USER GUIDE FOR ICONNECTOR 3G STHC-B-ISG02DB-03

STHC-B-ISG02DB-03-MN-EN-01	Jul-2020

This document is applied for the following products

SKU	STHC-B	**HW Ver.**	1.1	**FW Ver.**	1.4
Item Code	STHC-B-ISG02DB-03	Iconnector 3g Dualband, internal antenna, 1 x battery size D 3.6VDC and external DC power, 1 x pulse input, 1 x 4-20mA input with 15v supply to external sensor, Ip67, 1 x M12-M for power, 1 x M12-F for IO			

1. Functions Change Log

HW Ver.	FW Ver.	Release Date	Functions Change
1.1	1.4	Jun-2020	

2. Introduction

STHC-B is same as STHC, is a Smart IoT Gateway, aka iConnector, a main component in any IoT application. However, STHC-B is operated by a Primary battery 3.6V, suitable for applications where no grid power like Water pipeline, water network...In addition, STHC-B is also powered by external power supply 7..48VDC or Solar panel system. STHC-B has built-in 1 Pulse input to read the Pulse from flow meter...and 01 Digital input can connect to Pressure sensor, Level, Temperature, Humidity... Data will be sent back to server for data logging, data analytics, monitoring & controls...With Ultra low power design, it can uses 01 battery size D for up to 05 years (depend on configuration of data logging and sending).

SMART IOT GATEWAY - iConnector BATTERY OPERATED
STHC-B



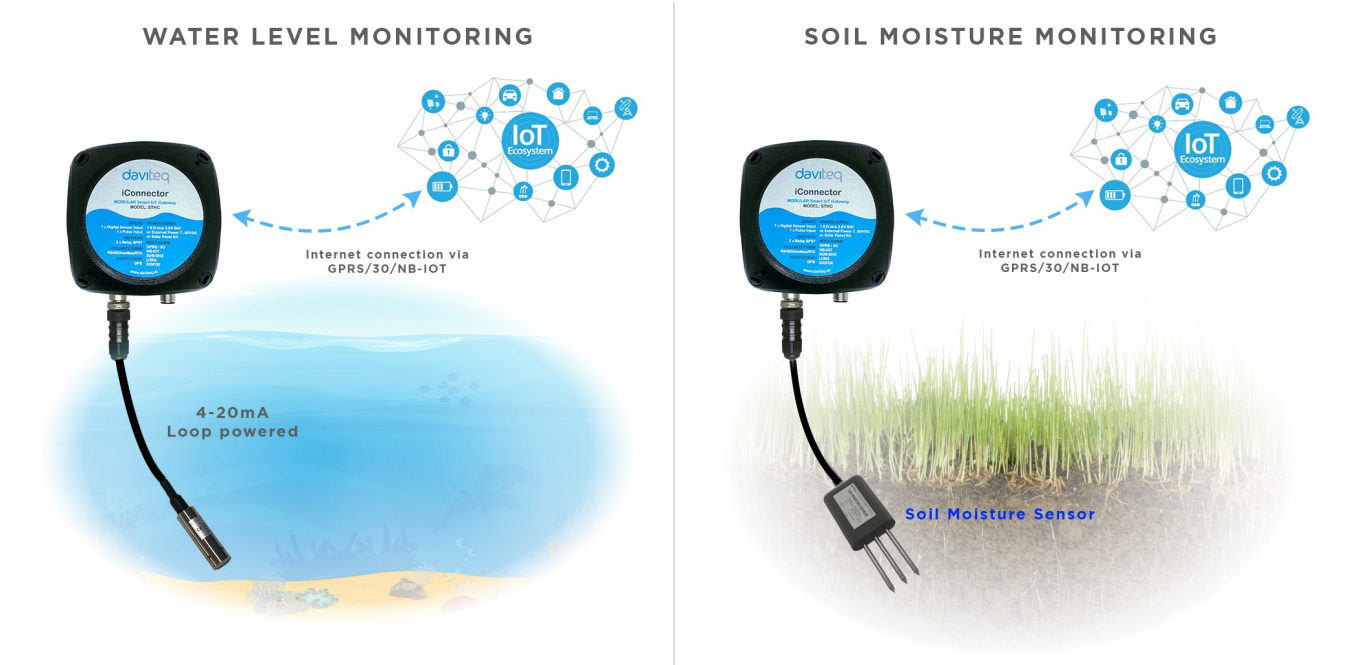
STHC-B-H1.PNG

3. Specification

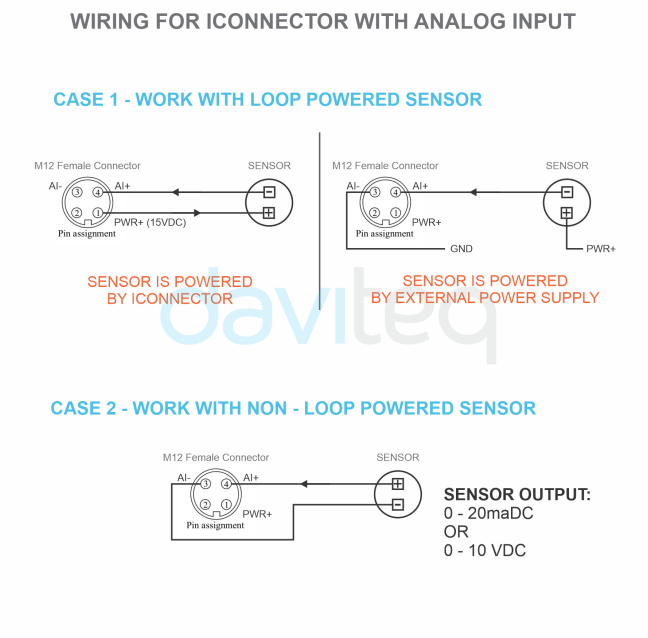
Host Communication	GPRS Quadband/3G-Dual band/NB-IoT, internal antenna

