Manual of STHC-ISGWET-WS433-CL-04 | FW8

I. QUICK GUIDE

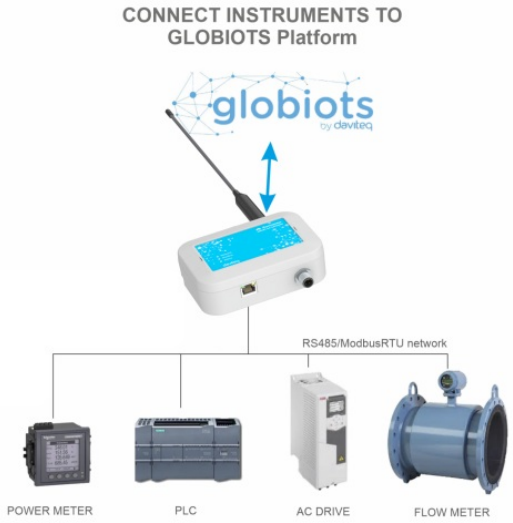
1. Introduction

1.1 Introduction

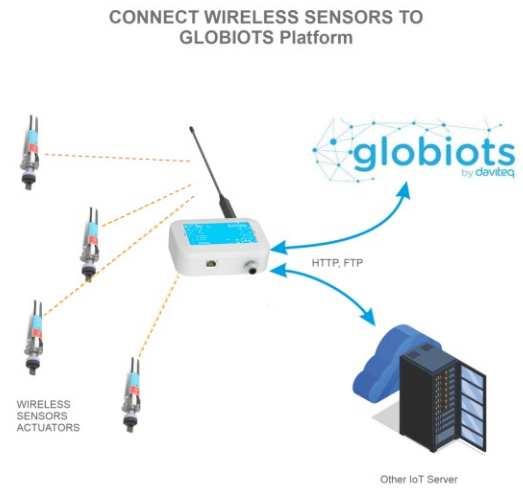
STHC-WET is a Smart IoT Gateway, aka iConnector, a main component in any IoT application. iConnector has a role to connect the real World's things like sensors, meters, machines...to server system for data logging, data analytics, monitoring & controls...iConnector support multiple Industrial Fieldbus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

1.2 System architecture

1.2.1. Connect instruments to GLOBIOTS Platform

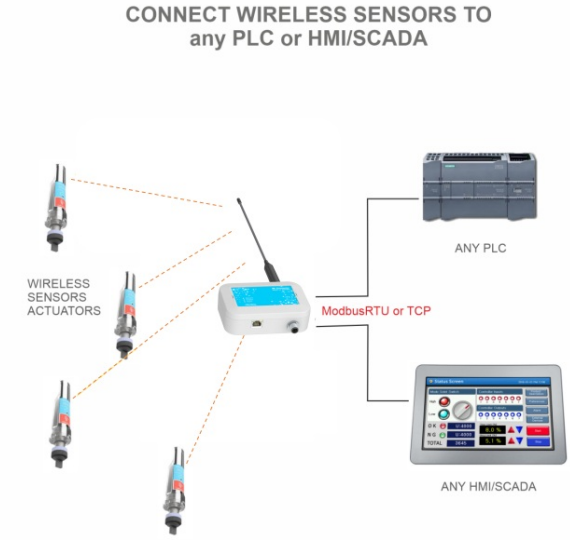


1.2.2. Connect wireless sensor to GLOBIOTS Platform



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

1.2.2. Connect wireless sensor 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
- **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

> Long Range Wireless Co-ordinator WS433-CL manual

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**7.1** to see how to change the network mode.

4.3. Wireless co-ordinator

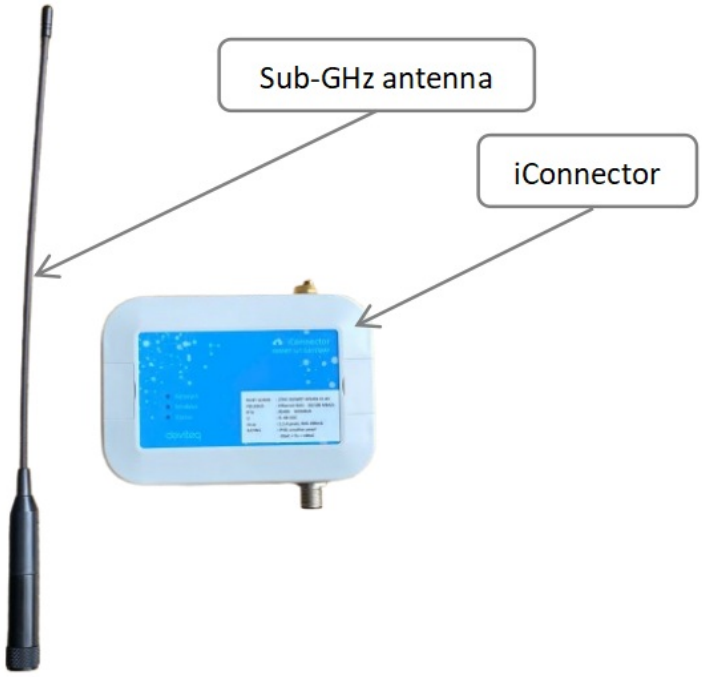
Parameters	**Default value**
Modbus address	1
Modbus baudrate	9600 bps
Modbus parity	none
Radio frequency	433.92 MHz
Tx power	15 dBm
Data rate RF	50 kbps

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?



> **The packages include:**
> 01 x iConnector
> 01 x Sub-GHz antenna

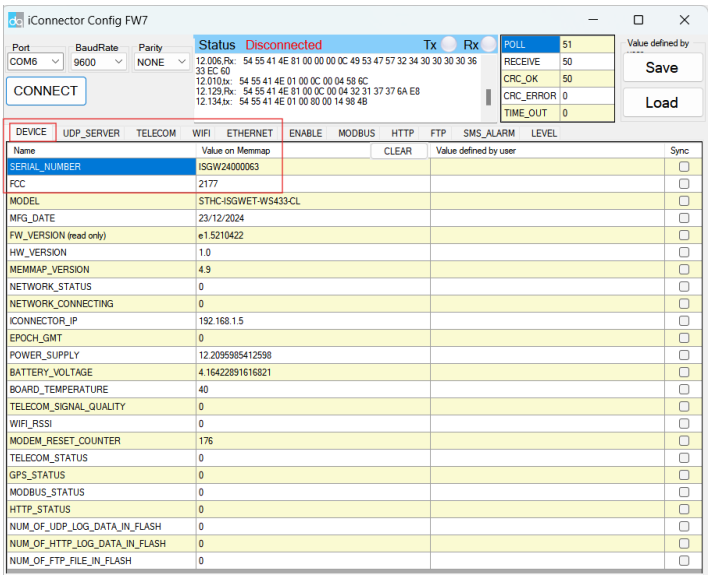
7. Guide for Quick Test

7.1. Connecting the iConnector to the Daviteq Platform

> Refer section **3.2.2 Offline configuration** 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**

