

3G Gateway Instruction

(H3G-800)

H3 System Co., Ltd

< Revision Notes >

No.	Date	Version	Content	Author

USA-Federal Communications Commission (FCC)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by tuning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the distance between the equipment and the receiver.
- Connect the equipment to outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Warning

This equipment should be installed and operated with separation distance of at least 20 cm from all persons.

Welcome

- Thank you for purchasing 3G Gateway (H3G-800).
- The 3G gateway receive health data from devices such as blood pressure monitor, glucometer, and weight scale
- The 3G Gateway transmit them into a healthcare center through CDMA(verizon) mobile network
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Packaging List

- Modem Main
- AC Adapter (5V/3A)

0. Overview

This document describes instructions regarding the H3 3G gateway (H3G-800, H3 System) and the related components. This document includes

- How to install and configure the H3 3G gateway
- How to use the H3 3G gateway
- How to setup a server system for the H3 3G gateways

1. Specification

1. Dimension & weight
 - Size : 125 x 100 x33 mm
 - Weight : 160g
 -
2. Communication technology
 - Bluetooth : class 2
 - Range : 10m
 - Profile : SPP (Serial Port Profile)
 -
3. Power supply : AC Adapter (5V/3A) or Rechargeable battery (Lithium polymer)
4. Frequency : Dual band (800, 1900MHz)
5. Operation temp : -10°C to 40°C (14 °F to 104 °F)
6. Antenna : External Quad band antenna
7. Available devices
 - Lifescan Onetouch Ultra/Mini with Bluetooth adapter(BA-110)
 - Weight : 160g
 - A&D weighting scale (UC-321PBT)
 - A&D blood pressure monitor (UA-767PBT)
 - IEM blood pressure monitor (Stabil-O-Graph)
 - ForaCare's thermometer (FORA IR20b)
 - Beijing Choice's Pulse Oximeter (MD300C318)

2. Gateway installation

- 1) Preparation for deployment
 - A. SIM card
 - i. Unscrew and open the bottom cover.
And insert a SIM card.
 - B. Gateway configuration
 - i. Turn off the gateway.
 - ii. Connect a serial cable (provided by H3 System) to a gateway and a PC.
 - iii. Run the configuration software.
 - iv. Turn on the gateway.
 - v. Configure the gateway with the configuration software. For the details, please see the section below, "Gateway configuration."
 - C. Pairing and testing
 - i. Pair with devices. Please see "Pairing" section below.
 - ii. Take readings and confirm if the readings are successfully delivered to a server. Please see "Measurement and data transmission" section.

