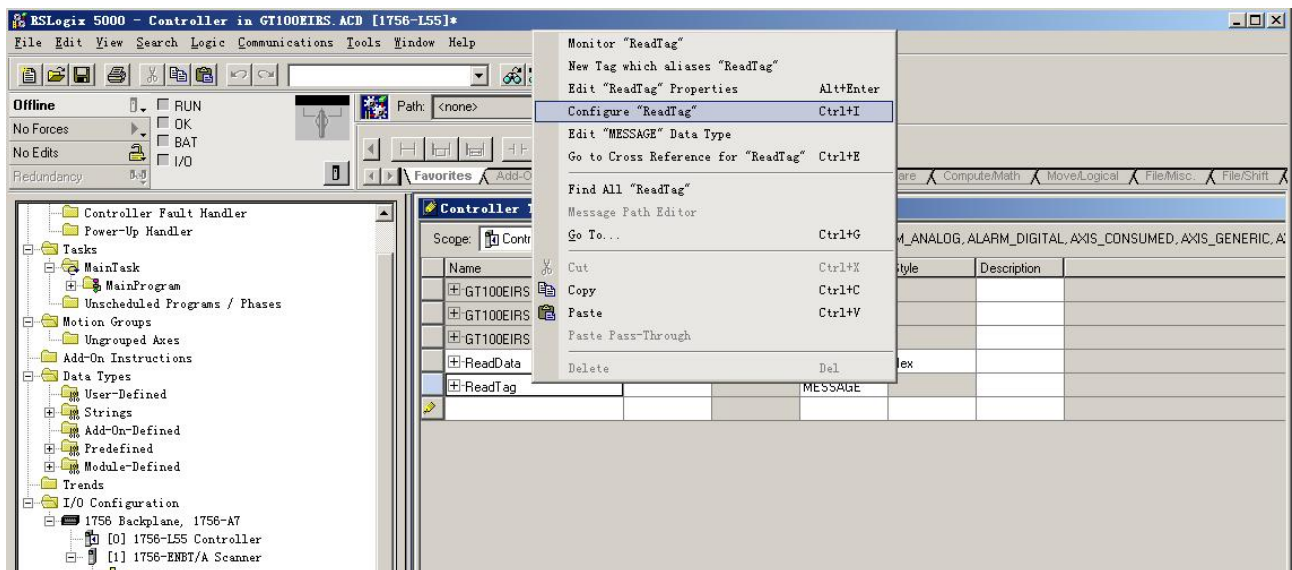
## 8.2 Read/Write Data by MSG

### 8.2.1 Read Data

Create a new project. Ensure it is in the "Offline" mode. Add two new tags "ReadTag" and "ReadData" under the "Controller Tags" and set the type of "ReadTag" as "MESSAGE" and "ReadData" as "DINT [500]".



Right click "ReadTag", select "Configure 'ReadTag'":



# GT200-HT-EI

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In the new pop-up window, some parameters need to be set as below:

- **Message Type:** CIP Generic
- **Service Type:** Select "Get Attribute Single", now, relevant service code will become "e (Hex)"
- **Class:** 4 (Hex)
- **Instance:** Please refer to chapter 7 EtherNet/IP Connection Parameters Set
- **Attribute:** 3 (Hex)
- **Destination:** Select "ReadData" label, now, the data that has been received will be saved in this tag

Message Configuration - ReadTag

Configuration\* | Communication | Tag

Message Type: CIP Generic

Service Type: Get Attribute Single

Service Code: e (Hex) Class: 4 (Hex) Instance: 102 Attribute: 3 (Hex)

Source Element: Source Length: 0 (Bytes) Destination: ReadData

New Tag...

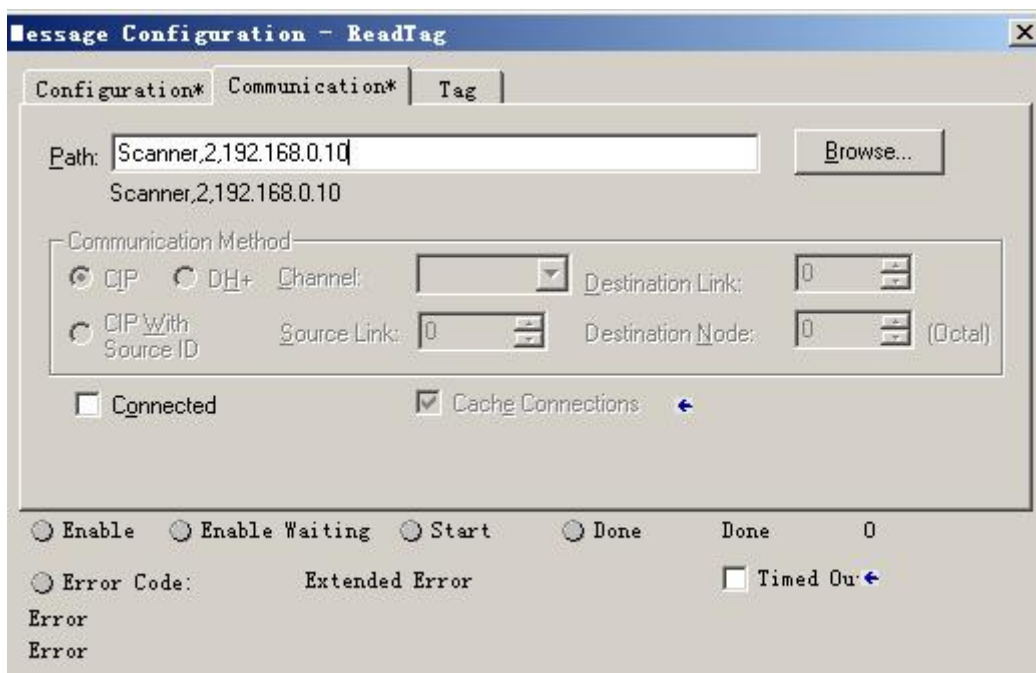
☐ Enable ☐ Enable Waiting ☐ Start ☒ Done