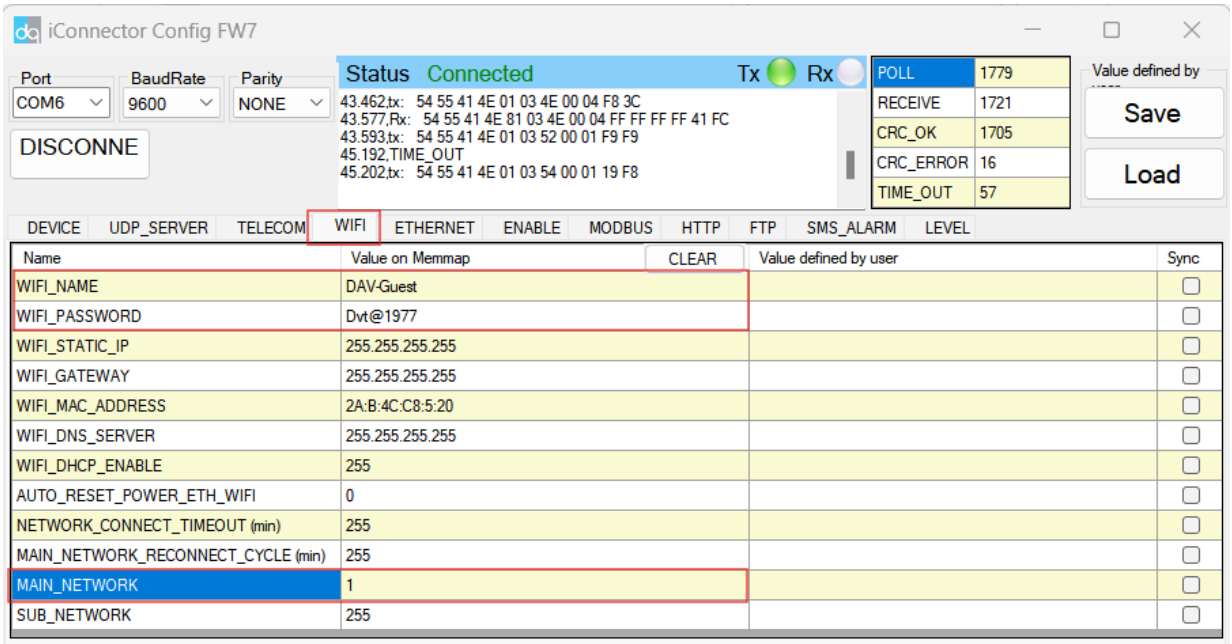


- Setup network information in order that the iConnector can go online in the internet. Base on your application, you should configure wifi or ethernet information.

WIFI mode

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

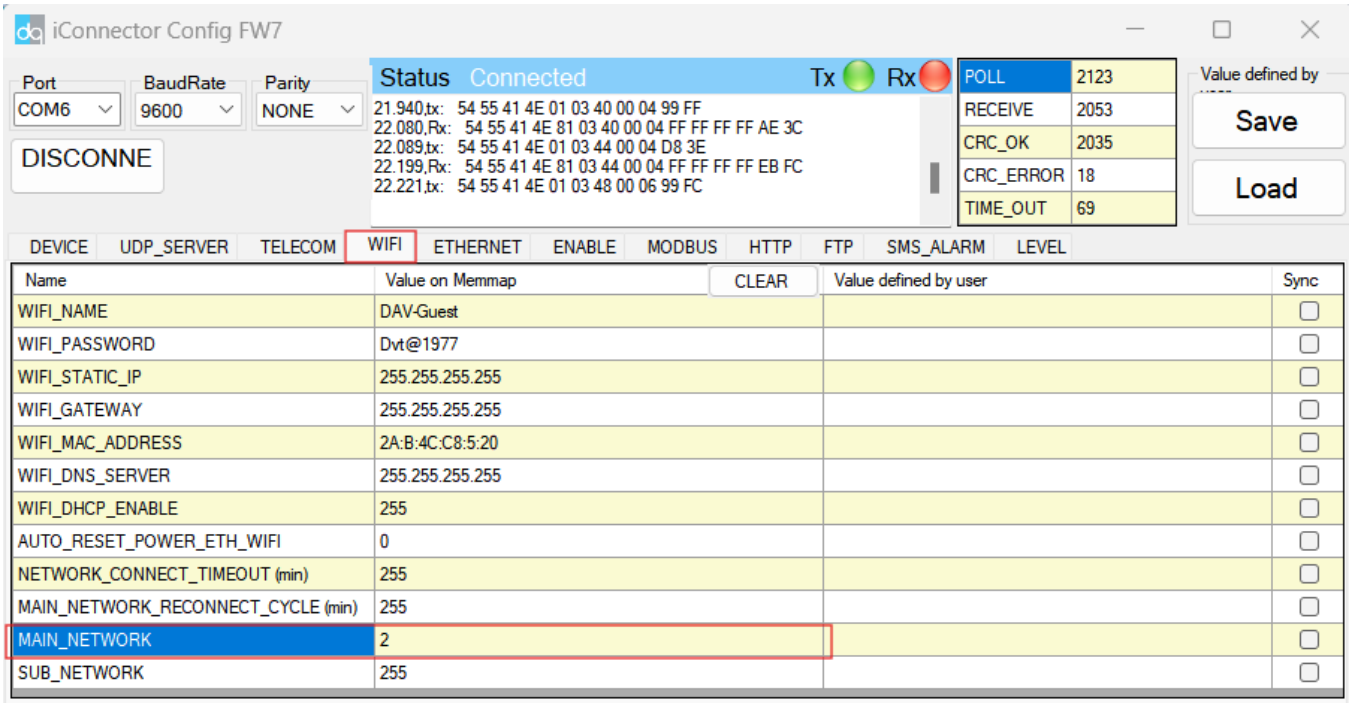
Parameters	Description
MAIN_NETWORK	1: WIFI mode 2: ETHERNET mode
WIFI_NAME	Wifi name of WIFI network
WIFI_PASSWORD	Password of WIFI network