Host communication supports	TCP/IP, UDP/IP, FTP, HTTPS, SNMP...
Vietnam Type Approval Cerification	QCVN 54:2011/BTTTT, QCVN 15:2015/BTTTT (DAVITEQ B00122019)
Analog Input	1 x 4-20ma input with 15v supply to external sensor
Pulse Input	1 x Pulse input with counting function, dry-contact, max 1Hz, auto-reset counter when reaching 9 digits
Digital Sensor Input	1 x Digital sensor input for DULP sensor type (Digital Ultra Low Power), M12 connector, IP67
Battery Supply	1 x D size battery holder, 3.6VDC
External Power Supply	7..48VDC, avg 200mA, peak 1.5A
Back-up battery	Lithium Super Capacitor (to alert shortage of power supply)
On-board logging	2MB Flash
SIM slot	01 x micro-SIM
Operating Temperature	-20 .. + 85 degC (refer temperature working range of Battery being used)
Dimension	H110xW110xD70
Housing	Poly-carbonate housing, IP67, wall mount pads
Net weight	< 250 g (excluded Battery and Sensor)

4. Applications







5. Operation principle

5.1 Process of measurement

When the sensor sampling interval is reached, for example, 2 minutes (Battery Mode), iConnector will wake up and turn ON the power to supply power to the external sensor to start measuring. Depending on the type and characteristics of the external sensor, it may take a certain time to complete the measurement.

For example, the measurement time is 200mS, after this time, iConnector will read the value of the sensor by I2C, it will switch the power OFF to the external sensor to save energy.

If we supply external power through M12 connector, iConnector will run realtime.

After reading the sensor value, the raw data is**X**, it can be scaled to any technical value by the following formula:

$$Y = aX + b$$

Where

X: the raw value from sensor

Y: the calculated value for parameter 1's value or parameter 2's value

a: constant

b: constant

So, if there is no user setting for**a** and **b** ==> **Y** = **X**

The **Y** value will be compared with Lo and Hi threshold.

5.2 Configuration via Memory map

We can configure online using the memmaps shown in the table below:

ADDRESS (in decimal)	ADDRESS (in hex)	LENGTH (in byte)	TYPE	NAME	DESCRIPTION	UNIT	Server
8960	2300	4	float	power supply	External power supply voltage	volt	R
8964	2304	4	float	battery	Battery voltage	volt	R

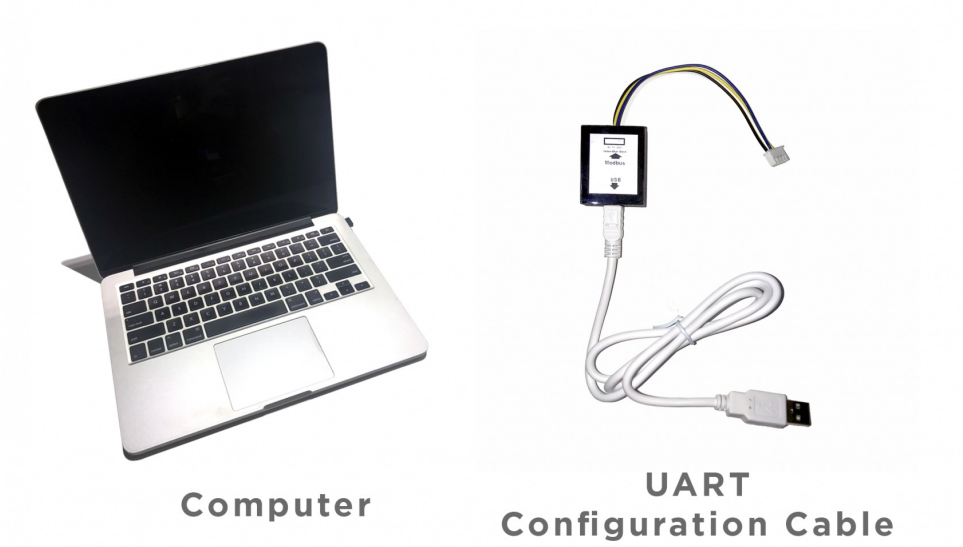
8982	2316	1	byte	gsm signal quality	GSM signal strength		R
902	386	4	uint32	I2C: sample_rate (sec)	sensor reading cycle, **e.g:** 60 seconds.	sec	R/W
906	38A	2	uint16	I2C: calc_time (ms)	time of supplying power to the sensor before reading the I2C, **e.g:** 200 ms.	ms	R/W
908	38C	2	uint16	I2C: num_of_sample	The number of ADC samples taken in a reading of sensor data, the more samples the longer the sensor reading time. **For example:** 8 samples with each sample have a reading time of 10ms, then the total sampling time is 80ms.		
910	38E	4	float	I2C: prm1_a	The **a** constants after calculation according to the formula		R/W
914	392	4	float	I2C: prm1_b	The **b** constants after calculation according to the formula		R/W
918	396	4	float	I2C: prm1_hi_cut	Cut the upper threshold of I2C **e.g: If** prm1_scaled_v > prm1_hi_cut **then** prm1_scaled_v = prm1_hi_cut		R/W
922	39A	4	float	I2C: prm1_lo_cut	Cut the lower threshold of I2C **e.g: If** prm1_scaled_v < prm1_lo_cut **then** prm1_scaled_v = 0.		R/W
9398	24B6	1	uint8	I2C: sensor type	Sensor type = 20 means that the I2C sensor reads 4-20mA		R/W