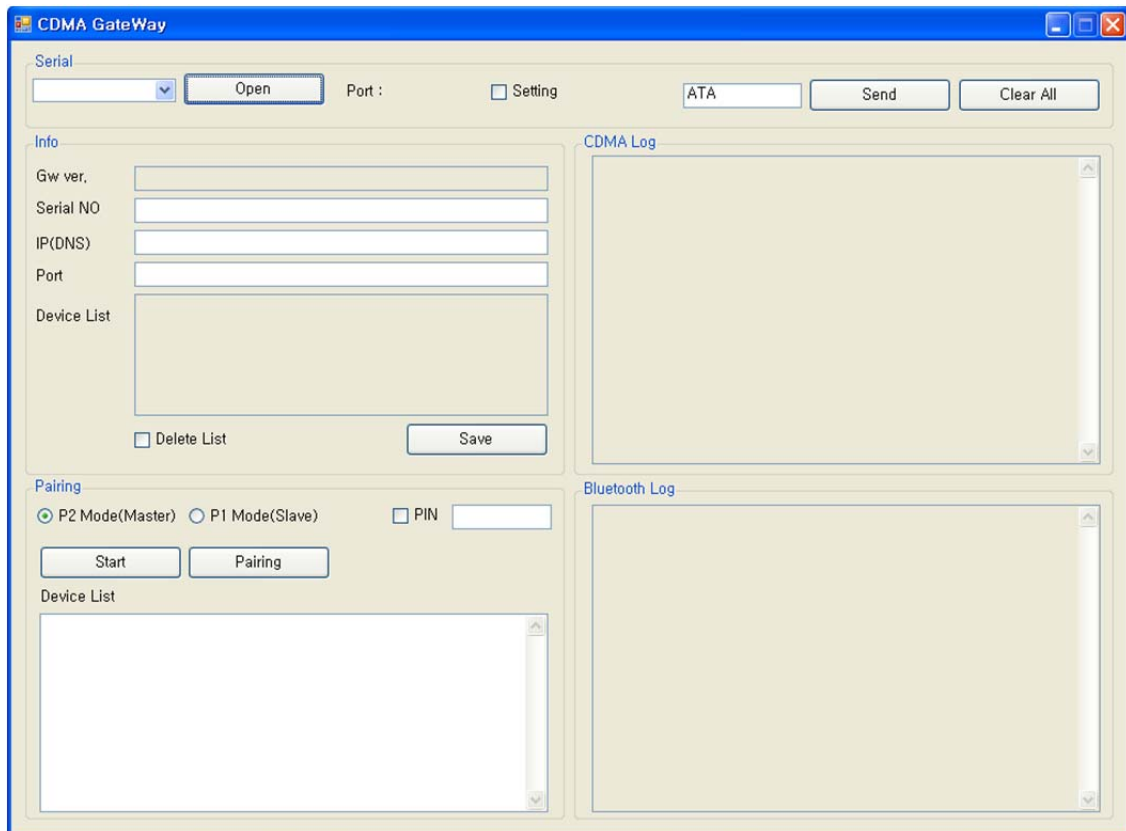


Figure 1. SIM card insertion

- D. Final inspection
 - i. Confirm the mode selection switch at “N.” If not, set the switch at “N.”
 - ii. Prepare dry cells for backup batteries.
 - iii. Close the bottom cover.
- 2) Installation at user’s home
 - A. Place a gateway at a suitable place.
 - B. Connect a power adapter.
 - C. Insert dry cells if required.

8. Gateway configuration

- 1) Components
 - A. A serial cable provided by H3 System
 - B. Configuration software
 - i. For admin: Serial numbers can be modified.
 - ii. For user: Serial number change is not allowed.