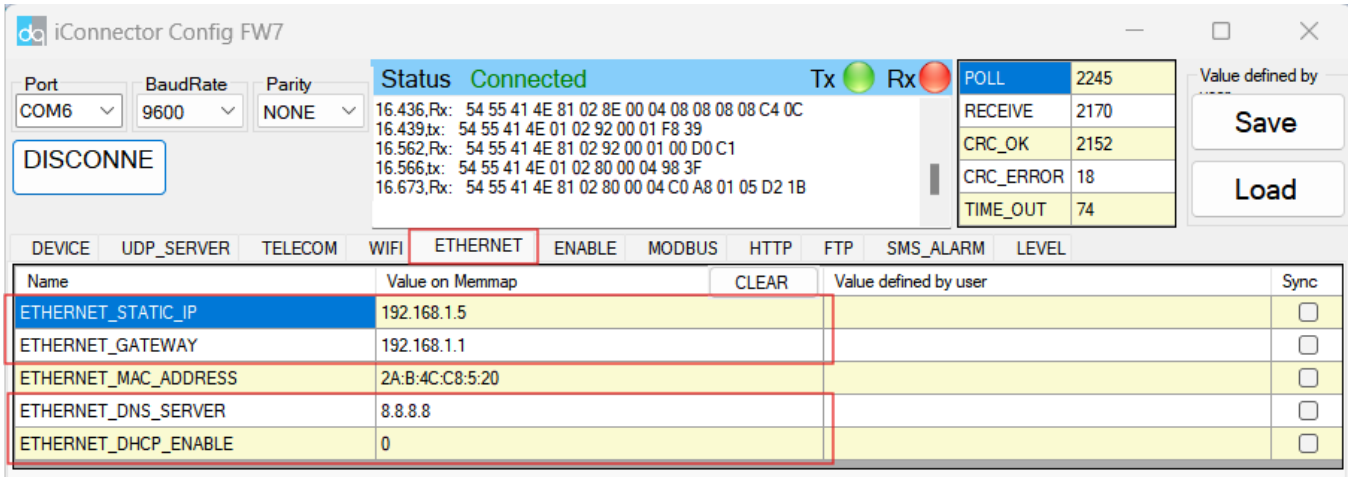


ETHERNET mode

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

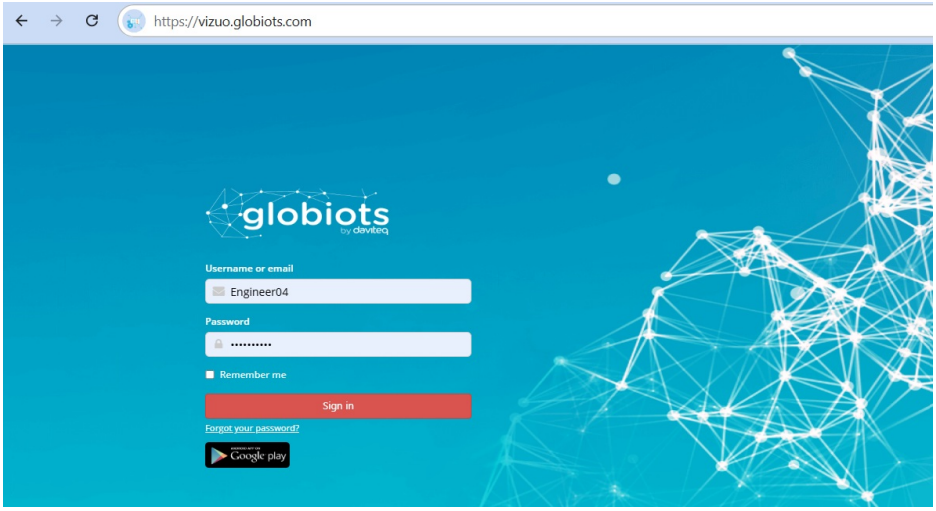




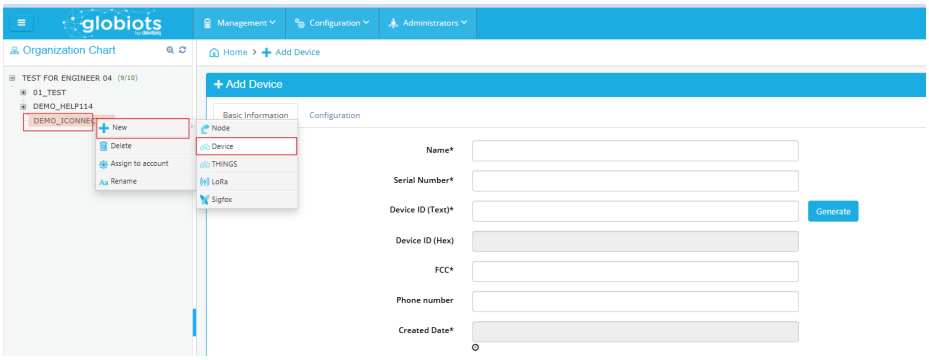
⚠ The parameter **MAIN_NETWORK** is located in the WIFI tab of the software, while other parameters are in the **ETHERNET** tab.

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.

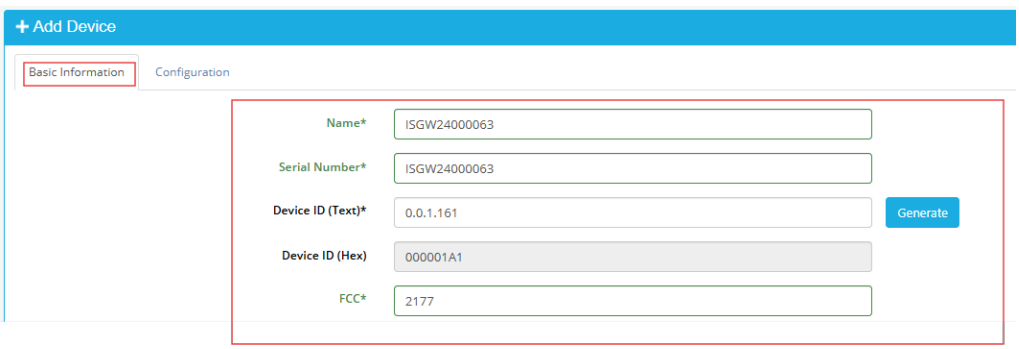


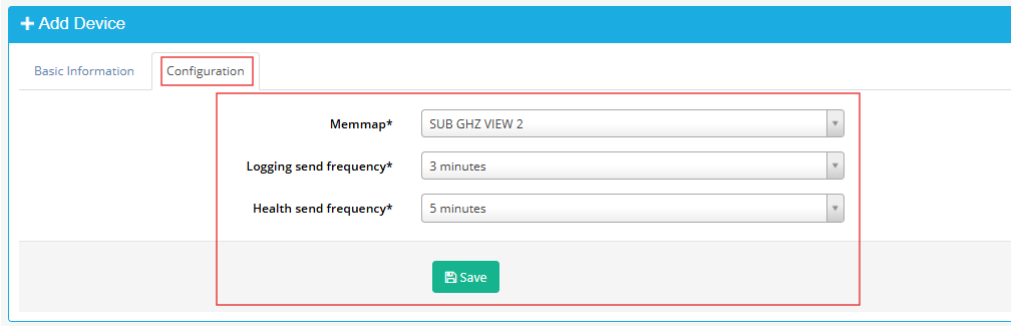
- Register the iConnector into Globiots
  - **RIGHT-CLICK** on the corresponding site in the ***Organization Chart*** => ***New***=>***Device***



  - 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

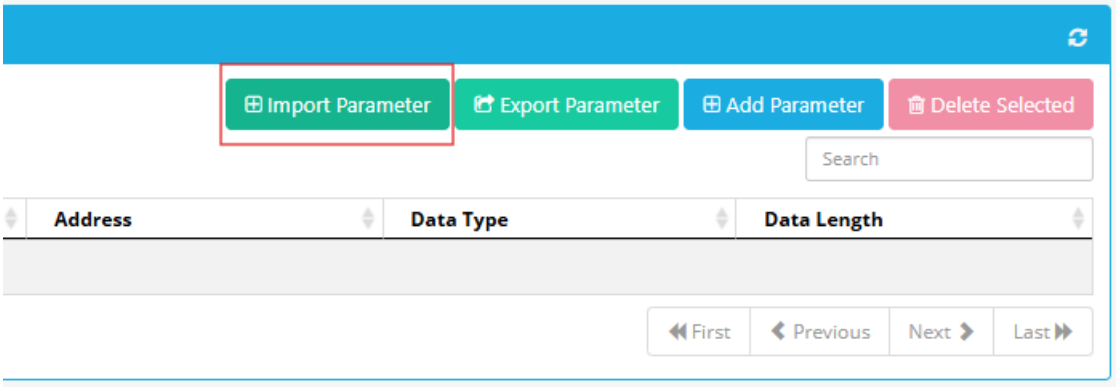
Fields	**Description**
Name	Optional name, must be 12 characters
Serial number	Serial number of iConnector **Taken from step 1*
Device ID	Click ***Generate*** button in the software
FCC	FCC of iConnector **Taken from step 1*
Memmap	Choose ***SUB-GHZ VIEW 2***
Logging send frequency	Choose ***3 minutes***
Health send frequency	Choose ***5 minutes***



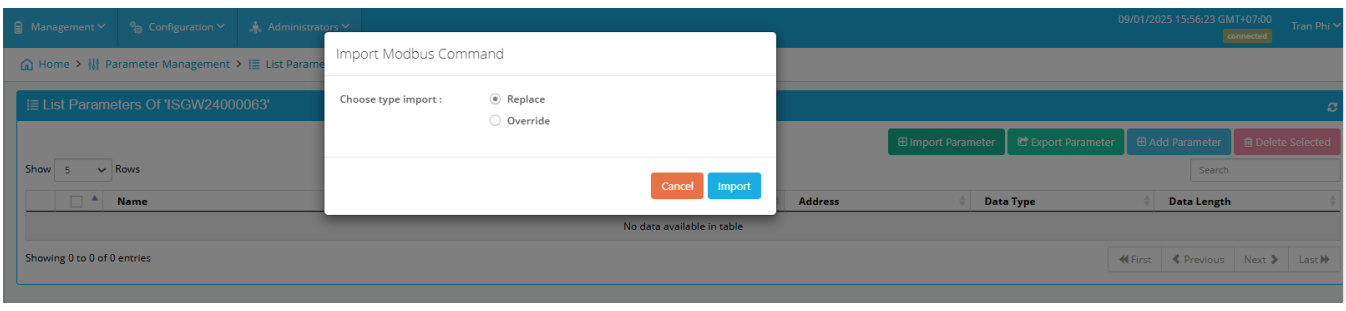


- Add parameter to read data from the iConnector
  - Download the parameter file in link
  - Right-click on the device=>***Pararameter***

