

I. QUICK GUIDE

1. Introduction

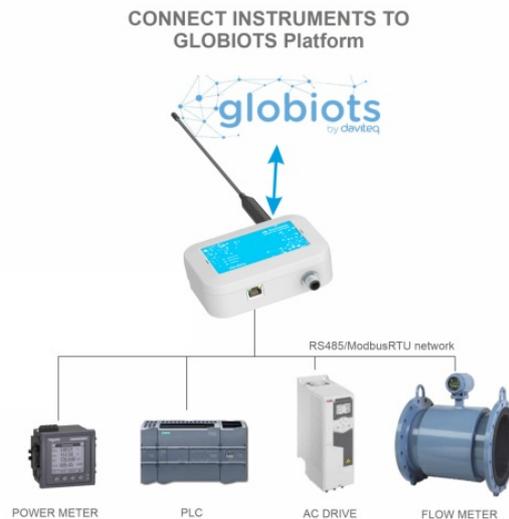
1.1 Introduction

STHC is a Smart IoT Gateway, aka iConnector, a main component in any IoT application. iConnector has a role to connect the real World's things like sensors, meters, machines...to server system for data logging, data analytics, monitoring & controls...iConnector support multiple Industrial Fieldbus like Modbus RTU, EthernetIP, Wireless sensor network...It connects to server system via LAN/WAN as Ethernet, WiFi or Cellular.



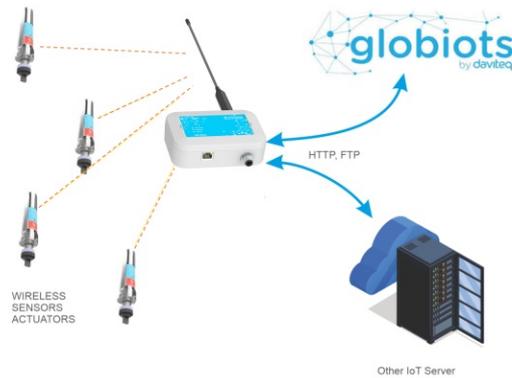
1.2 System architecture

1.2.1. Connect instruments to GLOBIOTS Platform



1.2.2. Connect wireless sensor to GLOBIOTS Platform

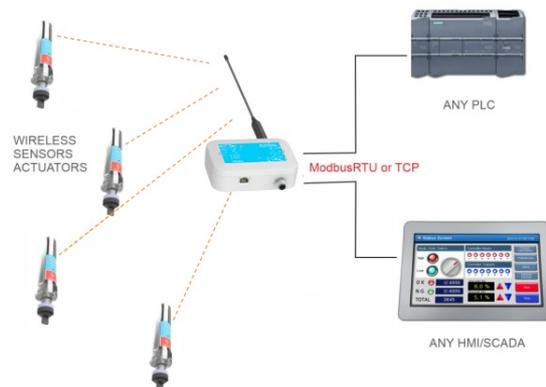
CONNECT WIRELESS SENSORS TO GLOBIOTS Platform



STHC-ISG02DB-WS433-CL-04-H2.PNG

1.2.2. Connect wireless sensor to any PLC or HMI/SCADA

CONNECT WIRELESS SENSORS TO any PLC or HMI/SCADA



STHC-ISG02DB-WS433-CL-04-H4.PNG

2. Application note

- **Typical Application:** Energy management, environment monitoring, smart building, smart factory,...
- **Multi-Protocol Support:** Modbus RTU/TCP, EthernetIP, Sub-GHz
- **Flexible Connectivity:** Ethernet, WiFi, Cellular (3G/4G)
- **Features:** Automatically collect parameters and energy data; Unified and centralized management of all energy types in a single system; Many prominent features, such as users grouping and management, data visualization, and automatic reporting; Flexible investment options and easy system expansion.

3. iConnector communication

3.1. Slave device communication

3.1.1. Modbus RTU Master

In this function, iConnector work as a Modbus RTU Master. It can poll for data from and write data to external Modbus Slaves connected to it through RS485 physical protocol.

3.1.2. Wireless co-ordinator

Thanks to the wireless co-ordinator has been integrated in the iConnector, it is able to connect with any Daviteq Sub-GHz devices. By the Sub-GHz technology from Texas Instruments, it is easy to establish multiple networks in same area without interference or channel conflict. One co-ordinator can handle maximum of 40 end nodes in its network. Prefer the link below to reach more detail information of this function

3.2 Host communication

The iConnector are designed to connect to Daviteq Platform, aka Vizuo Globiots. Vizuo Globiots is a web-based software application to remotely configure device, parameter, alarm and event. In addition, Vizuo displays current values, historical values of parameters as well as events, alarms. Values of parameter are stored on database of GLOBIOTS server.