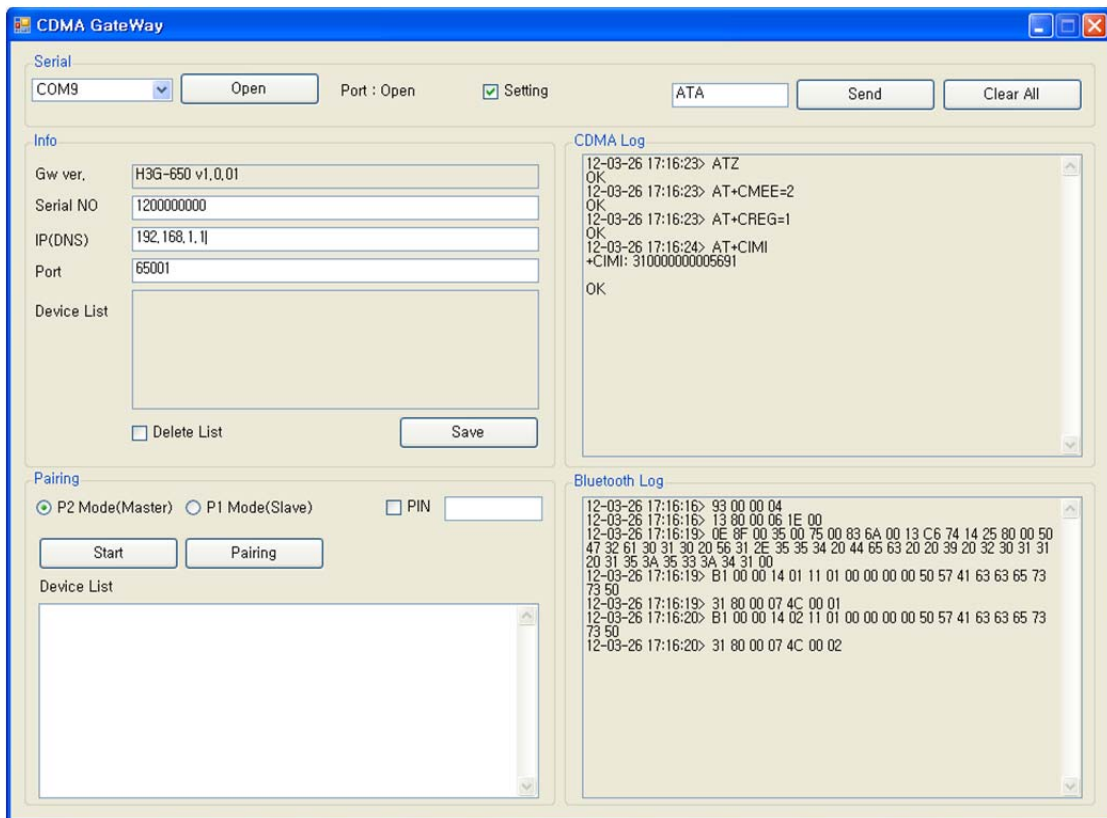


- 2) Descriptions
 - A. Configuration software for an admin: Serial No. modification is enabled.
- B. Items
 - i. Open: Open the serial port
 - ii. Setting: Shall be checked for changing gateway configurations
 - iii. Serial No: Serial number of the gateway. It’s only enabled for the Admin version
 - iv. IP(DNS): DataCollection Server IP or DNS

- v. Port: DataCollection Server port
- vi. Devices List: List of paired devices. Types and BT addresses.
- vii. Delete List: Delete all pairing info.
- viii. Clear Button: Clear window
- ix. Send Button: Send a new configuration to the gateway
- x. 3G Log: 3G AT-command logs

3) Steps

- A. Turn off the gateway.
- B. Connect a serial cable (provided by H3 System) to a gateway and a PC.
- C. Run the configuration software.
- D. Select the suitable COM port (You can check the COM port at the device manager.) and click “Open.”
- E. If you want to modify configuration, then check “Setting.” Otherwise uncheck



“Setting.”

- F. Turn on the gateway.
- G. The current configuration and paired devices info are shown.
- H. Change the parameters and click “Send.”
- I. If you want to delete the pairing info, check “Delete List” and click “Send.”
- J. Before clicking “Send”, please double check the settings.
- K. Turn off the gateway and disconnect the serial cable.

9. Pairing

- 1) Mode selection switch
 - A. “N”: Normal operation mode

- B. “P1”: Pairing mode as a slave. Used for A&D weighing scale (UC-321PBT) and blood pressure monitor (UA-767PBT).
- C. “P2”: Used for GMA (BA-110) for Lifescan’s blood glucose meter (OneTouch Ultra, OneTouch Mini/Easy, OneTouch Ultra2), IEM blood pressure monitor (Stabil-O-Graph), ForaCare’s thermometer (FORA IR20b), and Beijing Choice’s Pulse Oximeter(MD300C318).

2) Pairing process

A. General process

- i. Turn off the gateway.
- ii. Set the mode selection switch at suitable mode.
- iii. Let the device be at pairing mode.
- iv. Turn on the gateway.
- v. The gateway shows the number of currently paired devices with LEDs for 5 seconds. **(Even at the mode “N”)**

Number of paired devices	SENDING LED	READING LED
0	Off	Red On
1	Green On	Off
2	Green On	Green On
3	Green On	Red On
4	Red On	Off
5	Red On	Green On

- vi. During pairing process, the “Readings” LED turns GREEN.
- vii. At successful pairing, the “Readings” LED blinks GREEN 5 times.
- viii. At failure, the “Readings” LED blinks RED 5 times.
- ix. **The gateway goes to the step “v.”**
- x. **You can pair another device at the same pairing mode successively.**
- xi. **After completion of pairing, you should turn off, set the mode selection switch at “N” and turn on the gateway for normal operation.**
- xii. **It is strongly recommended that you pair all devices even when you want to pair one device.**
- xiii. **For failure, just let the device at pairing mode and find the result. (Step “vii” and “viii”) Don’t turn off the gateway and restart the whole procedure again.**

B. Pairing A&D’s blood pressure monitor and weighing scale

- i. Turn off the gateway that the measuring device paired with before if exists.
- ii. Set the mode selection switch at “P1.”
- iii. Turn on the gateway.
- iv. The gateway shows the number of currently paired devices with LEDs for 5 seconds.
- v. The “Readings” LED turns GREEN.
- vi. Take a reading with the blood pressure monitor or weighing scale.
- vii. At success, the “Readings” LED blinks GREEN 5 times.
- viii. At failure, the “Readings” LED blinks RED 5 times.
- ix. The gateway goes to the step “iv.”
- x. You can pair another device at P1 mode successively.
- xi. After completion of pairing, you should turn off, set the mode selection switch

at “N” and turn on the gateway for normal operation.