  - Click ***Import Parameter*** button

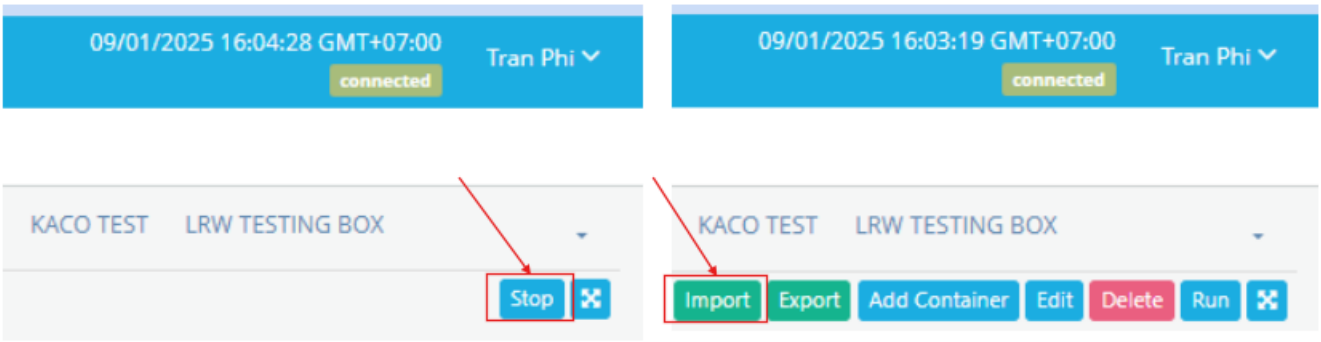


  - Choose the parameter file=> Tick ***Replace*** option=> Click ***Import*** button

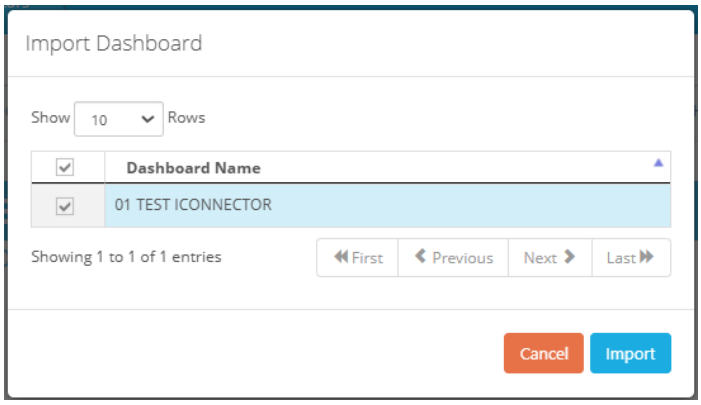


Refer the link below to see more detail of parameter configuration
https://daviteq.com/en/manuals/books/user-guides-for-vizuo-software-on-web/page/vizuo-software-on-web#bkmrk-5.4-configure-parame

- Add basic dashboard to show data of the iConnector
  - Download the dashboard file in the link
  - 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

Refer Section **5.1 Add sensors node to Co-ordinator WS433-CL** in **the link**

Step 2: Read data from Daviteq Platform

Refer section **5. Configure Device** of the Globiots manual in **the link** to get the instruction of configurating the iConnector in Globiots

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

Step 2 : Get modbus information of slave devices

Step 3: Read data from Daviteq Platform

> Refer section **5. Configure Device** of the Globiots manual in **the link** to get the instruction of configurating the iConnector in Globiots

7.4. Modbus TCP/IP converter function

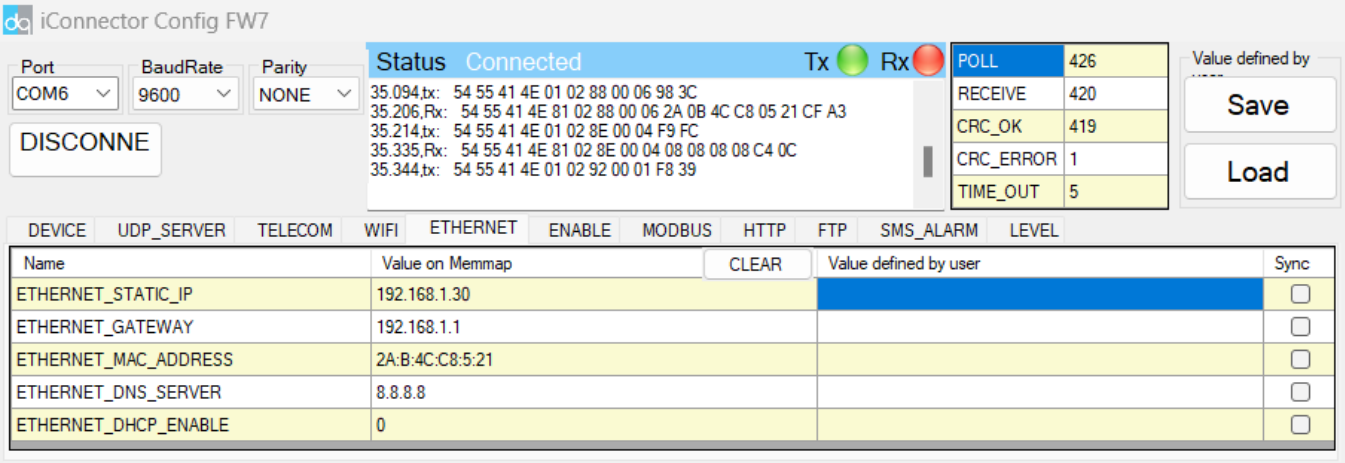
Principle Flow of this function as below

- 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

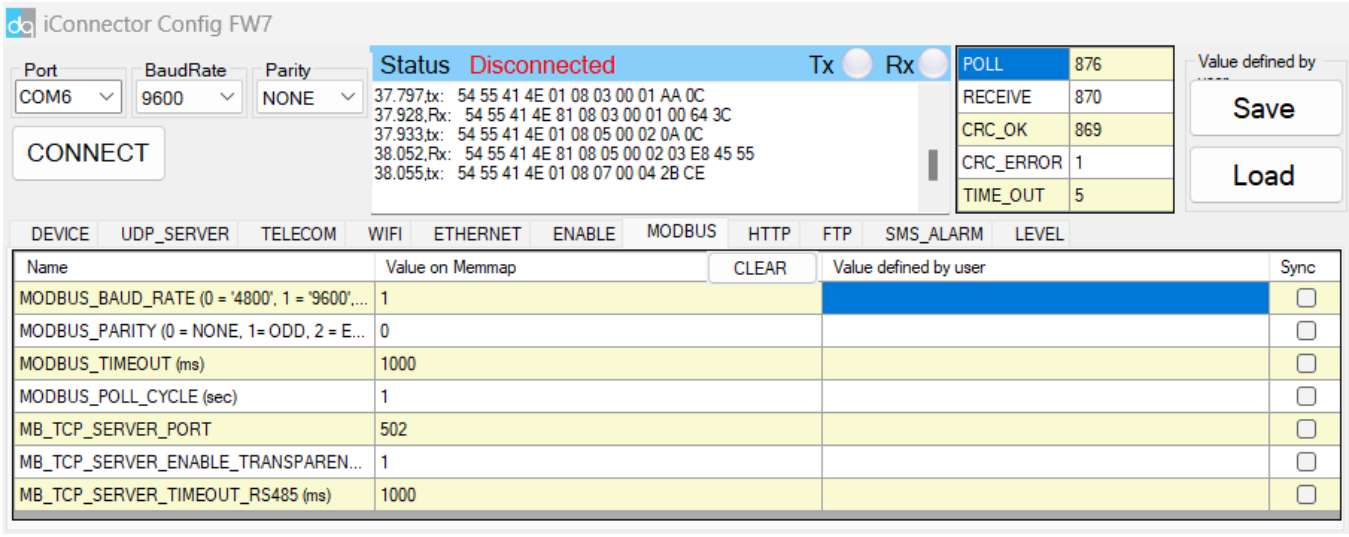
> Refer section x.xx to see how to use the iConfig software

- **Configure the iConnector at Ethernet tab**



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**



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.
MODBUS_TCP_SERVER_TIMEOUT	Used for modbus TCP Server

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

> 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 Adresss 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.