In additional, iConnector is able to send data to any servers via common protocols such as HTTP, FTP, UDP/IP,...

Refer **Section 10. How to connect device to Back-end/ Server** to see more detail instruction.

4. Default Configuration

4.1. UDP Server

The iConnection was configured to connect to Daviteq's platform

| Parameters | Default value |
|-------------------|-------------------------|
| UDP_SERVER_HOST | dataengine.globiots.com |
| UDP_SERVER_PORT | 9000 |
| DRM_TIMEOUT (sec) | 20 |
| TIME_ZONE | 7 |

4.2. Main network

In default mode, the iConnector connects to server through WIFI. Refer section **xx.xx** to see how to change the network mode.

4.3. Wireless co-ordinator

| Parameters | Default value |
|-----------------|---------------|
| Modbus address | 1 |
| Modbus baudrate | 9600 bps |
| Modbus parity | none |
| Radio frequency | 433.92 MHz |
| Tx power | 15 dBm |
| Data rate RF | 50 kbps |

5. Battery/ Power Supply

iConnectors are powered via M12 Male connector. The power supply range is 7..48VDC, avg 200mA, peak 1.5A

Detail wiring instruction, please refer section 8. Installation and wiring.

6. What's in the Package?

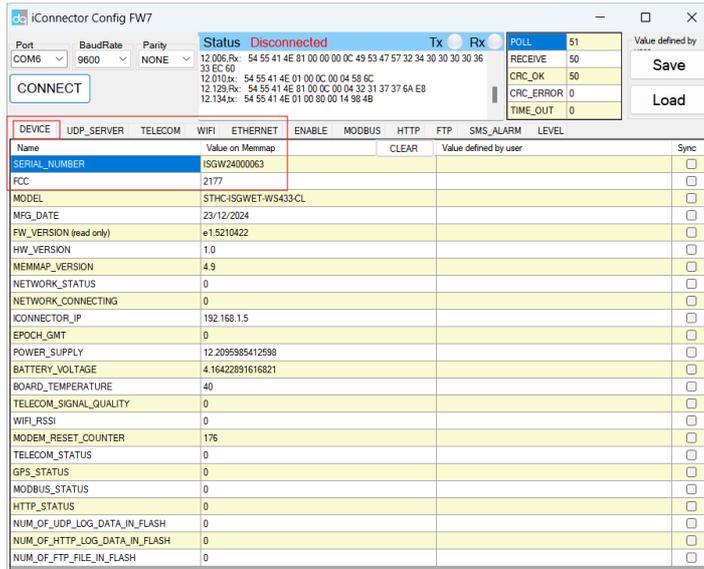
7. Guide for Quick Test

7.1. Connecting the iConnector to the Daviteq Platform

Refer section x.xx to see how to use the iConfig software

Step 1: Configure the iConnector via iConfig software

- Get basic information of the iConnector to register it into Daviteq Platform including **Serial number & FCC**



- Setup network information in order that the iConnector can go online in the internet. Base on your application, you should configure wifi or ethernet information.

WIFI mode

In this mode, there are three parameters must be configured, including MAIN_NETWORK , WIFI_NAME, WIFI_PASSWORD

| Parameters | Description |
|---------------|----------------------------------|
| MAIN_NETWORK | 1: WIFI mode 2: ETHERNET mode |
| WIFI_NAME | Wifi name of WIFI network |
| WIFI_PASSWORD | Password of WIFI network |

iConnector Config FW7

Port: COM6, BaudRate: 9600, Parity: NONE

Status: **Connected** Tx Rx

43.462.tx: 54 55 41 4E 01 03 4E 00 04 F8 3C
 43.577.Rx: 54 55 41 4E 81 03 4E 00 04 FF FF FF 41 FC
 43.593.tx: 54 55 41 4E 01 03 52 00 01 F9 F9
 45.192.TIME_OUT
 45.202.tx: 54 55 41 4E 01 03 54 00 01 19 F8