9399	24B7	1	uint8	I2C: error status	if error status = 0, it means the sensor reading is OK, else error status = 1 is faulty.		R/W
9400	24B8	4	float	I2C: prm1_scaled_v	The measured value has been scaled for the sensor **Formula to calculate scale:** prm1_scaled_v = prm1_raw_valu * prm1_a + prm1_b		R/W
9408	24C0	4	float	I2C: prm1_raw_valu	Raw sensor value read from I2C		R/W

5.3 Offline configuration

5.3.1 Connection

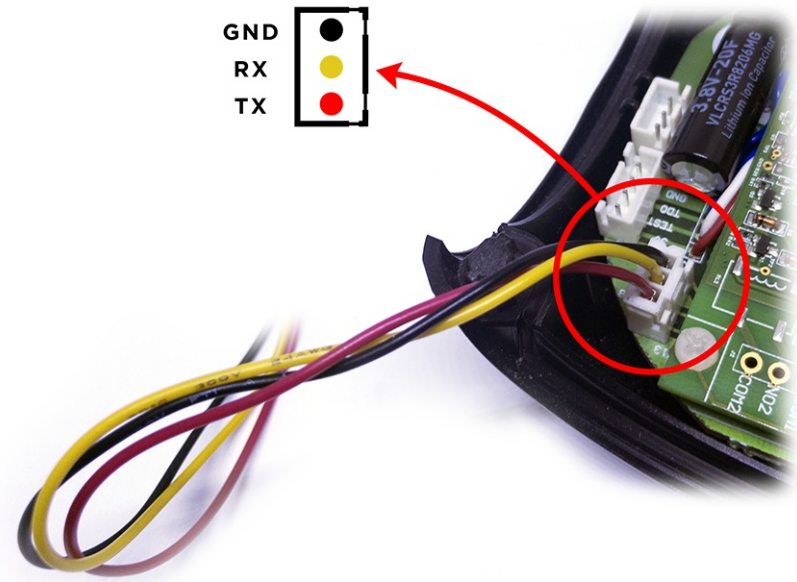
First, you need to prepare



- **Step 1:** Open the cover of the iConnector

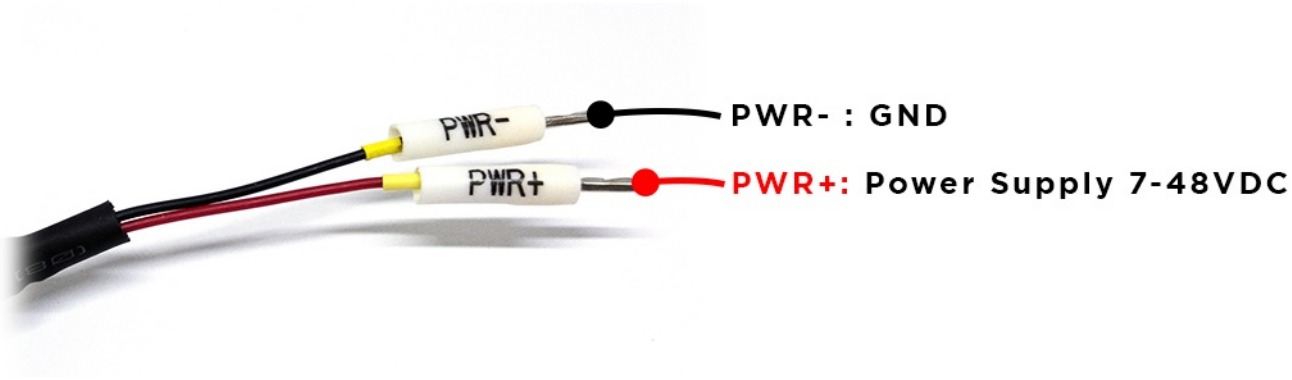


- **Step 2:**Connect the Configuration Cable to the UART Port in iConnector



- **Step 3:** Power the iConnector via M12 male connector on iConnector