> ⚠ 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.

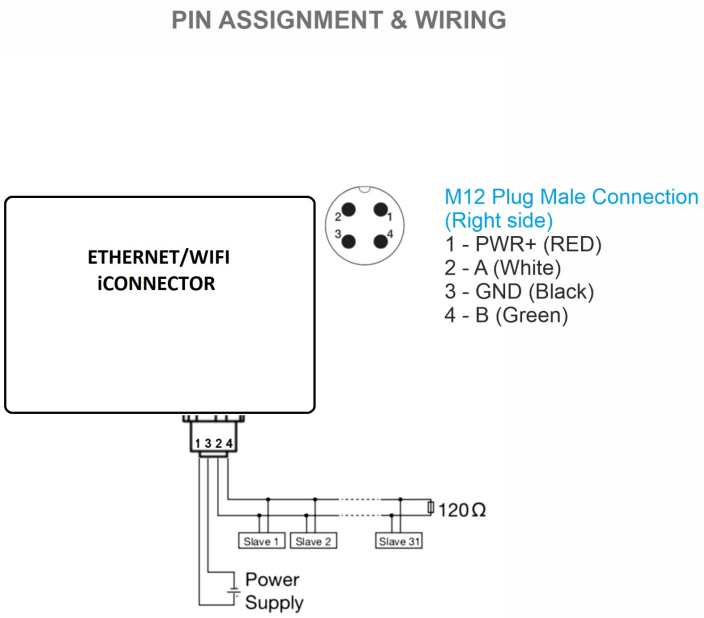
- Read a parameter base on the modbus memory map of slave device. For example, read a register 30001 of the Modbus slave

8. Installation and wiring

8.1.Installation and wiring for iConnector

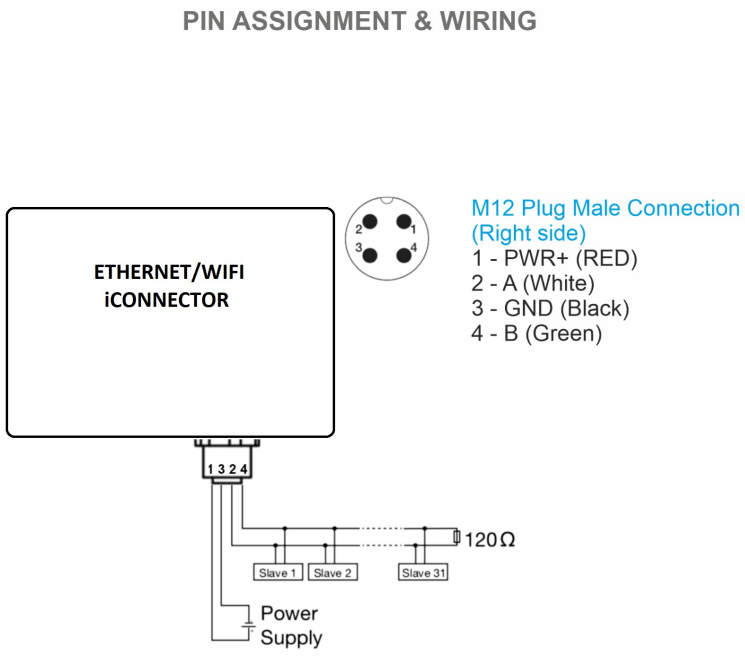
> ℹ There are 02 holes for screwing at the left and right of housing.
> These holes are covered by the cover.
> Open the cover, you can access the hole for screwing.
> Using screw with size 4mm diameter maximum.

> ℹ Power the iConnector on via M12 Port. Pin 1 is PWR+ , Pin 3 is GND.

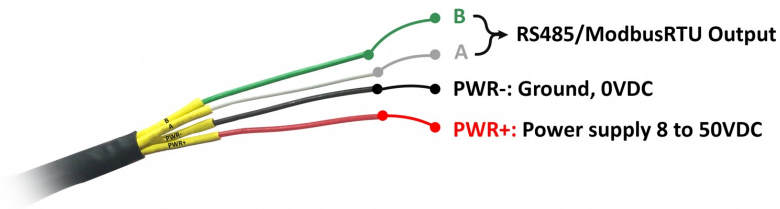


8.2 Installation and wiring for wired slave device

Connect the Modbus RTU slaves to the iConnector via RS485 protocol. Pin 2 is RS485+ (A), Pin 4 is RS485- (B)



Use M12 female connection cable to connect to iConnector



8.3 Installation and wiring for wireless sensor

> ⚠ **DO NOT** install the Wireless sensor or its antenna inside a completed**metallic** box or housing, because the RF signal can not pass through the metallic wall. The housing is made from Non-metallic materials like plastic, glass, wood, leather, concrete, cement...is acceptable.

8.4 Installation and wiring for host Modbus TCP/IP

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

9. Payload Document and Configuration Tables

Download the iConnector Modbus Memory Map in **the link**

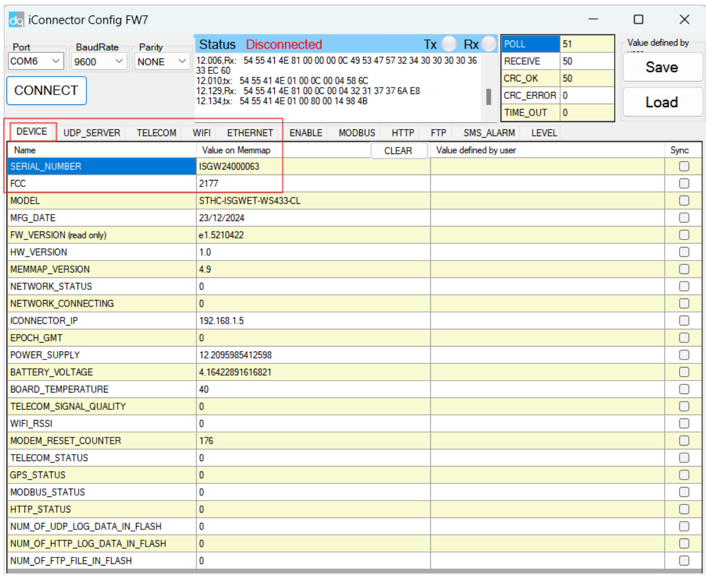
10. How to connect device to Back-end/ Server

10.1 How to connect device to Globiots platform

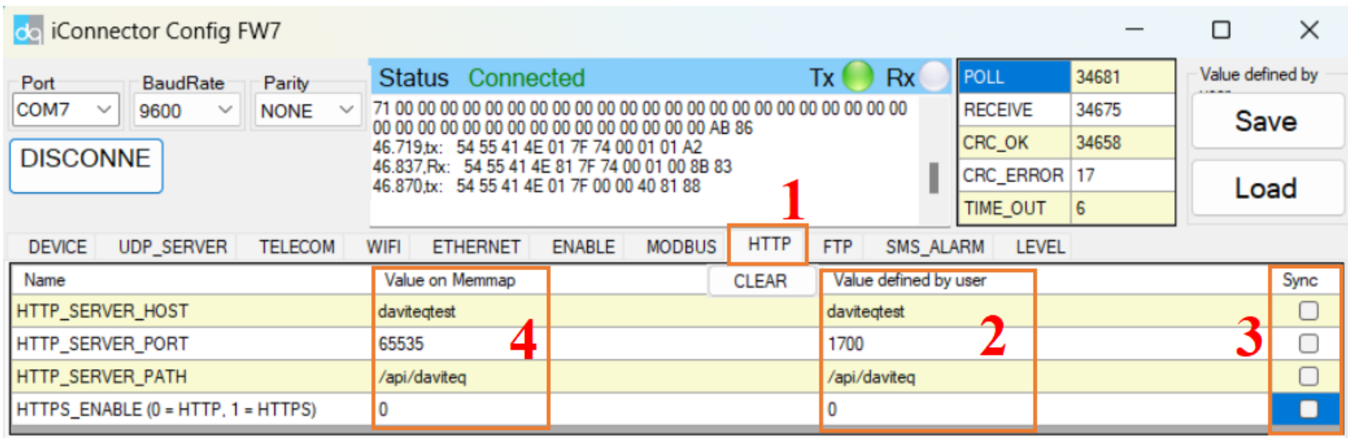
Read the section **7.1 Connecting the iConnector to the Daviteq Platform** to get the instruction of adding the iConnector to the Globiots platform.