Error Code: Extended Error ☐ Timed Out

## GT200-HT-EI HART/EtherNet Gateway User Manual

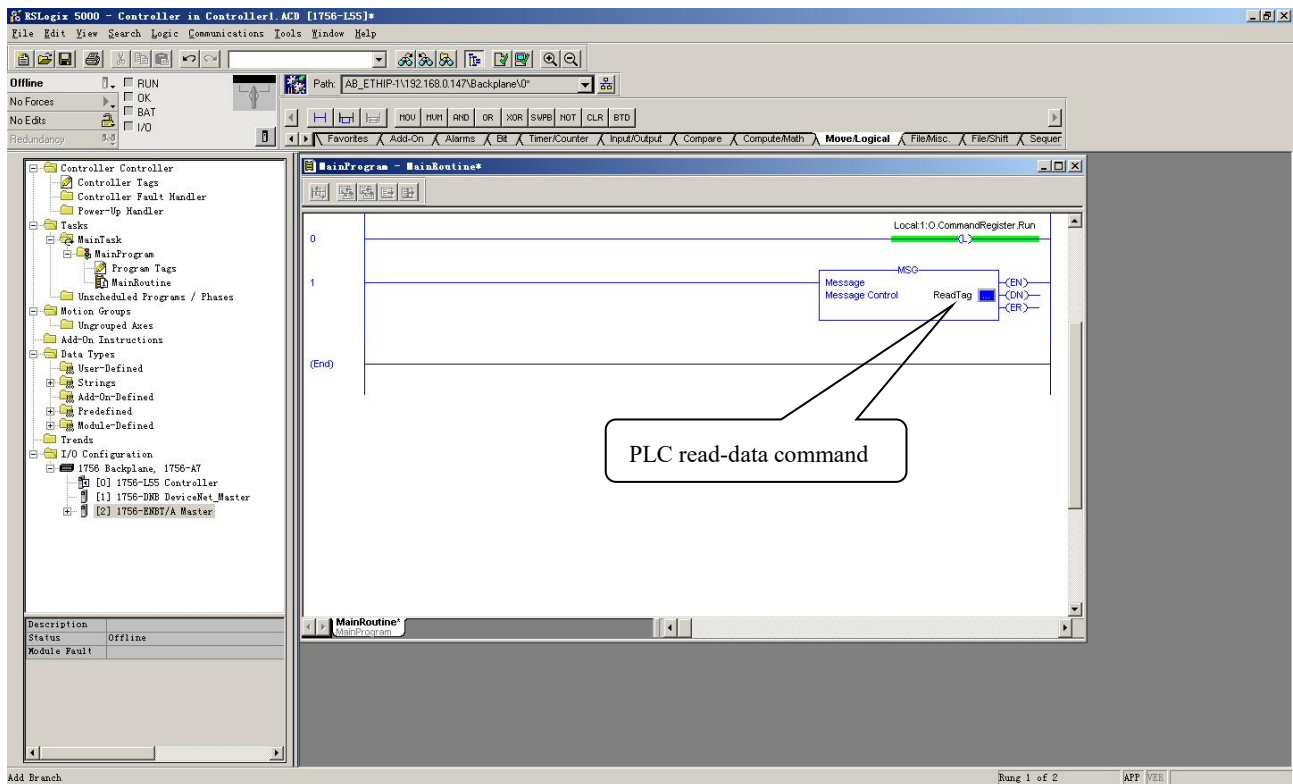
Choose "Communication" tab, input the relevant path of connecting EtherNet/IP adapter in the blank space behind the Path, the path format is: EtherNet/IP hostname, EtherNet/IP scanner slot No., IP address of EtherNet/IP adapter, after setting the path, click "Apply", "Confirm". As is shown below:

In this instance, EtherNet/IP hostname is "Scanner", EtherNet/IP scanner slot No. Is "2", EtherNet/IP adapter is "192.168.0.10". IP address of SST Gateway is the address which is configured by the configuration software.



# GT200-HT-EI HART/EtherNet Gateway User Manual

Add a "MSG" command in "MainRoutine" under the "MainProgram" and choose "ReadTag" as "Message Control", as shown below:

