Installation and Diagnostic Tool

IDT

Version 1.0

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Introduction

Thank you for choosing an HWM data device, we trust it will provide you with many years of service.
The individual configuration of your device(s) may differ slightly from the detailed descriptions that follow, but any additional setup information that you need, should be available from our website.

The screen shots and menu descriptions used throughout this manual refer to specific functionality that is only installed in certain device types, therefore always refer to the on screen menu to determine which features are available on your device.

Unpacking

As you unpack your new device, please confirm that you have the following parts required to install the equipment. If there are any omissions, please contact our sales team to rectify or supply the missing parts.

- HWM Data device
- Software Installation Tool (IDT) from www.hwm-water.com or CD-ROM
- Communications lead (optional)

Please dispose of your waste packaging responsibly.

Before proceeding to site for physical installation, please take the time to configure your device in an office environment. Most settings can be configured before visiting site and this will save time at the point of install.

You will need to have:-

- A PC with Windows 7/8/10 installed (IDT also supports Windows XP & Vista) 32bit and 64bit systems are supported.
    - Minimum Requirements are:-
        - 1GHz processor
        - 512Mb RAM
        - 2GB Disk Space
- A description and reference number for the installation site.

Installing the software

1. Insert the CD-ROM supplied into your CD drive.
   (If your PC does not have a CD drive, then either copy the files from the CD-ROM onto a memory stick, or download and run the installation file from the HWM website at www.hwm-water.com)

NOTE: If you use proprietary archiving software, such as WinZip or 7zip, please ensure that you extract the files to a temporary folder using the automatic extraction buttons that maintain the original folder structure.

2. Ensure you have system administration rights for your computer, ask your IT department if you are unsure.

3. If the installation does not start automatically, locate and run the file “setup.exe” (in the IDTInstall/IDT folder), which installs the program and the necessary USB drivers for the device.

4. Follow the on screen installation instructions to complete the install of the IDT.

   Should the automatic installation fail, please check with your system administrator that you have sufficient rights to install the driver or try installing the drivers manually.
   You may be required to update Microsoft .Net; the install file is included with the IDT setup files for your convenience.