10.2 How to connect device to http server

Step 1: Connect the iConnector to a PC via Modbus configuration cable, then open the iConfig software. After that, set up correct port, baud rate, parity and click **Connect** button



Step 2: Choose HTTP tab, fill in the information of HTTP sever, such as HTTP_SERVER_HOST, HTTP_SERVER_PORT, HTTP_SERVER_PATH, HTTPS_ENABLE (0 = HTTP, 1 = HTTPS) in **Value defined by user** column. Then, tick in the corresponding cell of these configuration in **Sync** column. After that, check the value in the**Value on memmap** column.



II. MAINTENANCE

2.1 Maintenance

There is no requirement for maintenance of the Hardware of the iConnnector

2.2 Troubleshooting

No.	Phenomena	Reason	Solutions
1	Cannot read modbus	• No power supply, the power cord is incorrectly connected • Modbus connection pin A, B is loose or wrong • Configuration slave address, baudrate, parity is not correct • Reading the wrong command, wrong address register	• Check the power connection • Check the connection modbus A, B • Check the configuration of slave address, baudrate, parity • iConnector only supports modbus 3, 4, and 16. Check if the value of modbus status returned by 2 or 3 is an incorrect address reading.
2	Failed to add auto sensor (iConnector integrated Co-ordinator version)	• When the first 5 minutes are up, the sensor cannot be added • Node needs to be added further away from WS433-CL • The iConnector and the node are configured to run at 2 different RF frequencies, or different data rates	• Unplug, wait 10 seconds, plug in again to enable automatic add or write to modbus Enb_auto_add_sensors = 1 • Bringing nodes and iConnector together or temporarily setting the smaller Rssi_threshold can add sensors farther (then return the old values) • Check the RF frequency, data rate of iConnector and the node
3	Read modbus normal health values but read the data of the node, all are 0	• The modbus 4 command only supports FW 1.9, old FWs can't read command 4	• Check the FW of WS433-CL in iConnector if it is older than 1.9 then use command 3 to read data and other registers
4	The node's data has no data of prm1 and prm2	• The sensor attached to the node is loose • For the WS433-M12F node, if the sensor is attached after the battery is attached to the node, the sensor type may be different so the data cannot be read.	• Attach the sensor to the node firmly • Attach the sensor to the WS433-M12F node first. Then remove the node pin, wait for 10 seconds, re-attach to the node to re-identify the sensor
5	Status led of iConnector doesn’t light	• No power supply	• Check if the power cable is disconnected • Check if the connector of iConnector is loose or disconnected
6	Mobus led of iConnector doesn’t light	• No RS485 connection	• Check if the signal cable is loose or disconnected
7	Network led of iConnector doesn’t light	• No network connection	• Check if the power cable is disconnected • Check if the connector of iConnector is loose or disconnected

III. ADVANCE GUIDE

3.1 Principle of Operation

3.1.1 LED meaning

3.1.1.1 LED status

Status	Meaning
Fixed ON	iConnector has been supplied with external power
Blinking (4 seconds blink 1 time)	Without external power, iConnector is using battery.
Blinking (2 seconds blink 1 time)	Low battery warning (Used for type D battery version)

3.1.1.2 LED modbus

Status	Meaning
Fixed ON	Modbus connected
Blinking (1 seconds blink 2 time)	Connection errors (wrong configuration of baudrate, noise, ...)
OFF	No modbus connection

3.1.1.3 LED network

Status	Meaning
Blinking (1s change state)	Connecting with Globiots
Blinking (2s change state)	Initializing wifi generator, waiting for configuration via phone or modbus tool (For iConnector wifi)
OFF/Blinking (2s change state)	No connection with Globiots

3.1.2 Memory Map

Address	Size (bytes)	Memory type	Read/Write	Description
0-0x1FFF	8096	FLASH	R/W	Save active configuration, do not allow log, realtime.
0x2000-0x22FF	768	RAM	R	Save data read from modbus slaves.
0x2300-0x24FF	512	RAM	R	The intrinsic data of iConnector
0x3000-0x30FF	256	RAM	R/W	
0x5000-0x50FF	256	FLASH	R/W	
0x6000-0x6FFF	4096	RAM	R	Save data read from modbus slaves

- **Data address area:** 0x2000-0x22FF (768 bytes), and 0x6000-0x6FFF (4096 bytes).
- **Controller address area:** 0x3000-0x30FF (256 bytes, without flash storage), and 0x5000-0x50FF (256 bytes, with flash storage).

Address area 0x5000-0x50FF

- 256 bytes;
- Save in flash (when power is lost, will keep the same value);
- Allows reading, and writing from **Globiots**;
- Allow log (realtime);
- Allows Modbus write to Slaves;
- It is not allowed to store data read from Modbus Slaves.

> ⚠ **NOTE:** Flash recorded about 100,000 times will be damaged so do not use this area to contain the value is changed several times.

3.1.3 Logged data

- Up to 20 different log cycles;
- 320 log parameters maximum for all log cycles.
- Up to 120 log parameters per log cycle.

3.1.4 Modbus

- Support modbus RTU.
- Address slave 1... 247.
- It is not allowed to set address slave = 0.
- Baudrate 4800/9600/19200.
- Parity none / odd / even.
- Up to 100 modbus instructions.
- The address area for storing read data: 0x2000-0x22FF (768 bytes), and 0x6000-0x6FFF (4096 bytes).
- Controller address area: 0x3000-0x30FF (256 bytes, without flash storage), and 0x5000-0x50FF (256 bytes, with flash storage).

3.1.5 Realtime

- Read up to 200 parameters.
- If all parameters are float (4 bytes) then read up to 140 parameters.
- The fastest realtime sending frequency is 1 second.

3.1.6 Alarm

- Up to 28 alarms.
- Supported data types:

PrmType	Description	# Byte	Range
1	BYTE	1	0 to 255
2	UINT16	2	0 to 65,535
3	UINT32	4	0 to 4,294,967,295
4	FLOAT	4	-/+3.40282347 * (10^+38)
5	INT16	2	-32,768 to 32,767
6	INT32	4	-2,147,483,648 to 2,147,483,647

3.1.7 Event

- The event table is 1024 bytes.
- The number of events depends on the short length of the event configured.
- Supported data types:

PrmType	Description	# Byte	Range
1	BYTE	1	0 to 255
2	UINT16	2	0 to 65,535
3	UINT32	4	0 to 4,294,967,295
4	FLOAT	4	-/+3.40282347 * (10^+38)
5	INT16	2	-32,768 to 32,767
6	INT32	4	-2,147,483,648 to 2,147,483,647

3.1.8 Health data

- Every 15 seconds send health pack 1 time.