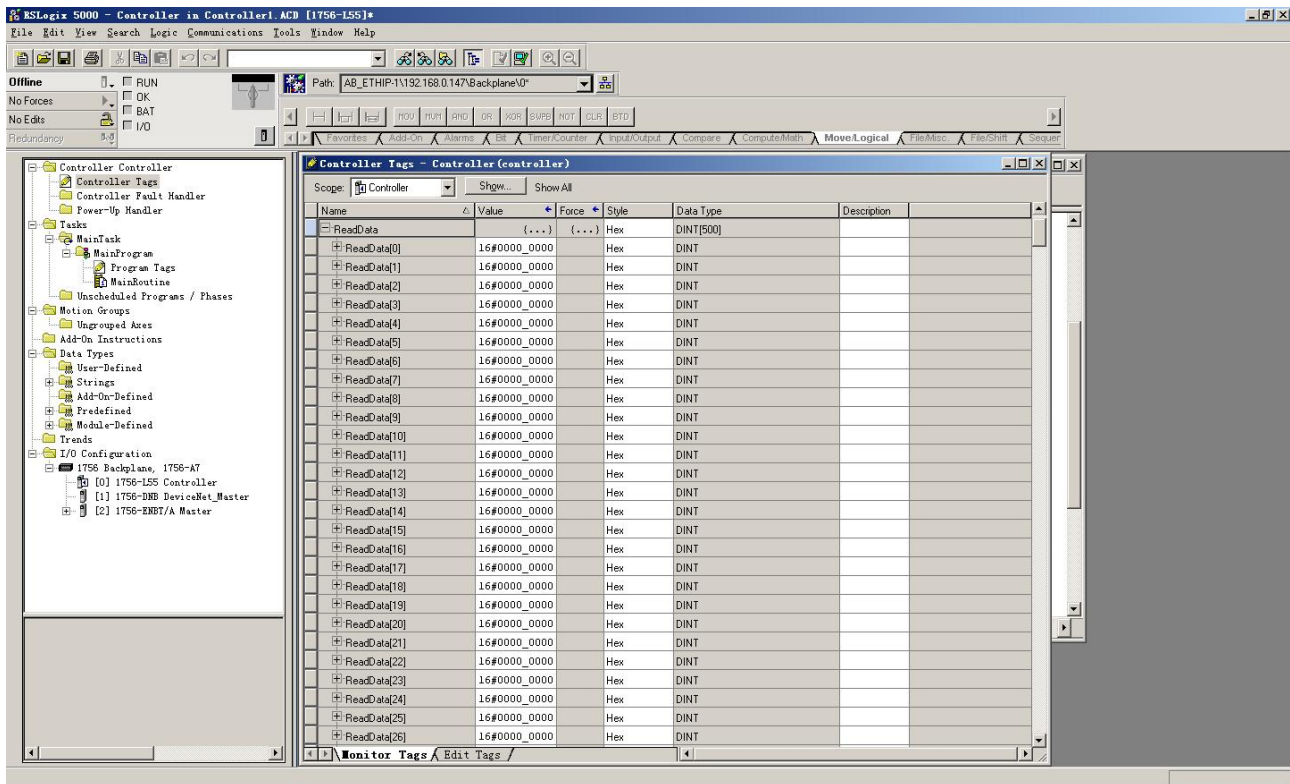


This is a simple command which can send a read request, it still needs to add some logic commands to trigger this command in the common program. For more detailed information, please refer to RSLogix5000.

Download the program to the PLC and set PLC into the "Online" state.

# GT200-HT-EI HART/EtherNet Gateway User Manual

Click "Control Tags" and select "Monitor Tags", unfold "ReadData", you will see that PLC can read the data from EtherNet/IP adapter SST Gateway.





## 8.2.2 Write Data

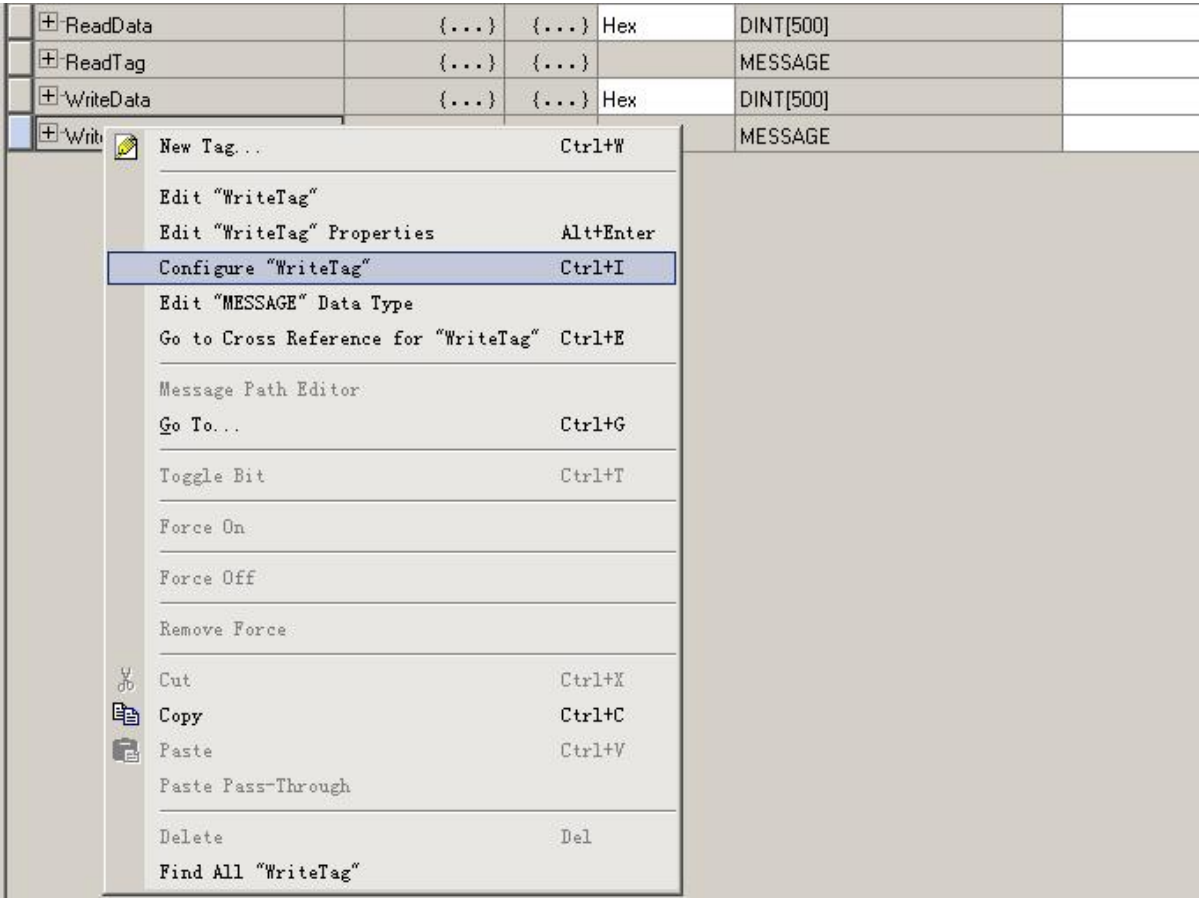
Enter the "Offline" mode, add two new tags "WriteTag" and "WriteData" under the "Controller Tags". Define the type of "WriteTag" as "MESSAGE" and "WriteData" as "DINT [500]":