- **Step 4:** Connect the USB port of the Configuration Cable to the Computer

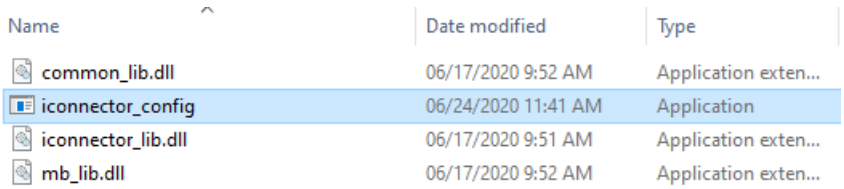


5.3.2 Configuration tool

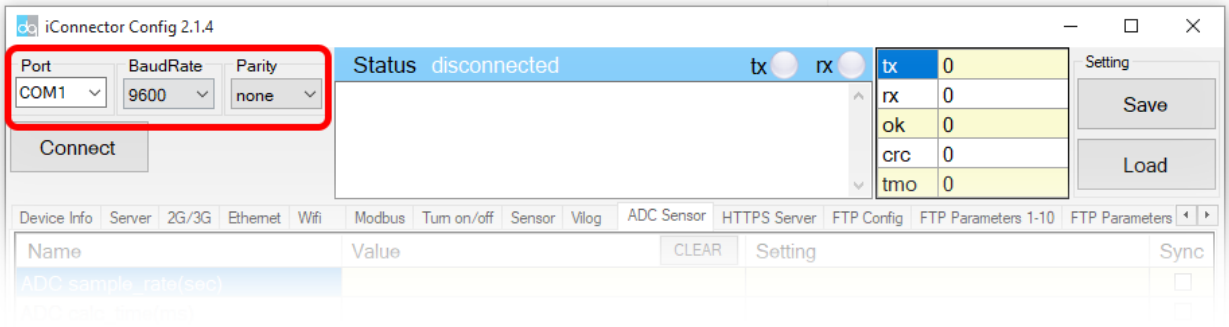
- You can download Configuration Tool with the following link:

https://filerun.daviteq.com/wl/?id=s5QApxosVNZLbATxi0TtKVoJX4ms1PxD

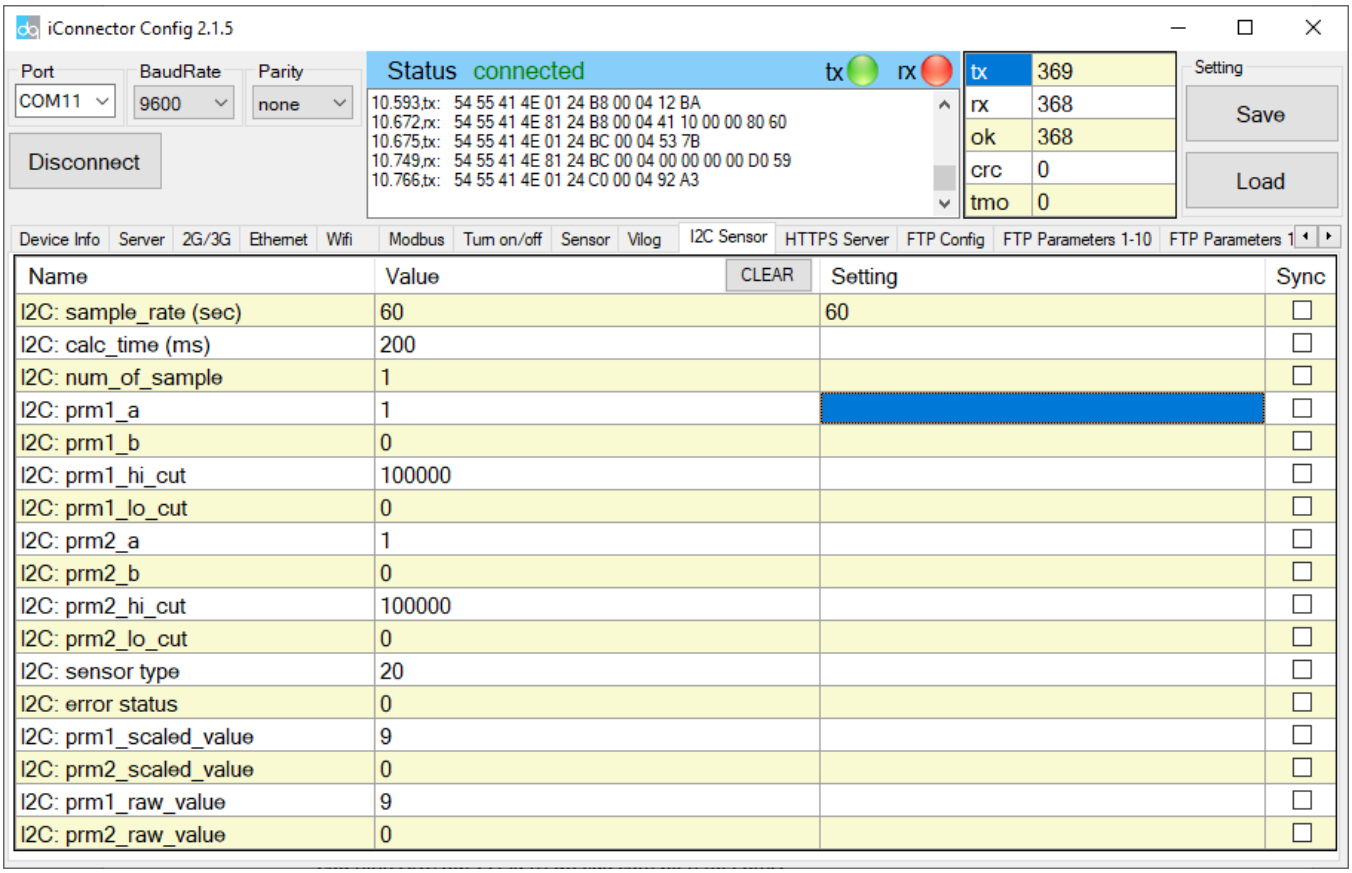
- Unzip file and run file application "iconnector_config"



- Choose **COM Port** (the Port which is USB cable plugged in)
- Set the **BaudRate: 9600**, **Parity: none**



- Click " **Connect** " untill the Status displays "**disconnected**" to "**connected**". It means the iConnector is being connected with computer;
- Configuration parameters:

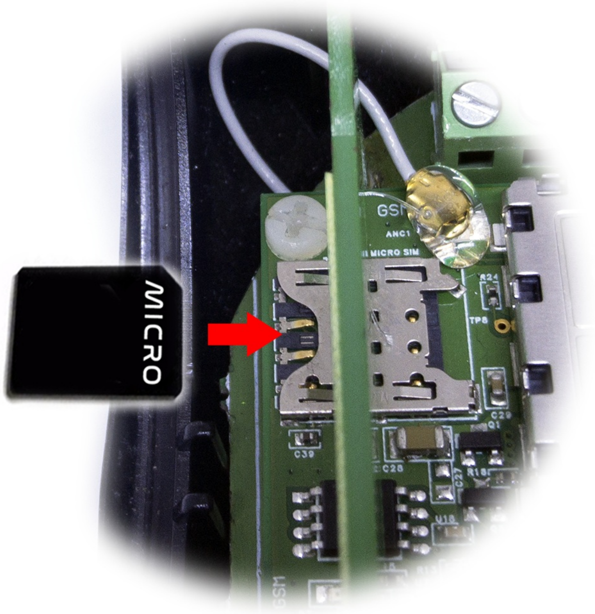


  - Write in the **Setting** column the data to be configured into iConnector
  - Click **Sync** to synchronize data into iConnector
  - After synchronizing the data into iConnector, if the data displayed in the**Value** column shows the corresponding data, the configuration is completed.

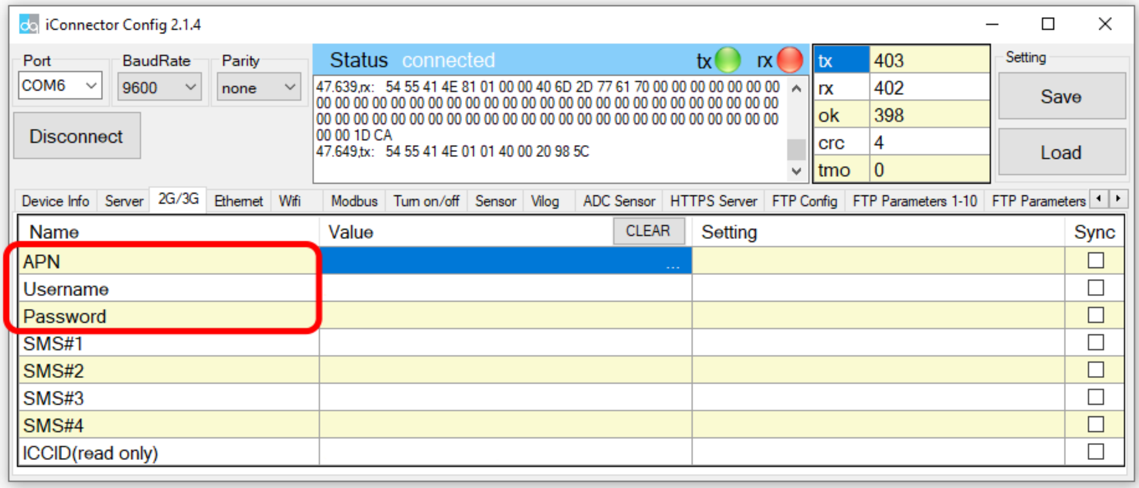
5.4 SIM configuration

iConnector 3G uses micro-SIM and needs to be configured to use the data network

1. Open iConnector cover and install the SIM card



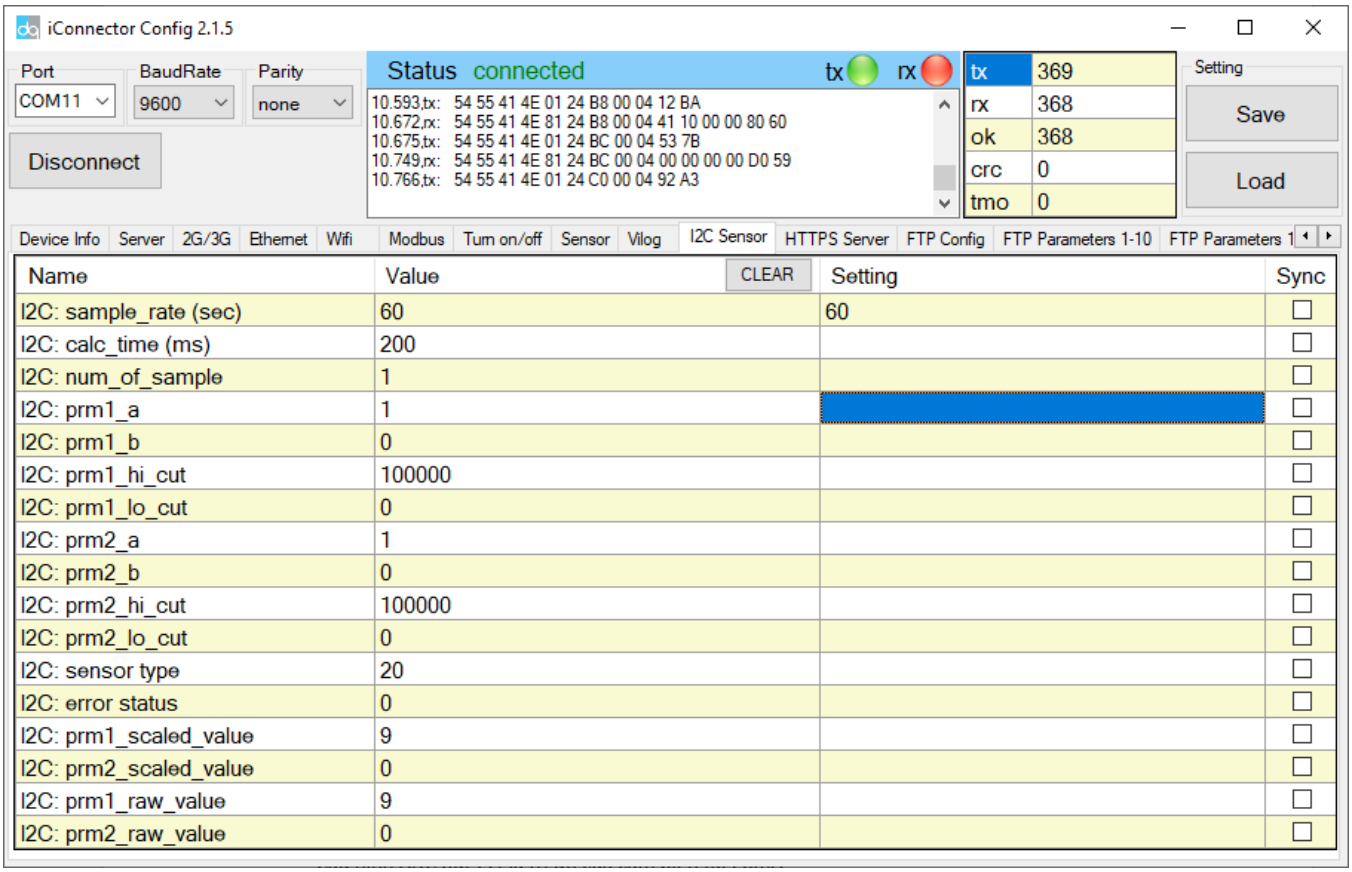
2. Based on the information of the mobile carrier that provides the SIM card, we configure data such as **APN**, **username**, **password** on the 2G/3G tab