| | |
|-----------|------|
| POLL | 1779 |
| RECEIVE | 1721 |
| CRC_OK | 1705 |
| CRC_ERROR | 16 |
| TIME_OUT | 57 |

Value defined by: Save Load

DEVICE UDP_SERVER TELECOM **WIFI** ETHERNET ENABLE MODBUS HTTP FTP SMS_ALARM LEVEL

| Name | Value on Memmap | CLEAR | Value defined by user | Sync |
|------------------------------------|-----------------|-------|-----------------------|--------------------------|
| WIFI_NAME | DAV-Guest | | | <input type="checkbox"/> |
| WIFI_PASSWORD | Dvt@1977 | | | <input type="checkbox"/> |
| WIFI_STATIC_IP | 255.255.255.255 | | | <input type="checkbox"/> |
| WIFI_GATEWAY | 255.255.255.255 | | | <input type="checkbox"/> |
| WIFI_MAC_ADDRESS | 2A:B:4C:C8:5:20 | | | <input type="checkbox"/> |
| WIFI_DNS_SERVER | 255.255.255.255 | | | <input type="checkbox"/> |
| WIFI_DHCP_ENABLE | 255 | | | <input type="checkbox"/> |
| AUTO_RESET_POWER_ETH_WIFI | 0 | | | <input type="checkbox"/> |
| NETWORK_CONNECT_TIMEOUT (min) | 255 | | | <input type="checkbox"/> |
| MAIN_NETWORK_RECONNECT_CYCLE (min) | 255 | | | <input type="checkbox"/> |
| MAIN_NETWORK | 1 | | | <input type="checkbox"/> |
| SUB_NETWORK | 255 | | | <input type="checkbox"/> |

ETHERNET mode

In this mode, there are five parameters should be configured, including MAIN_NETWORK , ETHERNET_STATIC_IP, ETHERNET_GATEWAY, ETHERNET_DNS_SERVER, ETHERNET_DHCP_ENABLE

| Parameters | Description |
|----------------------|--|
| MAIN_NETWORK | 1: WIFI mode 2: ETHERNET mode |
| ETHERNET_STATIC_IP | The static IP of Ethernet network use for iConnector. If running DHCP mode, ignore this parameter |
| ETHERNET_GATEWAY | The default gateway of Ethernet network use for iConnector. If running DHCP mode, ignore this parameter |
| ETHERNET_DNS_SERVER | The DNS server of Ethernet network use for iConnector. |
| ETHERNET_DHCP_ENABLE | 0 = DISABLE, 1 = ENABLE |

iConnector Config FW7

Port: COM6, BaudRate: 9600, Parity: NONE

Status: **Connected** Tx Rx

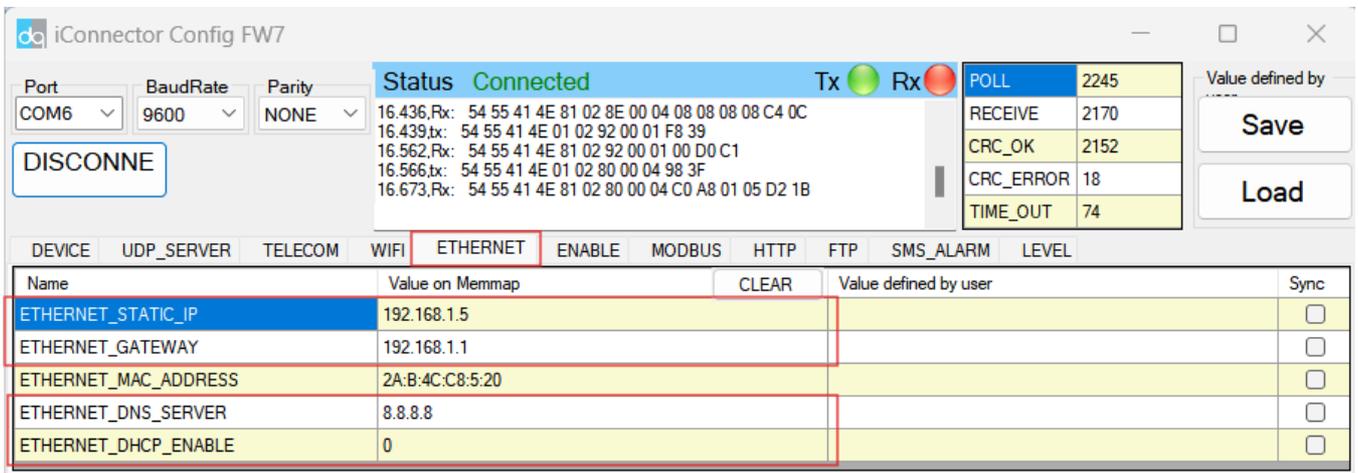
21.940.tx: 54 55 41 4E 01 03 40 00 04 99 FF
 22.080.Rx: 54 55 41 4E 81 03 40 00 04 FF FF FF AE 3C
 22.089.tx: 54 55 41 4E 01 03 44 00 04 D8 3E
 22.199.Rx: 54 55 41 4E 81 03 44 00 04 FF FF FF EB FC
 22.221.tx: 54 55 41 4E 01 03 48 00 06 99 FC