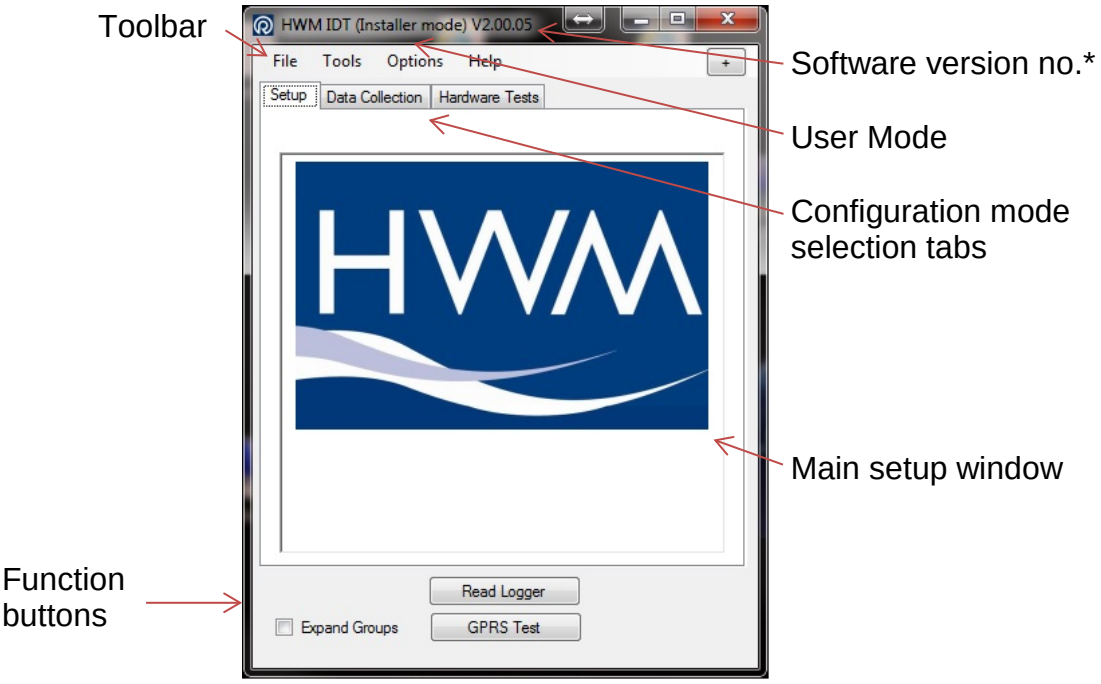
Reading the device

Once you have installed the IDT, connect USB cable first to the data device and then to your PC.

The first time you connect your device to a new USB port, Windows will configure the driver, wait until this process is completed before proceeding.

1. Run the “IDT” program.

2. The main window will appear of which the main items are:-

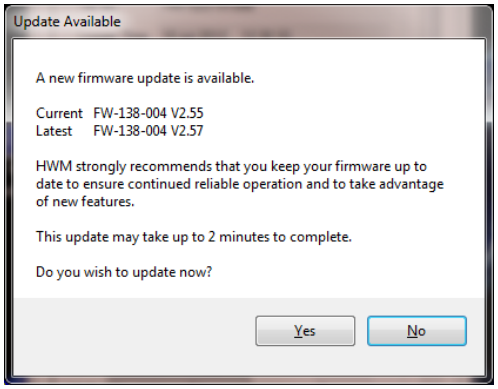


*Note actual software version numbers may differ from the ones shown throughout this user guide

3. Now click the <<Read Device>> button to load the current device settings into the setup window.

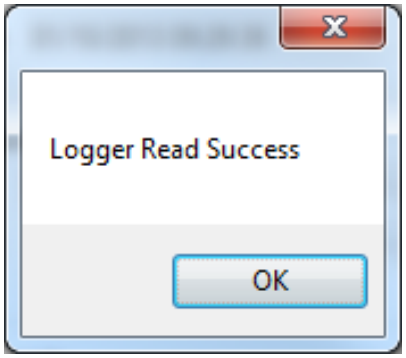
4. The IDT will now download the current settings from the device.

   If there is a more up-to-date version of the device firmware available on your PC, you will see the message “Update Available”.



   Click <<Yes>> to update the device, the process will take approximately 5 minutes, however the device will be restarted so you may wish to transfer any logged data first, in which case click <<No>>.

5. Once all the settings have been loaded, Click <<OK>> to start configuring your device.



Configuring the device

1. You will now see the main setup menu (expanded for illustration purposes) The menu is structured in sections for easy setup – this may not match your device:

i) Device Details including ID and SIM card phone number

ii) Device start time and data capture interval (days or time of measurement period)

iii) Device channel configuration including calibration factors where required (see appendix for info)