C. Pairing GMA (BA-100).

- i. Set the mode selection switch at “P2.”
- ii. Let the GMA be at pairing mode.
- iii. Turn on the gateway.
- iv. The gateway shows the number of currently paired devices with LEDs for 5 seconds.
- v. The “Readings” LED turns GREEN.
- vi. Wait for about a few minutes.
- vii. At success, the “Readings” LED blinks GREEN 5 times.
- viii. At failure, the “Readings” LED blinks RED 5 times.
- ix. The gateway goes to the step “iv.”
- x. You can pair another device at P2 mode successively.
- xi. After completion of pairing, you should turn off, set the mode selection switch at “N” and turn on the gateway for normal operation.

D. Pairing IEM’s blood pressure monitor

- i. Turn off all mobile devices nearby, especially Bluetooth.
- ii. Set the mode selection switch at “P2.”
- iii. Let the IEM’s blood pressure monitor at pairing mode.
- iv. Count 30 seconds.
- v. Turn on the gateway.
- vi. The gateway shows the number of currently paired devices with LEDs for 5 seconds.
- vii. The “Readings” LED turns GREEN.
- viii. Wait for about a few minutes.
- ix. At success, the “Readings” LED blinks GREEN 5 times.
- x. At failure, the “Readings” LED blinks RED 5 times.
- xi. The gateway goes to the step “v.”
- xii. You can pair another device at P2 mode successively.
- xiii. After completion of pairing, you should turn off, set the mode selection switch at “N” and turn on the gateway for normal operation.

E. Pairing ForaCare’s thermometer

- i. Set the mode selection switch at “P2.”
- ii. Take a reading with the thermometer.
- iii. Turn on the gateway.
- iv. The gateway shows the number of currently paired devices with LEDs for 5 seconds.
- v. The “Readings” LED turns GREEN.
- vi. Wait for about a few minutes.
- vii. At success, the “Readings” LED blinks GREEN 5 times.
- viii. At failure, the “Readings” LED blinks RED 5 times.
- ix. The gateway goes to the step “iv.”
- x. You can pair another device at P2 mode successively.
- xi. After completion of pairing, you should turn off, set the mode selection switch at “N” and turn on the gateway for normal operation.

F. Pairing Beijing Choice’s Pulse oximeter

- i. Set the mode selection switch at “P2.”

- ii. Take a reading with the oximeter.
- iii. When the Bluetooth icon of the oximeter flashes, remove the finger.
- iv. Turn on the gateway.
- v. The gateway shows the number of currently paired devices with LEDs for 5 seconds.
- vi. The “Readings” LED turns GREEN.
- vii. Wait for about a few minutes.
- viii. At success, the “Readings” LED blinks GREEN 5 times.
- ix. At failure, the “Readings” LED blinks RED 5 times.
- x. The gateway goes to the step “v.”
- xi. You can pair another device at P2 mode successively.
- xii. After completion of pairing, you should turn off, set the mode selection switch at “N” and turn on the gateway for normal operation.

3) Pairing

A. General process

- i. P2 Mode(Master): The same mode as “P2” mode with the mode selection switch
 - 1. Go to configuration mode. Please see the section “2. Gateway configuration” with “setting” checked.
 - 2. Click “Start” for searching devices. As the result, a list of Bluetooth devices available is shown in “Device List.”
 - 3. Select one device and click “Pairing.”
 - 4. Information about the process will be shown in “Bluetooth Log.”
- ii. P1 Mode(Slave): The same mode as “P1” mode with the mode selection switch
 - 1. Go to configuration mode. Please see the section “2. Gateway configuration” with “setting” checked.
 - 2. Click “Start” to make gateway be pairing standby mode.
 - 3. Information about the process will be shown in “Bluetooth Log.”

10. Measurement and data transmission

1) How to use

- A. Take a reading, and then the reading is transmitted to the gateway by Bluetooth.
- B. And the reading is automatically transmitted to the server via mobile networks.
- C. At server access failure, it tries 9 more times, in total 10 times at most with 1 hour period until success.

2) Clock setup

- A. Clock of the gateway is automatically set with 3G connection.
- B. Clocks of measuring devices can be set during communication with the gateway.
- C. But, regarding the IEM’s blood pressure monitor, clock must be set manually.

3) LED indications

- A. During Bluetooth communication, the “Readings” LED turns GREEN.
- B. At success, the “Readings” LED blinks GREEN 5 times.
- C. At failure, the “Readings” LED blinks RED 5 times.
- D. During server connections, the “Sending” LED turns GREEN.
- E. At success, the “Sending” LED blinks GREEN 5 times.
- F. At failure, the “Sending” LED blinks RED 5 times.