5.5 Configure sensor parameters on the iConnector

5.5.1 Configure **I2C_Sensor** tab

We configure the parameters of 4-20mA sensor in **I2C Sensor** tab:



I2C: sample_rate (sec)	sensor reading cycle, **e.g:** 60 seconds.
I2C: calc_time (ms)	time of supplying power to the sensor before reading the I2C, **e.g:** 200 ms.
I2C: num_of_sample	The number of ADC samples taken in a reading of sensor data, the more samples the longer the sensor reading time. **For example:** 8 samples with each sample have a reading time of 10ms, then the total sampling time is 80ms.
I2C: prm1_a	The **a** constants after calculation according to the formula
I2C: prm1_b	The **b** constants after calculation according to the formula
I2C: prm1_hi_cut	Cut the upper threshold of I2C **e.g: If** prm1_scaled_value > prm1_hi_cut **then** prm1_scaled_value = prm1_hi_cut
I2C: prm1_lo_cut	Cut the lower threshold of I2C **e.g: If** prm1_scaled_value < prm1_lo_cut **then** prm1_scaled_value = 0.
I2C: sensor type	Sensor type = 20 means that the I2C sensor reads 4-20mA
I2C: error status	if error status = 0, it means the sensor reading is OK, else error status = 1 is faulty.
I2C: prm1_scaled_value	The measured value has been scaled for the sensor **Formula to calculate scale:** prm1_scaled_value = prm1_raw_value * prm1_a + prm1_b
I2C: prm1_raw_value	Raw sensor value read from I2C

5.5.2 Operation mode of iConnector with different power sources

When iConnector only works with D type battery:

- 3G network will turn off, only when the 3G data sending cycle is turned on to send data, after sending it will turn off.
- Not sending a ping leads to iConnector not running realtime, unable to sync from the server.
- Unable to configure from iConfig software.

When iConnector is connected to 7-48VDC power source:

- 3G network is always on, running Ping and ready to receive realtime, synchronization, running full of features.
- Can be configured from iConfig software.

6. Installation

6.1 iConnector Installation

Installed on a wall or in non-metal box.

DO NOT install iConnector inside a complete **metallic** box or housing. The signal can not pass through metallic wall.

iConnector should be installed in a semi-metallic box.

Some non-metallic materials: plastic, glass, wood, leather, concrete, cement...