The screenshot displays the RSLogix 5000 software interface. At the top, two 'New Tag' dialog boxes are shown side-by-side. The left dialog is for 'WriteData' with 'Data Type' set to 'DINT[500]' and 'Style' set to 'Hex'. The right dialog is for 'WriteTag' with 'Data Type' set to 'MESSAGE'. Below these, the main software window shows the 'Controller Tags' table for the 'Controller (controller)' scope.

| Name          | Value        | Force | Style | Data Type                       | Description |
|---------------|--------------|-------|-------|---------------------------------|-------------|
| Local1:1      | (...)        | (...) |       | AB:1756_DNB_500Bytes:1:0        |             |
| Local1:0      | (...)        | (...) |       | AB:1756_DNB_496Bytes:0:0        |             |
| Local1:5      | (...)        | (...) |       | AB:1756_DNB_Status_128Bytes:5:0 |             |
| ReadData      | (...)        | (...) | Hex   | DINT[500]                       |             |
| ReadTag       | (...)        | (...) |       | MESSAGE                         |             |
| WriteData     | (...)        | (...) | Hex   | DINT[500]                       |             |
| WriteData[0]  | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[1]  | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[2]  | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[3]  | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[4]  | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[5]  | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[6]  | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[7]  | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[8]  | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[9]  | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[10] | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[11] | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[12] | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[13] | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[14] | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[15] | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[16] | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[17] | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[18] | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[19] | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[20] | 16#0000_0000 |       | Hex   | DINT                            |             |
| WriteData[21] | 16#0000_0000 |       | Hex   | DINT                            |             |

Enter the "Monitor Tags" interface. input some data beginning from address WriteData[0] in the "WriteData" tag. There, data will be outputted to SST Gateway.

Right click "WriteTag", select "Configure "WriteTag"":





In the new pop-up window, there are variables that need configuration as shown below:

- **Message Type:** CIP Generic
- **Service Type:** Select "Set Attribute Single", now, relevant Service Code will become "10 (Hex)"
- **Class:** 4 (Hex)
- **Instance:** Please refer to chapter 7 EtherNet/IP Connection Parameters Set
- **Attribute:** 3 (Hex)
- **Source Element:** Select "WriteData" tag, it indicates the data in the "WriteData" tag will become the data PLC outputs
- **Source Length:** Use byte as unit, this value should be less than or equal to the current selecting bytes which Instance represents

The screenshot shows a 'Message Configuration - WriteTag' dialog box with the following fields and values:

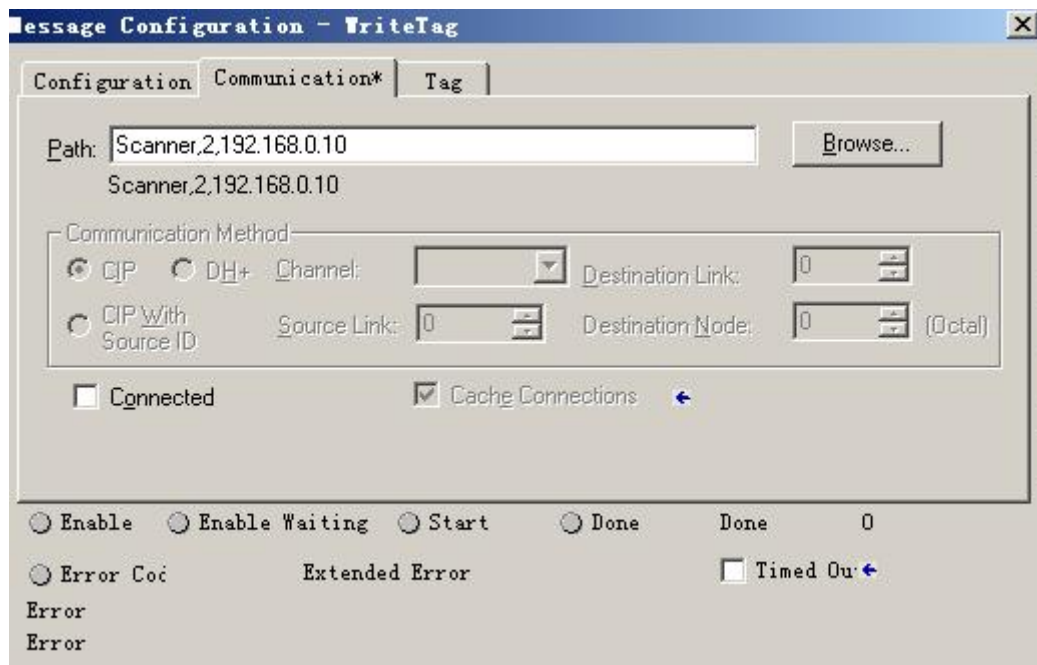
- Message Type:** CIP Generic
- Service Type:** Set Attribute Single
- Service Code:** 10 (Hex)
- Instance:** 101
- Class:** 4 (Hex)
- Attribute:** 3 (Hex)
- Source Element:** WriteData
- Source Length:** 128 (Bytes)
- Destination:** (Empty)

Buttons at the bottom include: Enable, Enable Waiting, Start, Done, Done, 0, Error Code, Extended Error, Timed Out, and New Tag...