3.2 Configuration

3.2.1 Online configuration from Globiots

> Refer section **5. Configure Device** of the Globiots manual in **the link** to get the instruction of configurating the iConnector in Globiots

3.2.2 Offline configuration

Step 1: Preparation

> **Prepare some required devices as below**
> 01x A window PC
> 01x USB-RS485 Configuration Cable
> 01x Power adapter 12-24VDC

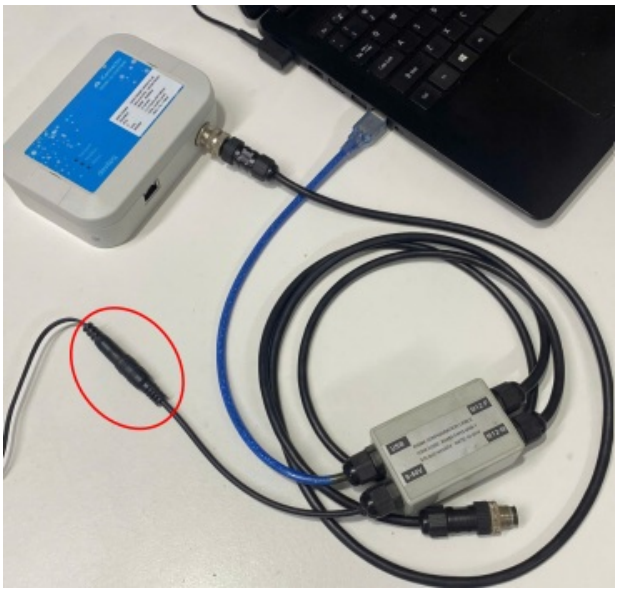
> Download the Configuation software in **the link**

Step 2: Hardware connection

- Connect the USB-A to the PC

- Connect M12 female of the cable to the iConnector

- Power the iConnector on by connecting DC jack from Power Adapter

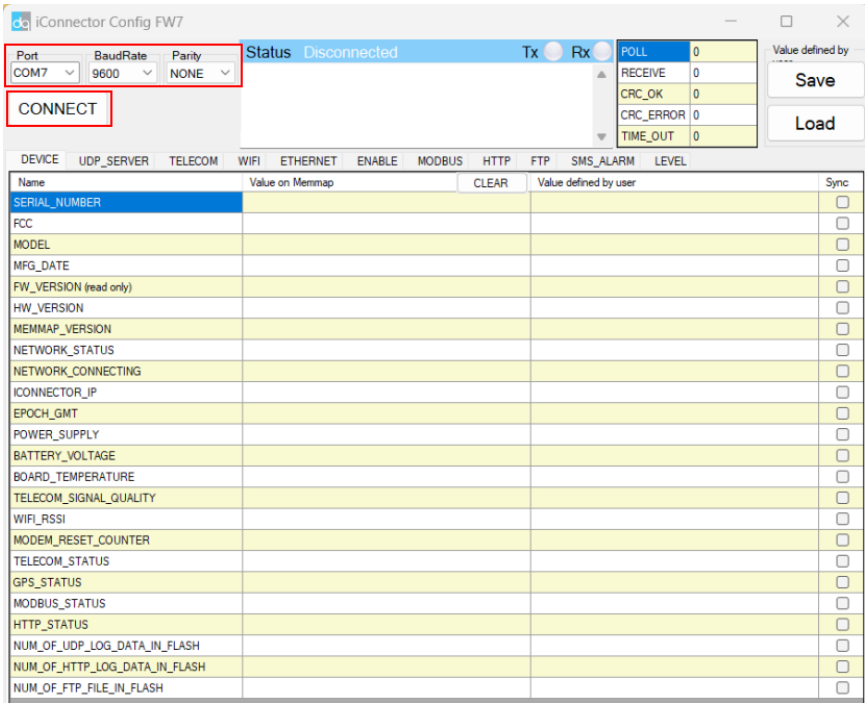


> ⚠ The above steps must be performed in order

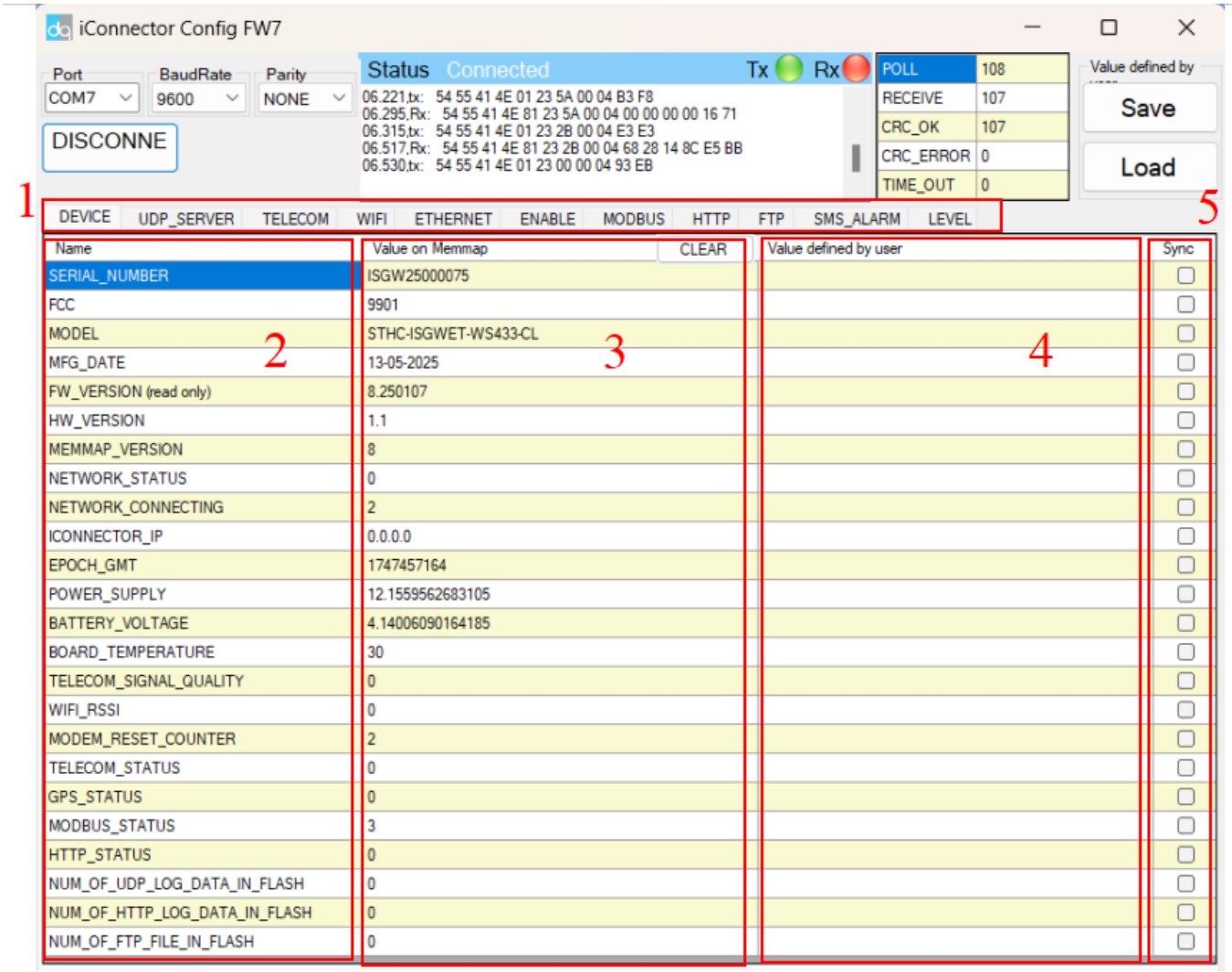
Step 3: Configuration the iConnector via iConfig software

- Open the iConfig software, then choose Correct Port, BaudRate and Parity.

> ℹ **Port** is based on the PC
> **BaudRate** is 9600
> **Parity** is NONE



- Click **CONNECT** button on the software



(1) There are 11 configuration tabs on the top banner. Click a tab name to navigate to the corresponding sheet.

(2) The first column displays the parameter names of the iConnector.

(3) The second column shows the current values of the corresponding parameters

(4) The third column is where users can input new configuration values.

(5) After entering the new configuration in the third column, users must tick the corresponding checkbox to apply it. The tick will disappear once the new configuration is successfully written to the iConnector. After that, the updated value will appear in the second column.