iv) Device recorded meter readings

v) Cellular data service provider settings

vi) Data call settings

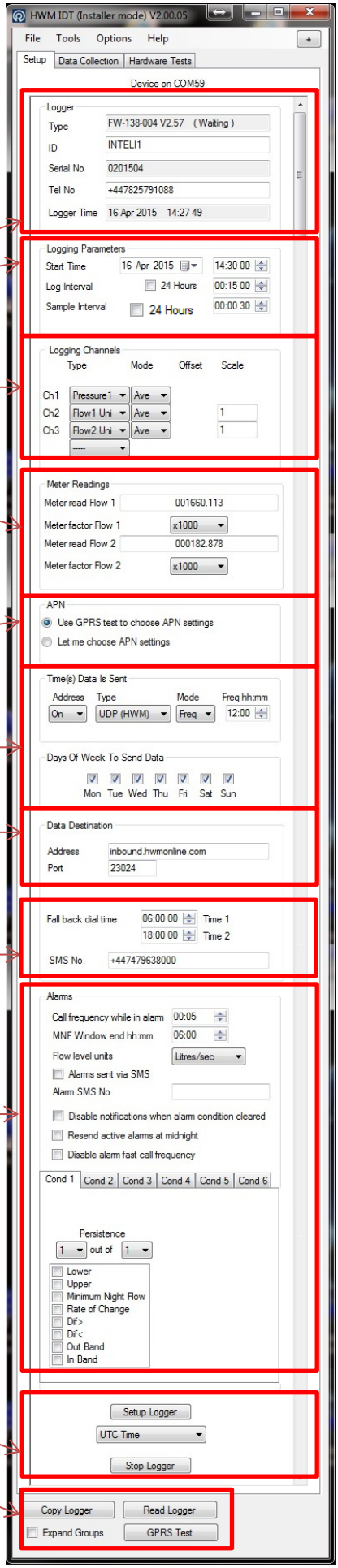
Data Destination details, the server address for the UDP data

vii) Backup call in timing details in case of main call failure or external battery exhaustion and SMS message destination number

viii) Alarm configuration

Final Setup button and device time zone selection

Main function button



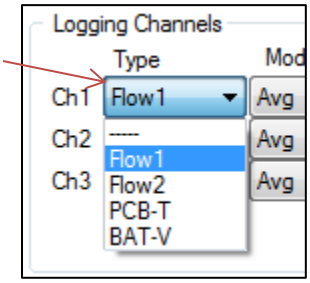
2. Now you can enter the configuration you require for each section

   i. **Device** – enter the site ID that you wish for the device, e.g. Postal/ZIP code up to 7 alpha-numeric characters and the telephone number associated with the SIM card. If you ordered a SIM with the device, this will have been programmed already for you, otherwise enter the number from your service provider in international format (e.g. +44…)

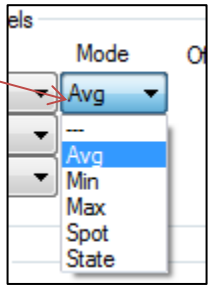
   ii. **Logging Parameters** – Accept the default start time or enter your own. Default start time is in the past so the device will begin recording immediately. You can delay this start time by selecting one from the calendar or enter the time directly from your number keypad. Set your log interval by ticking the "24 hour" box or enter a shorter time in the time box. (Default is 15mins)

   iii. **Logging Channels** – Here you can configure your connections and what data you wish to see.

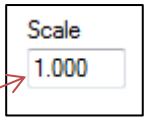
From the dropdown box select the Type of data to appear on Channel 1. This will depend on your individual order, but you may have a selection like that show here. Click "-----" if you do not wish to use that channel.



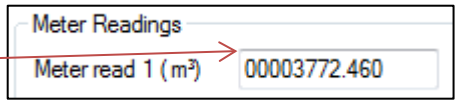
Next choose what mode of collation you wish
Avg = average reading over the log interval
Min/Max = Min/Max values measured over the log interval
Spot = The value at the log interval
State(0) = the state of the switch at the log interval
State(1) = as above but switch state inverted



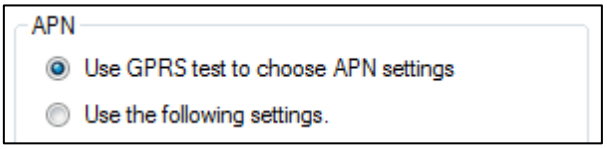
Now, if required, enter the scaling factor for the chosen Type of device input, click in the box and enter the multiplication factor you require. See appendix for info.



   iv. **Meter Readings** – If you wish the meter reading to be sent through to HWMonline, enter the current value in the box(s). This needs to be configured on site as the timing is important, however it can be corrected later via HWMOnline.