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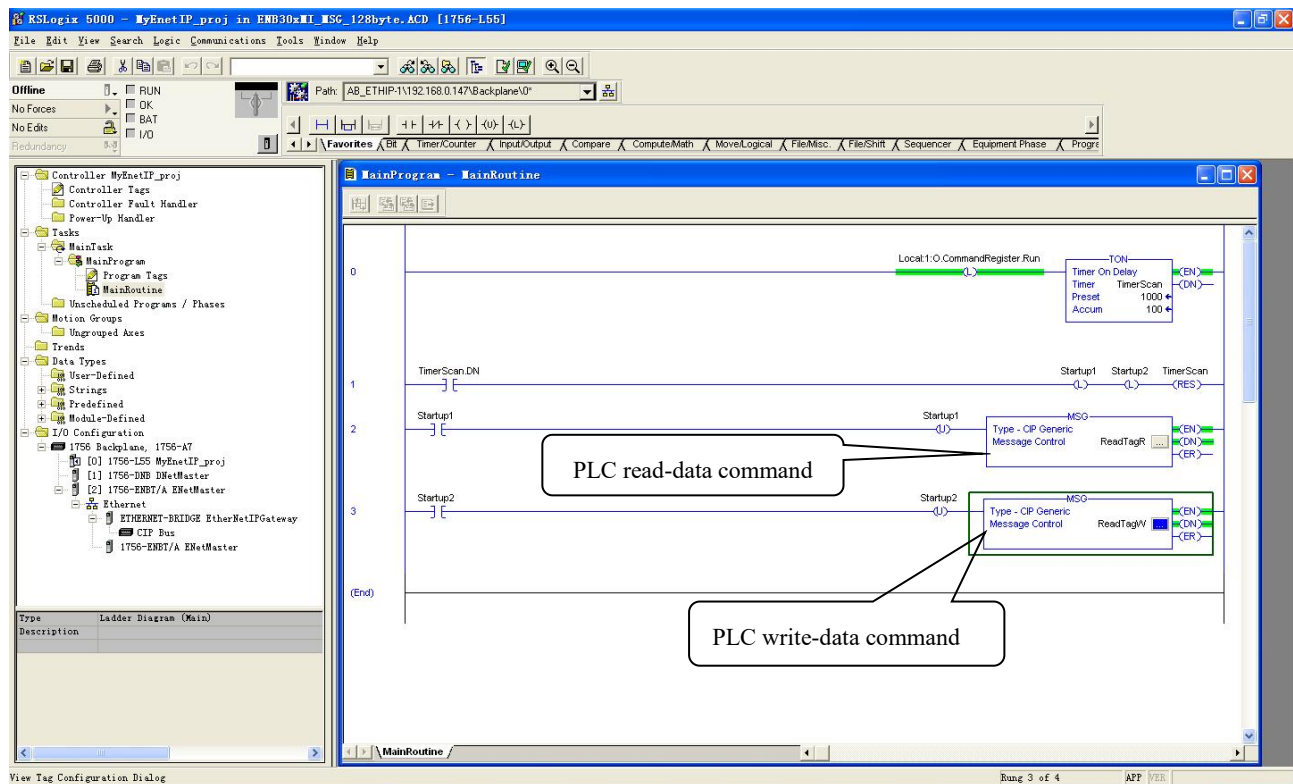
Choose "Communication" tab, input the relevant path of connecting EtherNet/IP adapter in the blank space behind the Path, the path format is: EtherNet/IP hostname, EtherNet/IP scanner slot No., IP address of EtherNet/IP adapter, after setting the path, click "Apply", "Confirm". As is shown below:

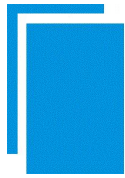


In this instance, EtherNet/IP hostname is "Scanner", EtherNet/IP scanner slot No. is "2", EtherNet/IP adapter (SST Gateway) is "192.168.0.10". IP address of SST Gateway is the address which is configured by the configuration software.

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Add a "MSG" command in the "MainRoutine" under the "MainProgram" and choose "WriteTag" as the "Message Control", as shown below:





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八、 Download the PLC program to the PLC and set PLC to the "Online" state, the data in the "WriteData" will be outputted to EtherNet/IP adapter (SST Gateway).

## 9 Modbus TCP Client Communication

GT200-HT-EI Gateway provides a solution for HART instruments to communicate with Modbus TCP Client through Modbus TCP network, the gateway acts as Server, the following example illustrates how the gateway communicates with Modbus Poll (Modbus TCP Client emulation software).

1. Configure point-to-point mode (HART address is 0) with HART Commands ID1, ID3 and ID6. The common HART command format can be found in Appendix B, and the configuration is as follows:
  - (1) When configuring HART Command ID1, the response is 2 bytes more than the actual one (command state) because HART Command ID1 is without request. In the command state, byte 0 (primary variable unit) and the primary variable are 7 bytes in total, and after mapping to 4 Modbus register addresses, there will be 1 byte extra, resulting in the last 3 bytes of the primary variable being placed in the last 2 Modbus registers, and the actual primary variable value cannot be read. So it should be configured to advanced mode to extract the primary variable for direct acquisition.