| | |
|-----------|------|
| POLL | 2123 |
| RECEIVE | 2053 |
| CRC_OK | 2035 |
| CRC_ERROR | 18 |
| TIME_OUT | 69 |

Value defined by: Save Load

DEVICE UDP_SERVER TELECOM **WIFI** ETHERNET ENABLE MODBUS HTTP FTP SMS_ALARM LEVEL

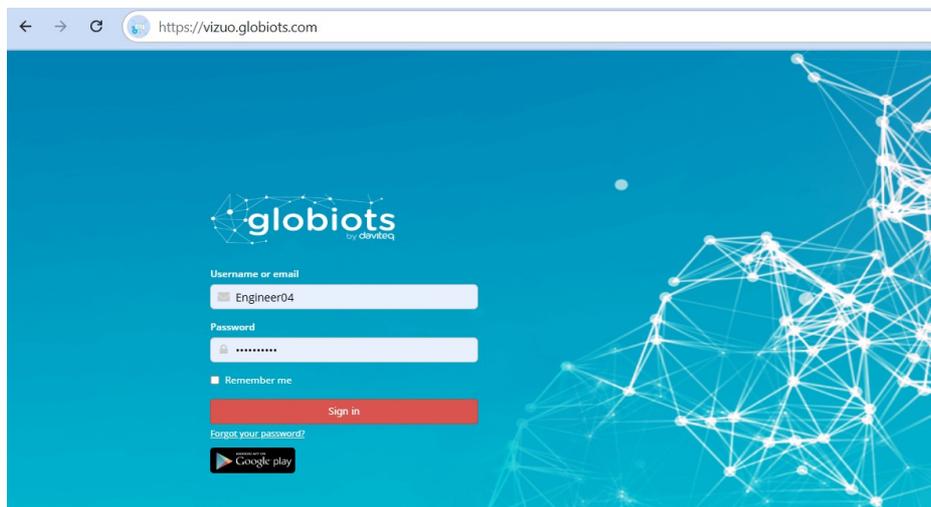
| Name | Value on Memmap | CLEAR | Value defined by user | Sync |
|------------------------------------|-----------------|-------|-----------------------|--------------------------|
| WIFI_NAME | DAV-Guest | | | <input type="checkbox"/> |
| WIFI_PASSWORD | Dvt@1977 | | | <input type="checkbox"/> |
| WIFI_STATIC_IP | 255.255.255.255 | | | <input type="checkbox"/> |
| WIFI_GATEWAY | 255.255.255.255 | | | <input type="checkbox"/> |
| WIFI_MAC_ADDRESS | 2A:B:4C:C8:5:20 | | | <input type="checkbox"/> |
| WIFI_DNS_SERVER | 255.255.255.255 | | | <input type="checkbox"/> |
| WIFI_DHCP_ENABLE | 255 | | | <input type="checkbox"/> |
| AUTO_RESET_POWER_ETH_WIFI | 0 | | | <input type="checkbox"/> |
| NETWORK_CONNECT_TIMEOUT (min) | 255 | | | <input type="checkbox"/> |
| MAIN_NETWORK_RECONNECT_CYCLE (min) | 255 | | | <input type="checkbox"/> |
| MAIN_NETWORK | 2 | | | <input type="checkbox"/> |
| SUB_NETWORK | 255 | | | <input type="checkbox"/> |



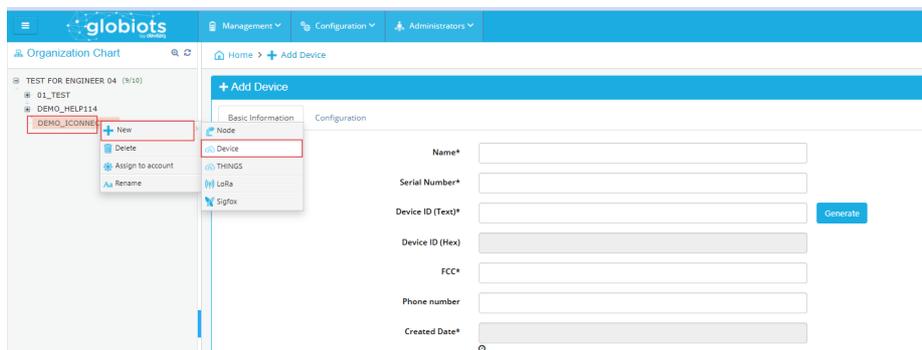
⚠ The parameter **MAIN_NETWORK** is located in the WIFI tab of the software, while other parameters are in the **ETHERNET** tab.

Step 2: Read data of iConnector from Daviteq Platform

- Access to Vizuo Globiots via the link <https://vizuo.globiots.com> and login to the system with the username and password supplied Daviteq.