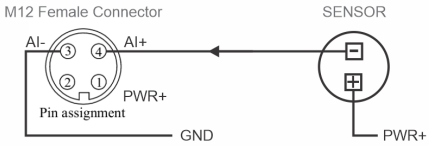
6.2 IO Wiring & Sensor installation

WIRING FOR ICONNECTOR WITH ANALOG INPUT

CASE 1 - WORK WITH LOOP POWERED SENSOR

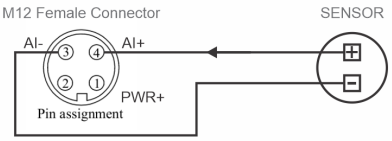


SENSOR IS POWERED
BY ICONNECTOR



SENSOR IS POWERED
BY EXTERNAL POWER SUPPLY

CASE 2 - WORK WITH NON - LOOP POWERED SENSOR

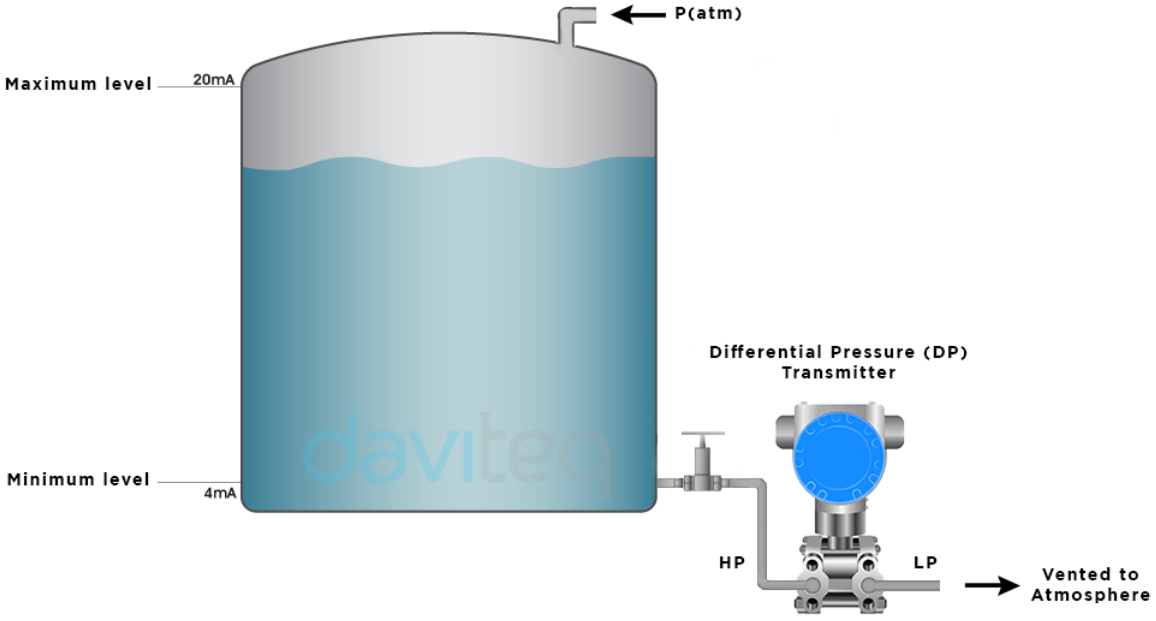


SENSOR OUTPUT:
0 - 20maDC
OR
0 - 10 VDC

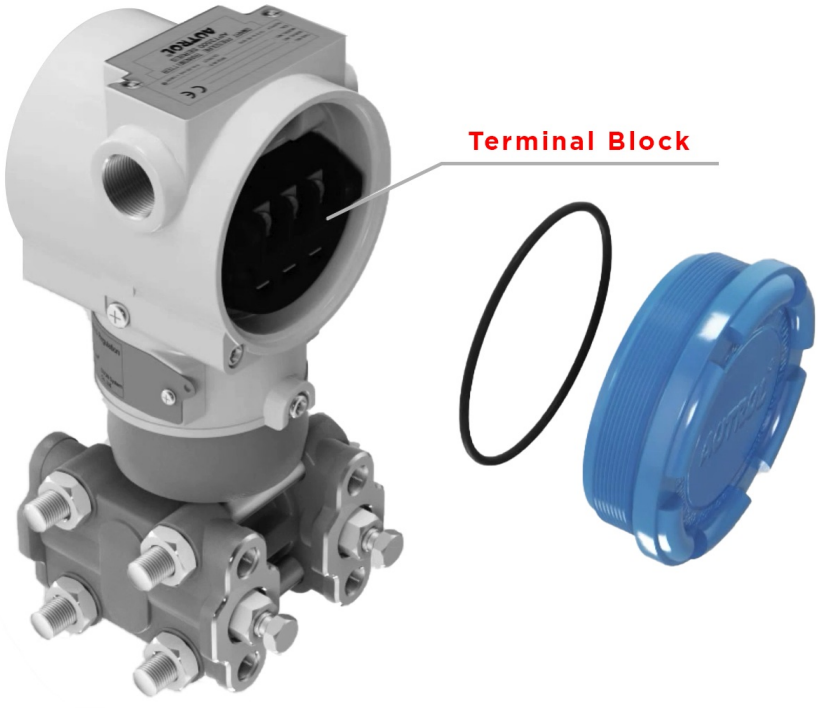




Install the sensor as shown below:

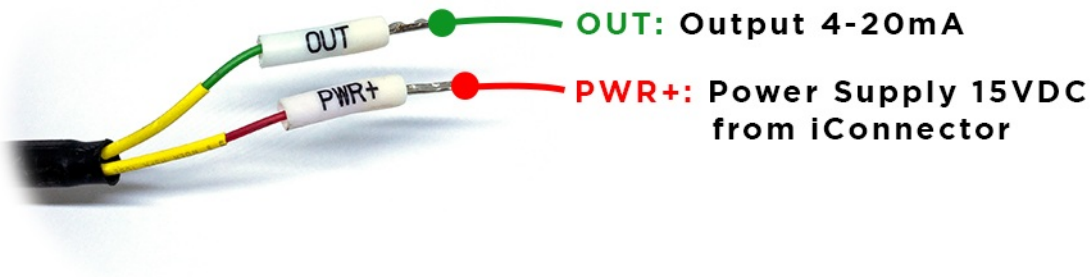


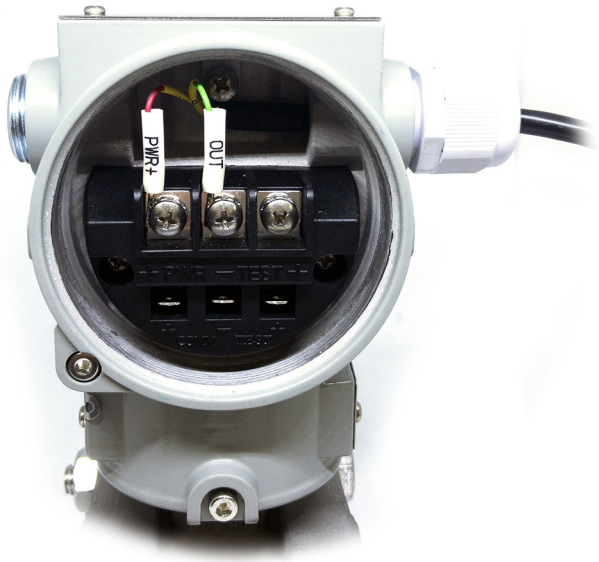
- **Step 1:** Open the back cover of the sensor



- **Step 2:**Wiring to sensors







- **Step 3:** Connect Sensor to **Input 4 .. 20mA** port of iConnector via M12 connector



For more information about DP transmitter:

https://filerun.daviteq.com/wl/?id=lT9lfZuEQUQksWLhFgSoQrs28sEGY0Kt

6.3 Power Supply & Battery installation

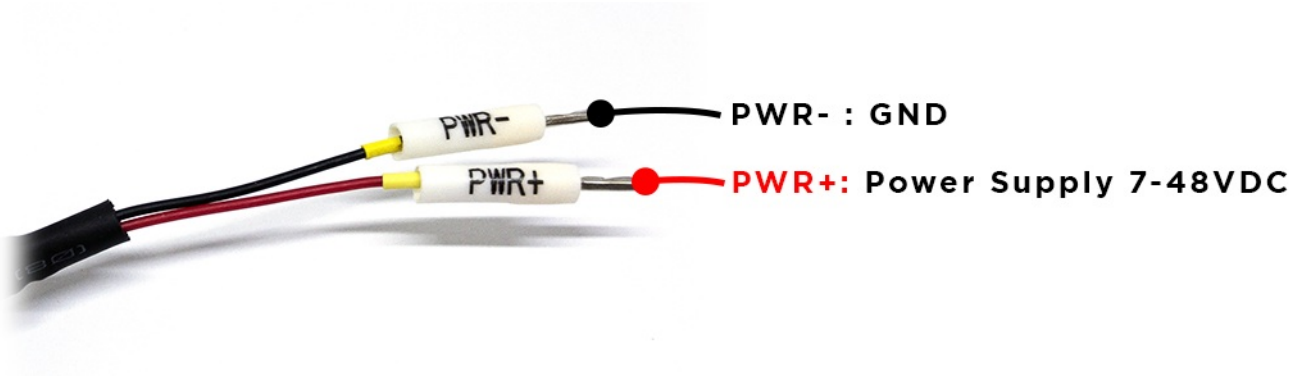
6.3.1 Power Supply of iConnector

Connect 7 .. 48VDC power supply to iConnector via M12 Male connector



Use M12 female connection cable to connect to iConnector





6.3.2 Battery installation

Steps for battery installation:

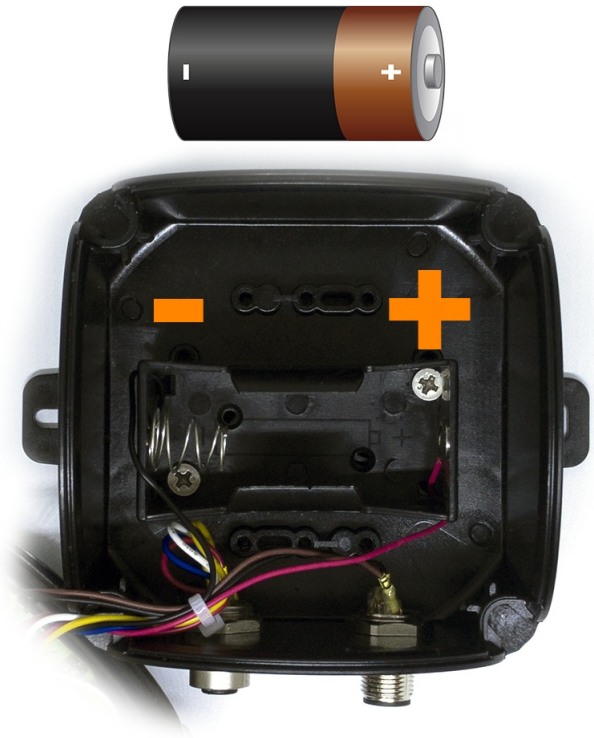
- **Step 1:** Using Flat Tip Screwdrivers to open the cover



- **Step 2:** Carefully pull out the top plastic housing



- **Step 3:** Insert the type D battery 3.6VDC, please take note the poles of battery



- **Step 4:** Insert the top plastic housing and locking by Flat Tip Screwdrivers

7. Troubleshooting

No.	Phenomena	Reason	Solutions

1	The value of the sensor is 0	Sensor connecting 4-20mA is loose/not connected	Check sensor connection
2	The iConnector does not connected to the sever	• No power supply • The network information of the SIM card data is incorrect • No SIM card inserted	• Check the power supply • Check that the battery is empty or not installed correctly • Check the sim card configuration section
3	The battery drains quickly	Turn On/Off tab configuration is incorrect	Check the configuration of the Turn On/Off tab

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