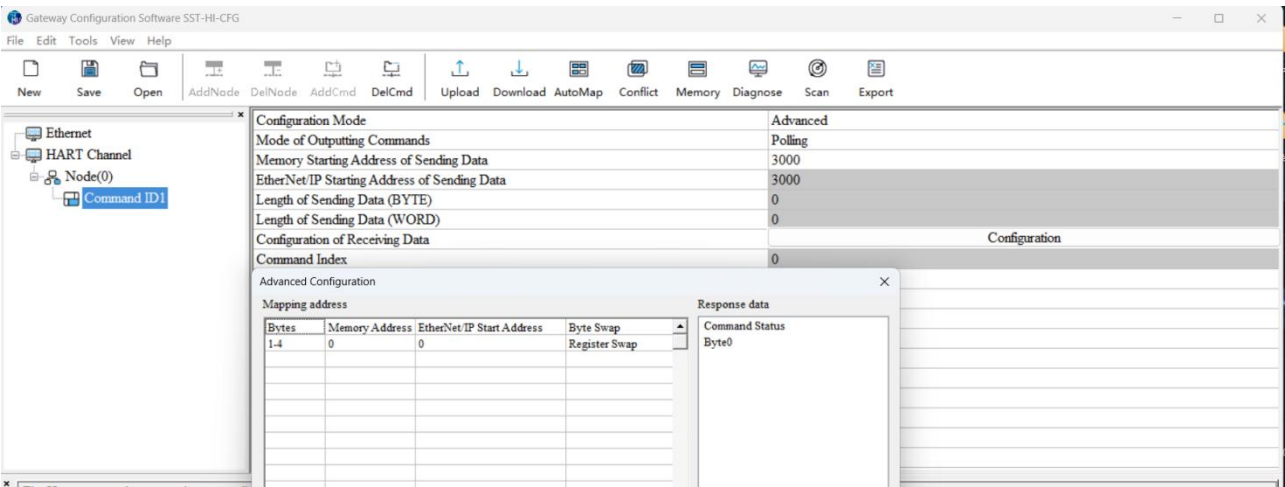
### Command ID1: Read primary variable (PV)

Returns the value of the primary variable as a floating-point type

Request: None

Response:

| Byte     | Description            |
|----------|------------------------|
| Byte 0   | Primary Variable Units |
| Byte 1-4 | Primary Variable       |



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- (2) When configuring HART command ID3, use the advanced function to configure the primary variable (PV), the secondary variable (SV), and the tertiary variable (TV).

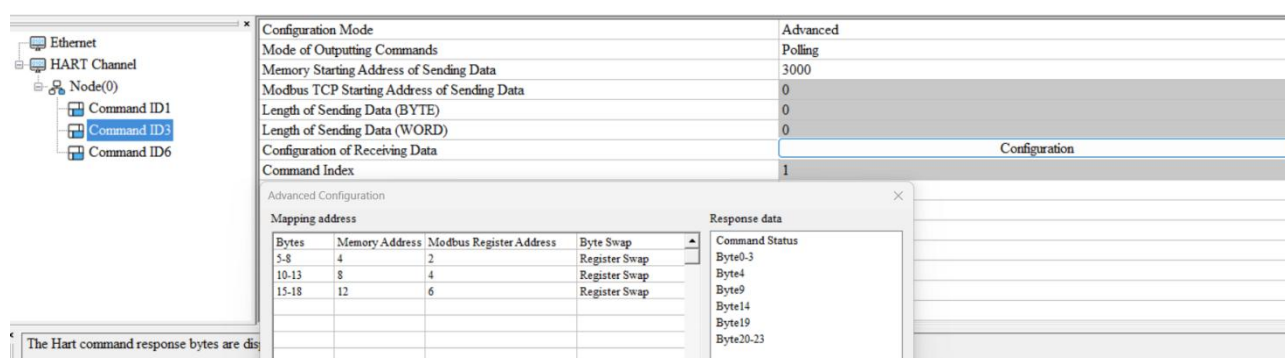
#### Command ID3: Reads four (predefined) dynamic variables and the primary variable current

Reads the primary variable current and 4 (at most) pre-defined dynamic variables, the primary variable current always matches the device's AO output current. primary, secondary, tertiary and quaternary variables defined for each device type.

Request: None

Response:

| Byte       | Description                                              |
|------------|----------------------------------------------------------|
| Byte 0-3   | Primary Variable Loop Current ( units of milli-amperes ) |
| Byte 4     | Primary Variable Units Code                              |
| Byte 5-8   | Primary Variable                                         |
| Byte 9     | Secondary Variable Units Code                            |
| Byte 10-13 | Secondary Variable                                       |
| Byte 14    | Tertiary Variable Units Code                             |
| Byte 15-18 | Tertiary Variable                                        |
| Byte 19    | Quaternary Variable Units Code                           |
| Byte 20-23 | Quaternary Variable                                      |



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(3) The configuration of HART Command ID6 is used to modify the address of the HART device.