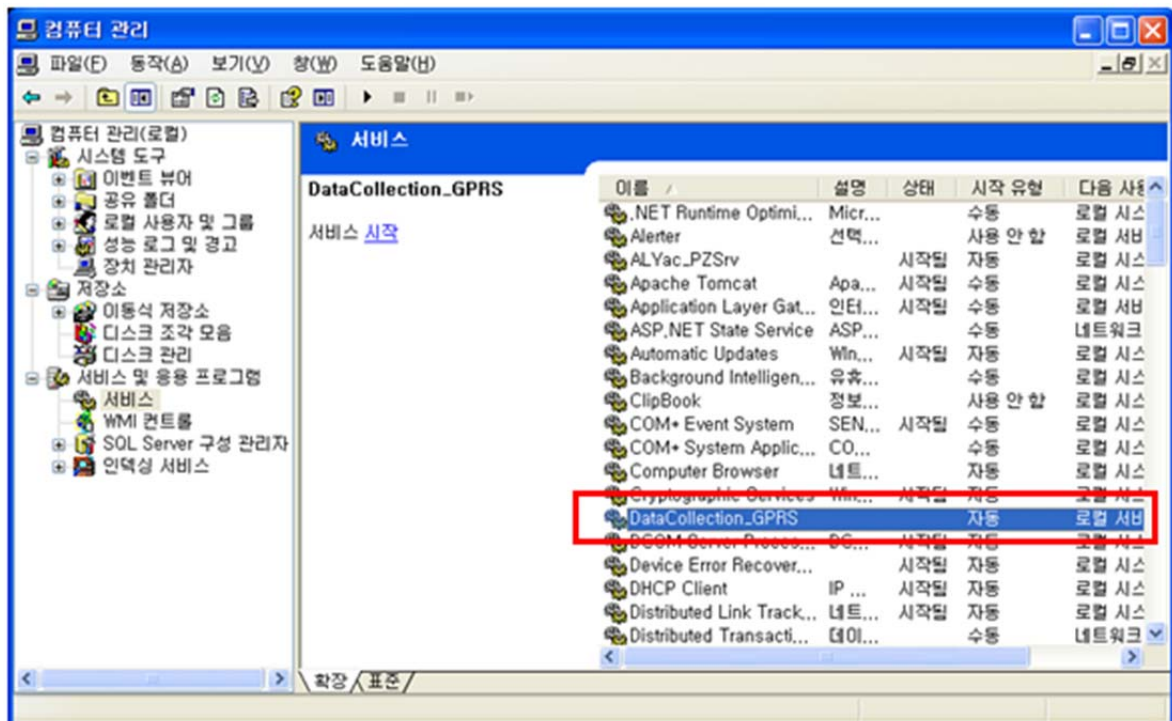
4) Notification for power failure

- A. The gateway is supposed to connect to a server when an AC adapter is connected and disconnected.
 - B. It sends “Power up” and “Power down” signals, respectively.
 - C. Backup batteries are required.
- 5) Heart beat
- A. Server access is taken every six hours for indication “I’m alive.”
 - B. If there is any reading unspent, the reading is sent to a server together.

11. Data collection software

1) Setup

- A. Default path :
C:\Program Files\H3SYSTEM\DataCollection_GPRS\DataCollection_GPRS.exe
- B. Configuration file name: gprs_config.ini
- C. Contents of configuration file (gprs_config.ini)
 - i. LOG_PATH=C:\gprs\log <= Log file path
 - ii. DATA_PATH=C:\gprs\data <= Data XML file path
 - iii. PORT=65001 <= TCP/IP port
- D. Change of configuration
 - i. Stop the corresponding windows service
 - ii. Change the configuration file, gprs_config.ini
 - iii. Re-start the windows service
- E. To start the windows service: At “Windows Service”, select “DataCollection_GPRS” and run.