- Register the iConnector into Globiots
 - **RIGHT-CLICK** on the corresponding site in the **Organization Chart** => **New=>Device**

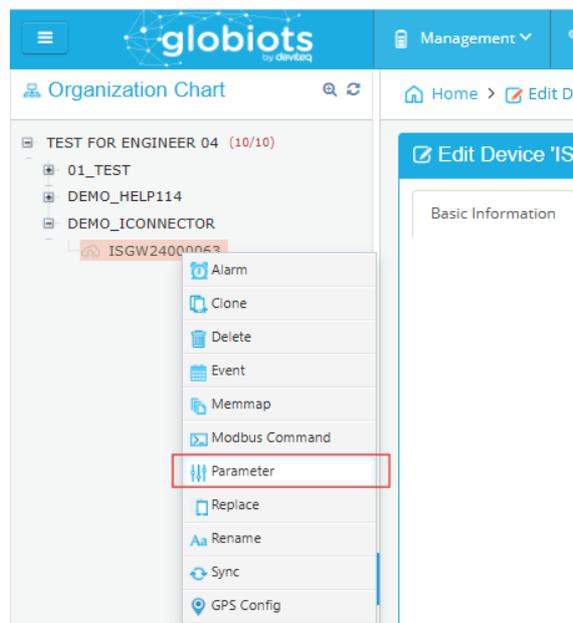


- There are some fields must be configured, including **Name, Serial number, Device ID, FCC, Memmap, Logging send frequency, Health send frequency**. After the fields were configured => Click **Save** button

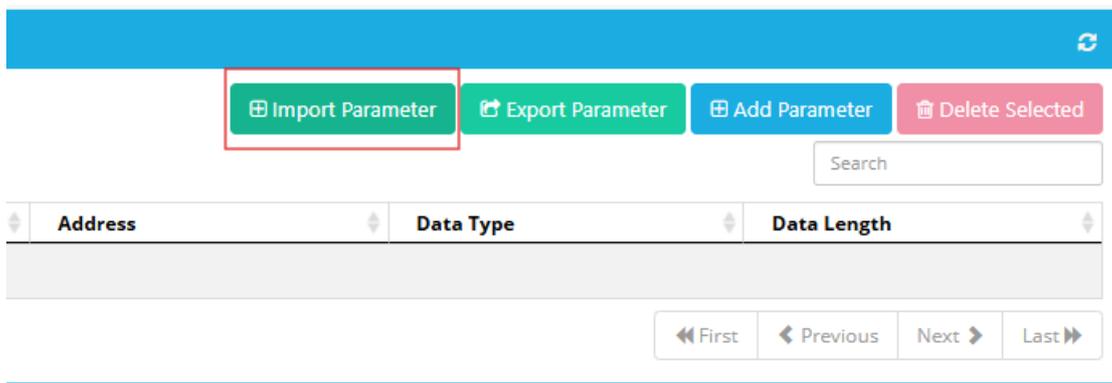
| Fields | Description |
|---------------|---|
| Name | Optional name, must be 12 characters |
| Serial number | Serial number of iConnector *Taken from step 1 |

| | |
|------------------------|--|
| Device ID | Click Generate button in the software |
| FCC | FCC of iConnector *Taken from step 1 |
| Memmap | Choose SUB-GHZ VIEW 2 |
| Logging send frequency | Choose 3 minutes |
| Health send frequency | Choose 5 minutes |

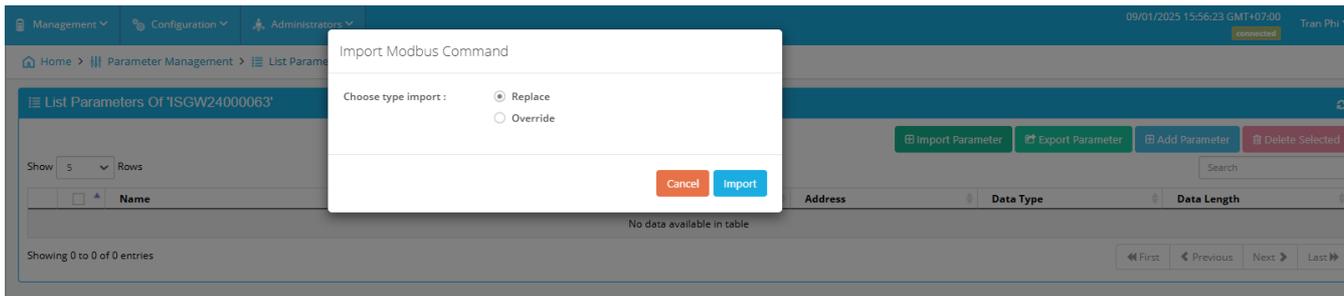
- Add parameter to read data from the iConnector
 - Download the parameter file in link **XXXXX**
 - Right-click on the device=>**Parameter**