#### Command ID6: Write POLLING address

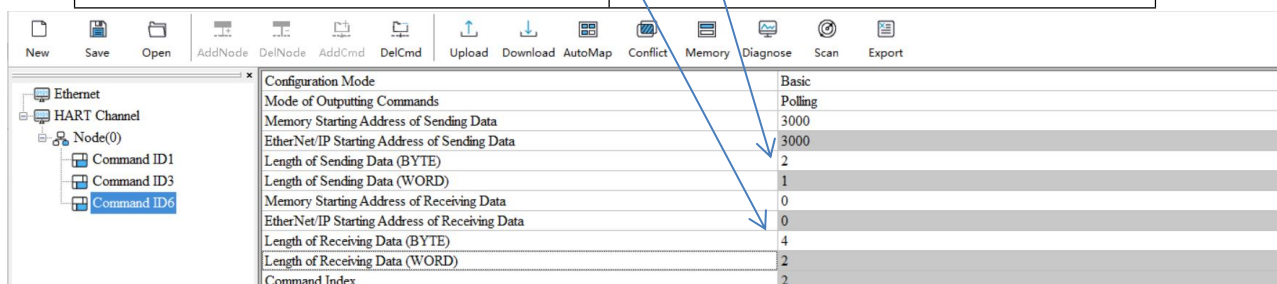
This is the data link layer management command. This command writes the Polling address and loop current mode to the field device.

Request:

| Bytes                                      | Description                                  |
|--------------------------------------------|----------------------------------------------|
| Byte 0                                     | Polling Address (Between 0-15)               |
| Byte 1<br>(Only on supported HART devices) | Loop Current Mode<br>(0=Disabled, 1=Enabled) |

Response:

| Bytes                                      | Description                                  |
|--------------------------------------------|----------------------------------------------|
| Byte 0                                     | Polling Address (Between 0-15)               |
| Byte 1<br>(Only on supported HART devices) | Loop Current Mode<br>(0=Disabled, 1=Enabled) |







Conflict



AutoMap

2. Click  , through  , to view the mapping address of the command in the gateway buffer. The primary variable of HART Command ID1 corresponds to gateway input buffer 0-3, Command ID3 corresponds to 4-15, Command ID6 request corresponds to output buffer 3000-3001, and response corresponds to 16-19. as follows:

Modbus TCP Client uses 04 function code, using 3x0001-3x0002 corresponding to the primary variable of HART Command ID1, 3x0003-3x0008 corresponding to the primary variable of HART Command ID3, the secondary and tertiary variables. 3x0009-3x0010 corresponds to the command status of HART Command ID6, the Polling address and loop current mode of the device with the 06/16 function code. The use of 4x0001 should correspond to the Polling address and loop current mode of the requested device of HART Command ID6..

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## HART/EtherNet Gateway

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The screenshot displays the configuration interface for the GT200-HT-EI HART/EtherNet Gateway. It is divided into two main sections, each showing a tree view on the left and a data table on the right.

**Top Section:**

- Tree View:** Ethernet (expanded) → HART Channel (expanded) → Node(0) (expanded) → Command ID1, Command ID3, Command ID6.
- Table:** A table with 17 columns (0-16) and rows for addresses 3000, 3032, 3064, 3096, 3128, 3160, 3192, 3224, 3256, 3288, 3320, 3352, and 3384. The 'Receive-data-memory' table below it has 17 columns (0-16) and rows for addresses 0000 and 0032.

**Bottom Section:**

- Tree View:** Ethernet (expanded) → HART Channel (expanded) → Node(0) (expanded) → Command ID1, Command ID3, Command ID6 (selected).
- Table:** A table with 32 columns (0-31) and rows for addresses 3000, 3032, 3064, 3096, 3128, 3160, 3192, 3224, 3256, 3288, 3320, 3352, and 3384. The 'Receive-data-memory' table below it has 32 columns (0-31) and rows for addresses 0000, 0032, and 0064.

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3. Use Modbus Poll and the gateway to connect and read/write data with the following configuration:

**Note:** The gateway acts as Modbus TCP Server, use Modbus Clinet to connect with the gateway, support 04/03 function code (configured in software) to read data from HART device, support 06/16 function code (preset single/multiple registers) to write data to HART device, 03/04 function code can read the data written back to HART device.

|                                                       |                                              |
|-------------------------------------------------------|----------------------------------------------|
| Function Code of Modbus TCP Client Reading Data       | 04 Read Input Data, 03 Read Back Output Data |
| Starting Address of Read-Only Register (Input Data)   | 04 Read Input Data, 03 Read Back Output Data |
| Starting Address of Read/Write Register (Output Data) | 03 Read Input Data, 04 Read Back Output Data |

# GT200-HT-EI HART/EtherNet Gateway User Manual

Read/Write Definition

Slave ID:

Function: 04 Read Input Registers (3x)

Address mode  
☒ Dec ☐ Hex

Address:  PLC address = 30001

Quantity:

Scan Rate:  [ms]

Disable  
☐ Read/Write Disabled  
☐ Disable on error

View  
Rows  
☒ 10 ☐ 20 ☐ 50 ☐ 100 ☐ Fit to Quantity  
☒ Hide Name Columns ☐ PLC Addresses (Base 1)  
☐ Address in Cell ☐ Enron/Daniel Mode

OK Cancel Apply Read/Write Once

Read/Write Definition

Slave ID:

Function: 03 Read Holding Registers (4x)

Address:  Protocol address. E.g. 40011 -> 10

Quantity:

Scan Rate:  [ms]

Disable  
☐ Read/Write Disabled  
☐ Disable on error

View  
Rows  
☒ 10 ☐ 20 ☐ 50 ☐ 100 ☐ Fit to Quantity  
☐ Hide Alias Columns ☐ PLC Addresses (Base 1)  
☐ Address in Cell ☐ Enron/Daniel Mode