2) Data files and communication log files

- A. Data XML files will be generated at the folder defined at “DATA_PATH.”
- B. Log files will be generated at the folder defined at “LOG_PATH.”
- C. Examples

Ex) Data XML file name: H3_20101004194422_111111111.xml
Creation logic of xml file name: Datetime + gateway serial no
Ex) Log file name: H3_20101004194422_156.log
Creation logic of log file name: Datetime

12. XML file

```
<?xml version="1.0" encoding="utf-8"?>
<Measure serial="111100002" dc="1" battery="1.2">
  <Info servertime="20111221132941" gwtime="20111221132941" sim="310260760561444"
  fw="H3G-700 v1.0.28" signal="99,99" />
  <Device type="Pressure_AND">
    <Data id="5080600120" measuretime="20111109132941" sys="155" dia="98" pul="77"
    battery="2.63"
    con_gwtime="20111221132941" con_devtime="20111221132941" />
  </Device>
  <Device type="Weight">
    <Data id="2222222201" measuretime="20110901142303" result="068.60" unit="kg" battery="2.3"
    con_gwtime="20111221132941" con_devtime="20111221132941" />
  </Device>
  <Device type="Glucose">
    <Data id="ZH3064BY" measuretime="20111109142303" result="463" unit="0" model="1"
    adapter="1"
    con_gwtime="20111221132941" con_devtime="" />
  </Device>
  <Device type="Glucose">
    <Data id="ZH3064BY" measuretime="20111109142303" result="463" unit="0" model="1"
    adapter="2" battery="3.0" con_gwtime="20111221132941" con_devtime="" />
  </Device>
  <Device type="Thermometer">
    <Data id="00123E0019B5" measuretime="20100101001000" otemp="97.88" btemp="83.66"
    unit="F" />
  </Device>
  <Device type="Pressure_IEM">
    <Data id="61102DM2" measuretime="20110215151641" sys="157" dia="100" pul="091"
    con_gwtime="20111221132941" con_devtime="20111221132941" />
  </Device>
  <Device type="OXI">
    <Data id="0018E41E7B7F" measuretime="20100116012117" pid="001" temp="000" pr="075"
    spo2="90"
    battery="10" con_gwtime="20111221132941" con_devtime="" />
  </Device>
  <Device type="OXI">
    <Data id="0018E41E7B7F" measuretime="20100116012117" pid="001" temp="000" pr="075"
```

```

spo2="90" battery="10"/>
</Device>
</Measure>

```

Item		Description
Common	serial="2222222222"	GateWay Serial No
	dc="0"	Power Adapter Connection Status (0 : Connected ,1 : unconnected)
	battery="1.2"	Gateway battery
	type="glucose"	Device - Glucose : Glucometer - Pressure_AND : Blood pressure(AND) - Pressure_IEM : Blood pressure(IEM) - Weight : weight scale(AND) - Thermometer : Thermometer - OXI : Pulse Oximeter
	id="ZH306CBY"	Device Serial No
	measuretime="20100101001250"	Measurement time
	con_gwtime="20111221132941"	Gateway's time stamp during communication between the measuring device and gateway
	con_devtime="20111221132941"	Measuring device's time stamp during communication between the measuring device and gateway (If the measuring device supports sending device's current time)
Glucometer	result="103"	Measurement value
	unit="0"	Unit (0 : mg/dL, 1 : mmol/L)
	model="1"	Glucometer Model (0:Ultra, 1:Ultra2, 2:Mini/Easy)
	adapter="1"	Glucometer Adapter (0 : N/A, 1 : BA-100, 2: BA-110)
	battery="3.0"	Battery level (only for BA-110)
BP Monitor (AND)	sys="139"	Systolic
	dia="091"	Diastolic
	pul="094"	Pulse rate
	battery="2.63"	Battery
Weight Scale	result="066.80"	Measurement value
	unit="kg"	Unit (kg or lb)
	battery="2.32"	Battery
Thermometer	otemp="98.42"	Object Temperature (Body temperature)
	btemp="74.84"	Back-ground temperature (Outside temperature)
	unit="F"	Unit (F : Fhar)
BP Monitor (IEM)	sys="157"	Systolic
	dia="100"	Diastolic
	pul="091"	Pulse rate
Oximeter	pid="001"	PID
	temp="000"	Temperature
	pr="075"	Pulse rate

	spo2="90"	Spo2
	battery="10"	Battery level (Unit: %) 10 for less than 10%
Gateway information	<pre><Info servertime="20111221132941" gwtime="20111221132941" sim="310260760561444" fw="H3G-700 v1.0.28" signal="99,99" /></pre>	servertime: timestamp of DataCollection Server during communication between gateway and server gwtime: timestamp of gateway during communication between gateway and server sim: SIM card ID including carrier info fw : GateWay firmware version signal: signal strength (format : signal="ssi,ber")