- Click **Import Parameter** button

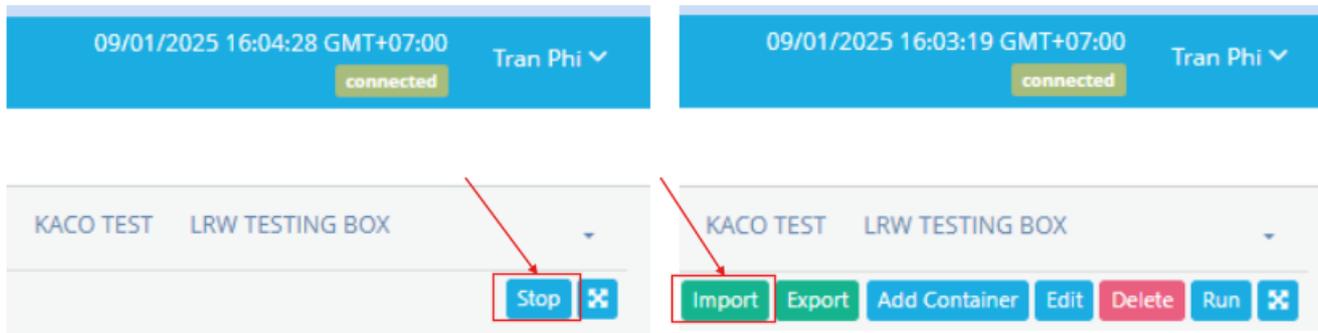


- Choose the parameter file=> Tick **Replace** option=> Click **Import** button

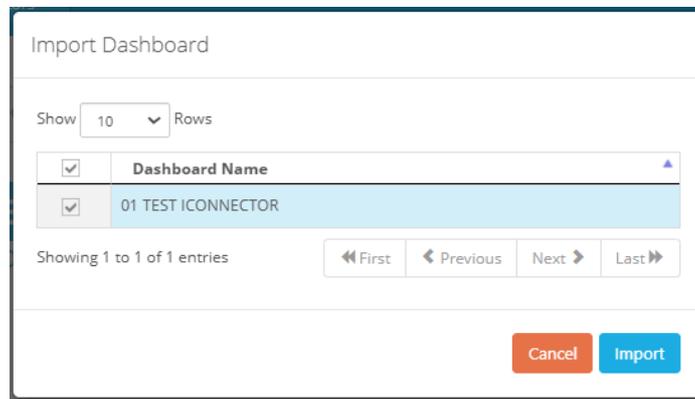


Refer the link below to see more detail of parameter configuration
<https://daviteq.com/en/manuals/books/user-guides-for-vizuo-software-on-web/page/vizuo-software-on-web#bkmrk-5.4-configure-parame>

- Add basic dashboard to show data of the iConnector
 - Download the dashboard file in link **xxxxx**
 - In Home screen, select **Management** => select sub-menu **Dashboard**
 - Click **Stop** button=> Click **Import** button



- Choose the Dashboard file=> Tick **01 TEST ICONNECTOR** => Click **Import** button



7.2. Read data of Wireless sensors from Globiots

Make sure the process in section 7.1 was completed successfully.

Step 1: Add Sub-GHz sensor to the iConnector

- Open software=> import template

- Install the batteries to the wireless sensor, then touch the sensor to the iConnector'antenna. If the iConnector sound "beep", it mean the paring process is successful.

Step 2: Read data from Daviteq Platform

- Create the parameter

- Create the modbus command

- Add the basic dashboard to show data

7.3. Read data of Modbus slave from Globiots

⚠ Make sure the process in section 7.1 was completed successfully.

Step 1: Establish the RS485 network among iConnector and modbus slaves

- wiring

- get modbus information of slave devices

Step 2: Read data from Daviteq Platform

- Create the parameter

- Create the modbus command

- Add the basic dashboard to show data

7.4. Modbus TCP/IP converter function

Principle Flow of this function as below

- iConnector is connected to the Modbus RTU slave as with electric meters, devices, ... via RS485 port;
- Software / device / PLC ... with Modbus TCP Client connected to iConnector (role as TCP Server)
- TCP Client sends command to iConnector;
- iConnector transfers commands from Modbus TCP to RTU and sends to devices via RS485 port;
- iConnector waits for the devices to respond;
- iConnector transfers the response from the RTU to the Modbus TCP and then sends it back to the TCP Client;
- TCP Client actively closes the connection if it no longer sends command to iConnector.