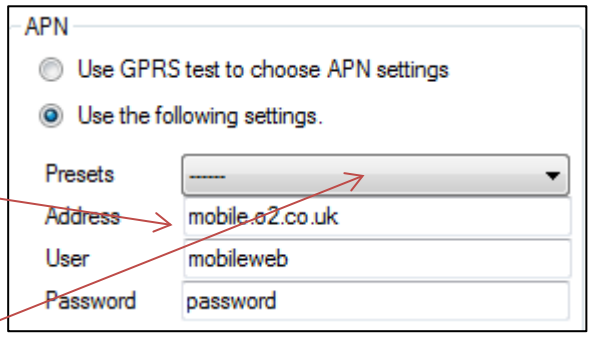
   v. **APN** – If you have ordered a data pack from HWM you can leave this setting alone (as below) as your device will have been preconfigured by HWM.



If you have ordered your data service & SIM card, then you will need to separately configure your service. HWM recommends that you allow the GPRS test utility to search for these settings automatically, however if you wish to enter them manually, click the button beside “Use the following settings”

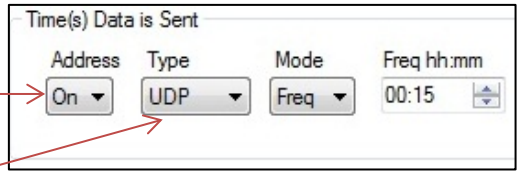
You can now enter your data service provider’s details into the appropriate boxes.

Alternatively select your network from the drop down list of presets

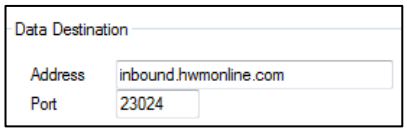


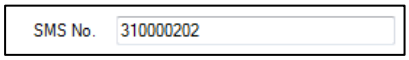
vi. **Time(s) Data sent** – Here you specify the Call Out requirement for the device. There are 2 modes available, SMS and UDP. SMS is a one way unacknowledged data transfer service using the common text messaging service. UDP is a true 2 way confirmed data transfer process via the internet over a GPRS connection. Both have advantages, however HWM recommends UDP wherever possible as this offers the most secure method of data transfer.

Switch on the Call out by selecting “1” in the Address selector, then choose UDP or SMS from the Type selector.



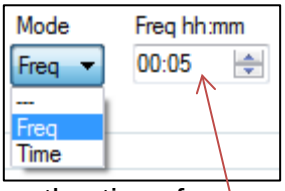
vii. **Call Addresses** – These will usually have been entered at the factory and should not be adjusted, however if you have your own data server, then you can enter either the telephone number for your receiving modem, or the UDP address & port no for where the device is to send its data.





The fall back times specified here instruct the device what to do in the event of the primary Call Out requirement not being met. This can be for 2 reasons:-

a. If a connected external battery goes flat, the device will default from the normal call out requirement to a 2 times per day routine. The times of these calls are specified by both Fall back 1 & 2.
b. If a GPRS data call cannot be completed due to non-availability of a GPRS service, then the device will try to send an SMS message at the Fall back 1 time.



Now choose your Call out mode, this can be either “Freq” for a call made at a regular frequency throughout the day or “Time” to specify up to 8 individual times during the day. Enter either the frequency (e.g. 00:05 minutes) or the time for the call in the box.

viii. **Alarms** – The data device has a comprehensive alarm system that you can configure to send out Alarm messages when certain defined conditions are breached.

When an alarm condition is triggered a new call frequency can be specified to allow the observer to gain more up-to-date data during an event.

Minimum Night Flow is measured between Midnight and the time specified here.