IV.PRODUCT SPECIFICATIONS

4.1 Specifications

Host Communication Ethernet type	01 x RJ45 port, 10Mbps
Host Communication WiFi type	802.11b/g/n, 2.4Ghz,internal antenna
Host communication supports	TCP/IP, UDP/IP, FTP, HTTPS, SNMP...
Fieldbus communication	Modbus RTU x 01 port, 31 slaves, max 19.2 kpbs
Optional	Integrated wireless co-ordinator with external antenna or internal antenna
Power supply	7..48VDC, avg 200mA, peak 1.5A
On-board memory & sensors	2MB Flash, PCB temperature sensor
Electrical connectors	M12, 4-pin, coding A or 9mm Power Plug and USB port
Included accessories	mounting bracket for wall mount (cellular version only)
Operating Temperature/Humidity	-20 .. + 60 degC / 95%RH, non-condensing
Housing/Protection	Anti-UV plastic for Ethernet/WiFi version. All version is IP67 protection
Dimension	H130xW90xD40 for Ethernet/WiFi versions
Net weight	190 grams for Cellular version, 350 grams Ethernet/WiFi versions

V. WARRANTY & SUPPORT

5.1 Warranty

> Below terms and conditions are applied for products manufactured and supplied by Daviteq Technologies Inc.

Free Warranty Conditions

1. The manufacturer undertakes to guarantee within 12 months from shipment date.
2. Product failed due to defects in material or workmanship.
3. Serial number, label, warranty stamp remains intact (not purged, detected, edited, scraped, tore, blurry, spotty, or pasted on top by certain items).
4. During the warranty period, if any problem of damage occurs due to technical manufacturing, please notify our Support Center for free warranty consultancy. Unauthorized treatments and modifications are not allowed.
5. Product failed due to the defects from the manufacturer, depending on the actual situation, Daviteq will consider replacement or repairs.

> ⚠ **Note:** One way shipping cost to the Return center shall be paid by Customers.

Paid Warranty

1. The warranty period has expired.
2. The product is not manufactured by Daviteq.
3. Product failed due to damage caused by disasters such as fire, flood, lightning or explosion, etc.
4. Product damaged during shipment.
5. Product damaged due to faulty installation, usage, or power supply.
6. Product damage caused by the customer.
7. Product rusted, stained by effects of the environment or due to vandalism, liquid (acids, chemicals, etc.)
8. Product damage is caused by unauthorized treatments and modifications.

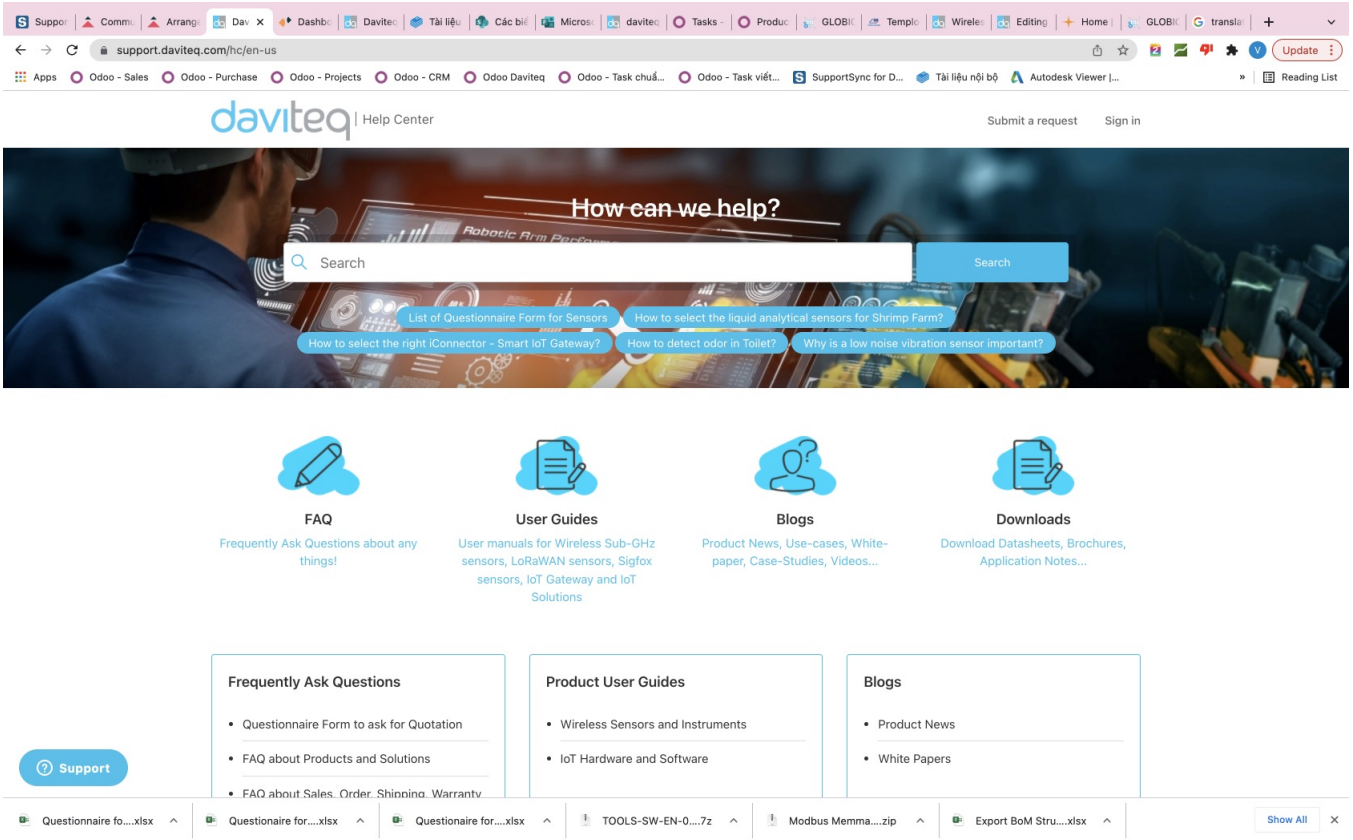
> ⚠ **Note:** Customers will be subjected to all repairing expenses and 2-way shipping costs. If arises disagreement with the company's determining faults, both parties will have a third party inspection appraise such damage and its decision be and is the final decision.

5.2 Support

Support via Help center

> For support, please contact our support center at the following link:https://support.daviteq.com/hc/en-us

- If you have any questions about the product, you can search for information on that page;
- If you can't find the right information, please register an account and send us a request. We will respond within 24 hours;
- Our support engineer will contact you via the Ticket system. If the product needs to be sent back to the factory for warranty, we will generate an RMA code so you can send it back to us. To follow the status of the RMA process, customers can visit our SupportSync system as below.


support.daviteq.com/hc/en-us
Update
Apps
Odoo - Sales
Odoo - Purchase
Odoo - Projects
Odoo - CRM
Odoo Daviteq
Odoo - Task chuẩ...
Odoo - Task viết...
SupportSync for D...
Tài liệu nội bộ
Autodesk Viewer |...
Reading List
daviteq | Help Center
Submit a request
Sign in
How can we help?
Search
Search
List of Questionnaire Form for Sensors
How to select the liquid analytical sensors for Shrimp Farm?
How to select the right iConnector - Smart IoT Gateway?
How to detect odor in Toilet?
Why is a low noise vibration sensor important?
FAQ
Frequently Ask Questions about any things!
User Guides
User manuals for Wireless Sub-GHz sensors, LoRaWAN sensors, Sigfox sensors, IoT Gateway and IoT Solutions
Blogs
Product News, Use-cases, White-paper, Case-Studies, Videos...
Downloads
Download Datasheets, Brochures, Application Notes...
Frequently Ask Questions
Questionnaire Form to ask for Quotation
FAQ about Products and Solutions
FAQ about Sales, Order, Shipping, Warranty
Product User Guides
Wireless Sensors and Instruments
IoT Hardware and Software
Blogs
Product News
White Papers
Support
Questionnaire fo....xlsx
Questionaire for....xlsx
Questionaire for....xlsx
TOOLS-SW-EN-0....7z
Modbus Memma....zip
Export BoM Stru....xlsx
Show All