Step 1: Configure the iConnector via iConfig software

• **Configure the iConnector at Ethernet tab**

iConnector Config FW7

Port: COM6, BaudRate: 9600, Parity: NONE

Status: **Connected** Tx (Green) Rx (Red)

35.094.tx: 54 55 41 4E 01 02 88 00 06 98 3C
 35.206.Rx: 54 55 41 4E 81 02 88 00 06 2A 0B 4C C8 05 21 CF A3
 35.214.tx: 54 55 41 4E 01 02 8E 00 04 F9 FC
 35.335.Rx: 54 55 41 4E 81 02 8E 00 04 08 08 08 C4 0C
 35.344.tx: 54 55 41 4E 01 02 92 00 01 F8 39

| | |
|-----------|-----|
| POLL | 426 |
| RECEIVE | 420 |
| CRC_OK | 419 |
| CRC_ERROR | 1 |
| TIME_OUT | 5 |

Value defined by: Save, Load

DISCONNECT

| DEVICE | UDP_SERVER | TELECOM | WIFI | ETHERNET | ENABLE | MODBUS | HTTP | FTP | SMS_ALARM | LEVEL |
|----------------------|-----------------|---------|-------|-----------------------|--------|--------------------------|------|-----|-----------|-------|
| Name | Value on Memmap | | CLEAR | Value defined by user | | Sync | | | | |
| ETHERNET_STATIC_IP | 192.168.1.30 | | | | | <input type="checkbox"/> | | | | |
| ETHERNET_GATEWAY | 192.168.1.1 | | | | | <input type="checkbox"/> | | | | |
| ETHERNET_MAC_ADDRESS | 2A:B:4C:C8:5:21 | | | | | <input type="checkbox"/> | | | | |
| ETHERNET_DNS_SERVER | 8.8.8.8 | | | | | <input type="checkbox"/> | | | | |
| ETHERNET_DHCP_ENABLE | 0 | | | | | <input type="checkbox"/> | | | | |

| Name | Description |
|------------|--|
| IP | Static IP configuration for iConnector. Example: 192.168.1.30 |
| Gateway | Configure gateway |
| DNS Server | Configure DNS Server |
| DHCP | Configure to 0 , it's mean Not using DHCP → Static IP |

• **Configure the iConnector at Modbus tab**

iConnector Config FW7

Port: COM6, BaudRate: 9600, Parity: NONE

Status: **Disconnected** Tx (Grey) Rx (Grey)

37.797.tx: 54 55 41 4E 01 08 03 00 01 AA 0C
 37.928.Rx: 54 55 41 4E 81 08 03 00 01 00 64 3C
 37.933.tx: 54 55 41 4E 01 08 05 00 02 0A 0C
 38.052.Rx: 54 55 41 4E 81 08 05 00 02 03 E8 45 55
 38.055.tx: 54 55 41 4E 01 08 07 00 04 2B CE

| | |
|-----------|-----|
| POLL | 876 |
| RECEIVE | 870 |
| CRC_OK | 869 |
| CRC_ERROR | 1 |
| TIME_OUT | 5 |

Value defined by: Save, Load

CONNECT

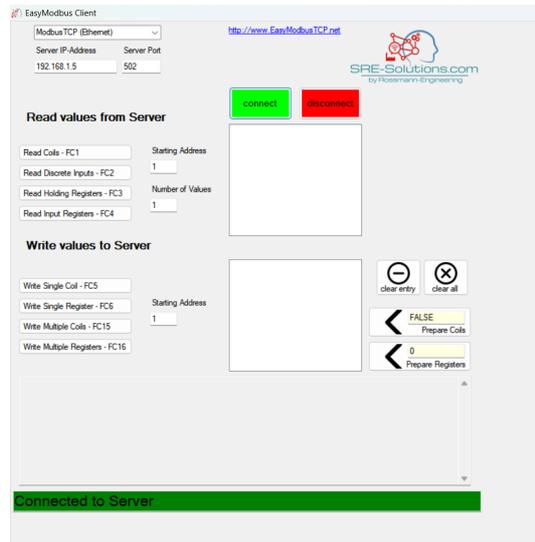
| DEVICE | UDP_SERVER | TELECOM | WIFI | ETHERNET | ENABLE | MODBUS | HTTP | FTP | SMS_ALARM | LEVEL |
|---|-----------------|---------|-------|-----------------------|--------|--------------------------|------|-----|-----------|-------|
| Name | Value on Memmap | | CLEAR | Value defined by user | | Sync | | | | |
| MODBUS_BAUD_RATE (0 = '4800', 1 = '9600',...) | 1 | | | | | <input type="checkbox"/> | | | | |
| MODBUS_PARITY (0 = NONE, 1= ODD, 2 = E...) | 0 | | | | | <input type="checkbox"/> | | | | |
| MODBUS_TIMEOUT (ms) | 1000 | | | | | <input type="checkbox"/> | | | | |
| MODBUS_POLL_CYCLE (sec) | 1 | | | | | <input type="checkbox"/> | | | | |
| MB_TCP_SERVER_PORT | 502 | | | | | <input type="checkbox"/> | | | | |
| MB_TCP_SERVER_ENABLE_TRANSPAREN... | 1 | | | | | <input type="checkbox"/> | | | | |
| MB_TCP_SERVER_TIMEOUT_RS485 (ms) | 1000 | | | | | <input type="checkbox"/> | | | | |