OK Cancel Apply Read/Write Once

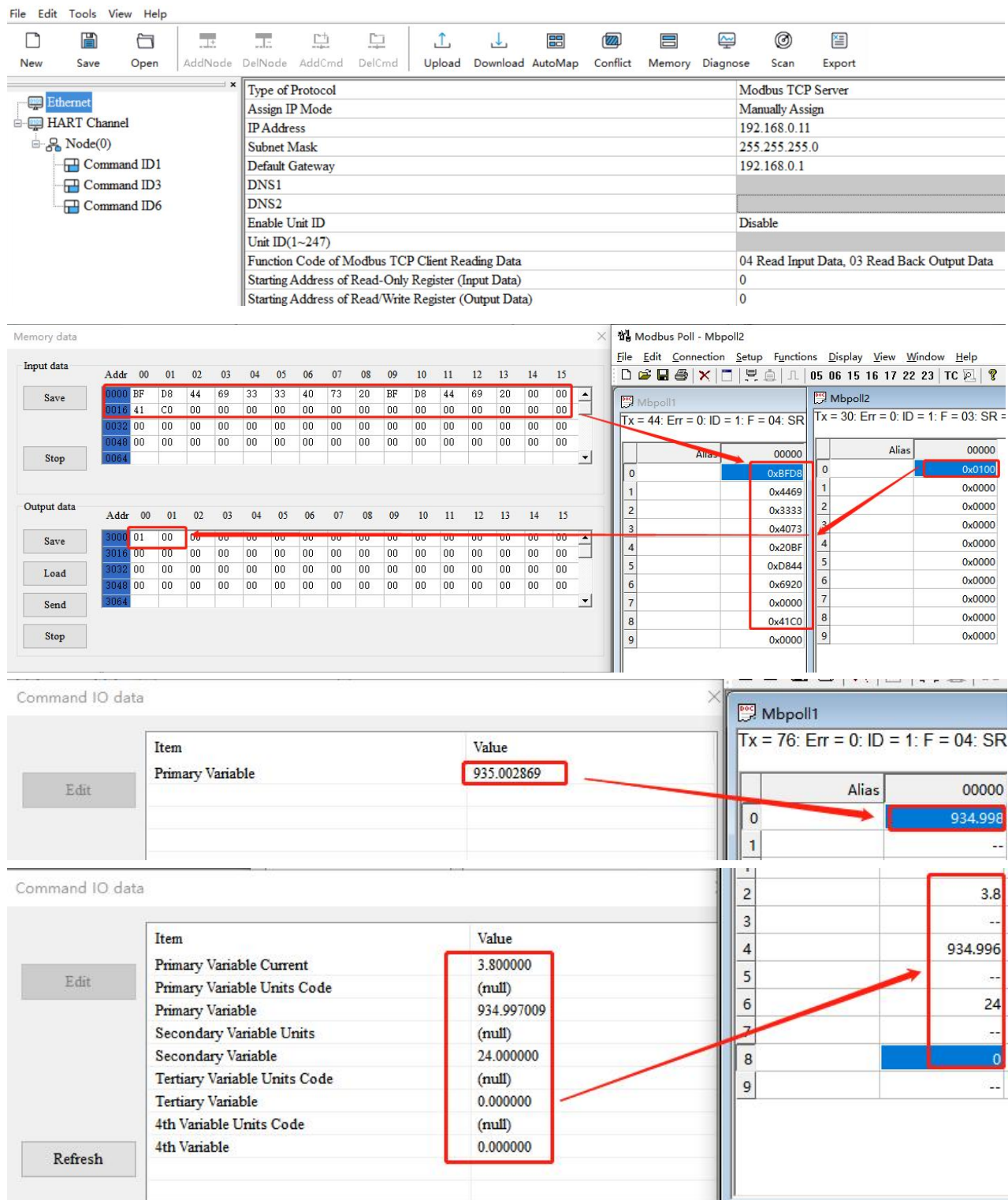
# GT200-HT-EI

## HART/EtherNet Gateway

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4. Use Modbus POLL to read data (3x0001-3x0010) and write data via 4x0001. The data in the gateway buffer

can be viewed in  **Memory** (refer to [Chapter 5.5.4](#)) and the actual floating-point data of the HART device can be viewed via  **Diagnose** (refer to [Chapter 5.5.5](#)).



The screenshot displays the SSTAutomation software interface, which is used for configuring and monitoring the GT200-HT-EI HART/EtherNet Gateway. The interface is divided into several sections:

- Modbus Configuration:** This section shows the settings for the Modbus TCP Server. Key parameters include:
  - Type of Protocol: Modbus TCP Server
  - Assign IP Mode: Manually Assign
  - IP Address: 192.168.0.11
  - Subnet Mask: 255.255.255.0
  - Default Gateway: 192.168.0.1
  - DNS1, DNS2: (Empty)
  - Enable Unit ID: Disable
  - Unit ID(1~247): (Empty)
  - Function Code of Modbus TCP Client Reading Data: 04 Read Input Data, 03 Read Back Output Data
  - Starting Address of Read-Only Register (Input Data): 0
  - Starting Address of Read/Write Register (Output Data): 0
- Memory data:** This section displays the input and output data registers. The input data table shows addresses 0000 to 0064, with values ranging from 00 to FF. The output data table shows addresses 0000 to 0064, with values ranging from 00 to FF. Red boxes highlight specific data points, and red arrows indicate the flow of data between the memory and the command IO data sections.
- Command IO data:** This section displays the command IO data. It includes a table with columns for Item and Value. The values are:
  - Primary Variable: 935.002869
  - Primary Variable Current: 3.800000
  - Primary Variable Units Code: (null)
  - Primary Variable: 934.997009
  - Secondary Variable Units: (null)
  - Secondary Variable: 24.000000
  - Tertiary Variable Units Code: (null)
  - Tertiary Variable: 0.000000
  - 4th Variable Units Code: (null)
  - 4th Variable: 0.000000