| Name | Description |
|----------------------------------|--|
| MODBUS_BAUD_RATE | Configure the modbus baudrate to 9600 bps |
| MODBUS_PARITY | Configure the parity to none |
| MODBUS_TIMEOUT | Configure the modbus timeout to 1000 ms |
| MODBUS_POLL_CYCLE | Configure the modbus poll cycle to 1s |
| MB_TCP_SERVER_PORT | Configure the receiving port to 502 |
| MB_TCP_SERVER_ENABLE_TRANSPARENT | Configure to 1 : To run transparent, interrupt modbus RTU poll. |

Step 2: Read data of iConnector from TCP/IP Client software

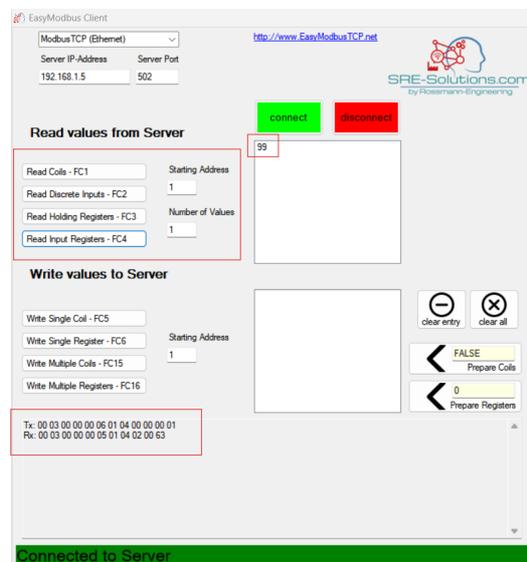
i In this guide, we use Easy Modbus Client software. You can use any other Modbus TCP/IP client software

- Connect the iConnector to the PC via LAN cable.
- Connect the Modbus RTU slave to the iConnector via RS485 cable.
- Power on the devices
- In TCP/IP Client software, input correct Server IP Address and Port that configured in step 1. Then, click Connect button. If the status at the bottom show "Connected to server", it means the successful connection.



w Ensure that the IP address of the PC is configured within the same subnet as the TCP/IP server address set on the iConnector in Step 1.

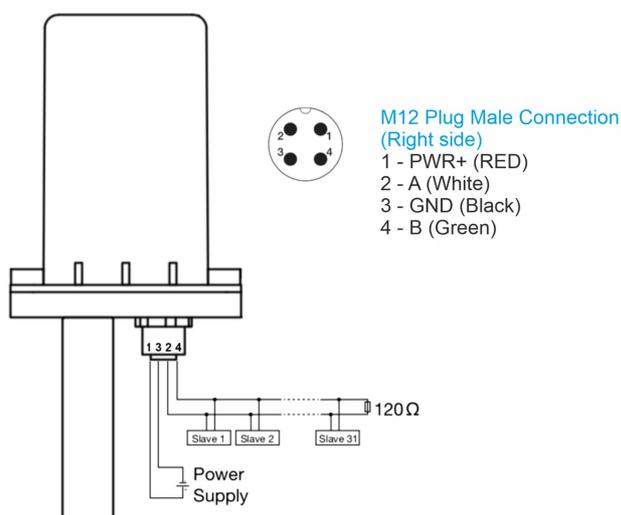
- Read a parameter base on the modbus memory map of slave device. For example, read a register 30001 of the Modbus slave



8. Installation and wiring

8.1. Installation and wiring for iConnector

PIN ASSIGNMENT & WIRING



STHC-ISG02DB-WS433-CL-04-H5.PNG

8.2 Installation and wiring for wired slave device

8.3 Installation and wiring for wireless sensor

8.4 Installation and wiring for host Modbus TCP/IP

Connect the iConnector with TCP/IP client via the LAN cable.

9. Payload Document and Configuration Tables

10. How to connect device to Back-end/ Server

10.1 How to connect device to Globiots platform

10.2 How to connect device to http server

10.3 How to connect device to Modbus TCP/IP server (only for ...with Ethernet connection)

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