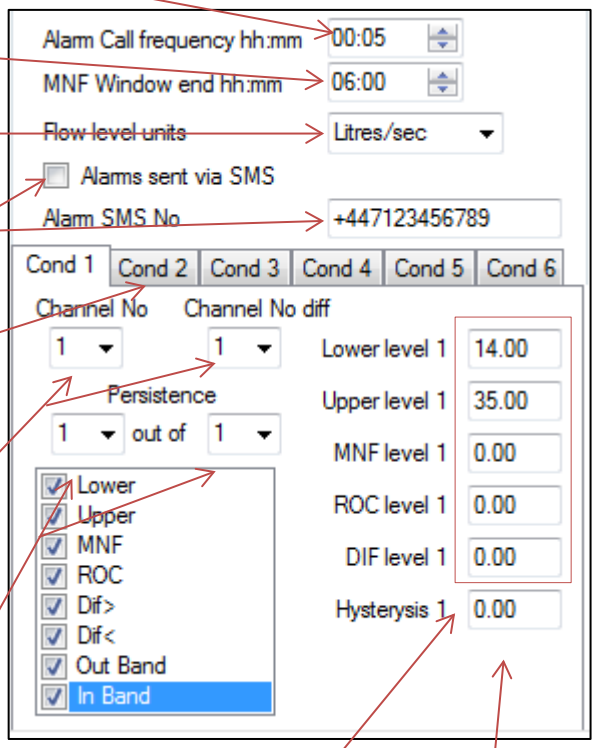
Choose your flow units

If you want SMS alarm messages to be sent, tick this box and enter a phone number

There are 8 possible different alarm conditions that can be configured, select each one from the tabs each generates a separate alarm.

Choose the main alarm channel and then the difference channel if making a comparison.

Set your persistence or trigger point, e.g. 3 occurrences out of 5 incidents triggers the alarm



Choose your type of alarm from the list:-
Lower or **Upper** Limit breach
Minimum Night Flow (**MNF**) not met
Rate Of Change (**ROC**) faster than x per minute
Difference (**Dif**) between channels greater or less than limit
Either **In** or **Out** of **Band** set by Upper & Lower levels

Enter the alarm threshold

Enter the alarm clear Hysteresis

Note on switches
If an alarm is required for a switch type input, set the alarm threshold to 1 or zero depending on the normal operating state. E.g. an Upper alarm set to zero will cause an alarm to be generated when the switch causes a state change from 0 to 1.

Note on Hysteresis: When an alarm is triggered, if the value is set to zero then immediately the threshold is re-crossed then another clear message will be sent. If there is a period when the

alarm threshold is borderline, this can result in numerous messages for the same event. By specifying a value in the Hysteresis box, you can provide a window that allows the threshold to be repeatedly crossed without sending repeated messages. e.g with an Upper limit of 5 and a hysteresis of 1, the alarm will trigger at 5, but the clear message will not be sent until the value drops to below 4.

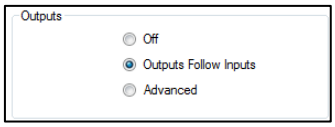
Tamper Alarms

After you have configured the main pulse input channels of your device, if you have a spare input, this can be configured as a Tamper circuit. By linking the appropriate input to ground and ticking the appropriate box, if the circuit is broken (either by cutting the wire or with a door/window type sensor) then an alarm signal is sent via GPRS which will repeat once per day until the circuit is reclosed.

Sensor Power or Control Outputs (optional)

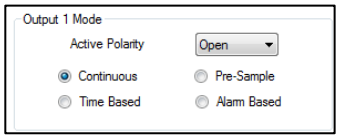
If your Intelligens/Comlog™IS equipped with sensor power or control outputs you will see additional configuration menus appear

Choosing “Outputs Follow Inputs” makes the output port replicate the input ports 1 & 2, for example when connecting an additional device.

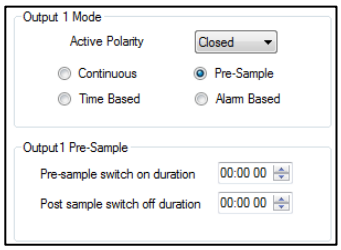


Advanced output options:

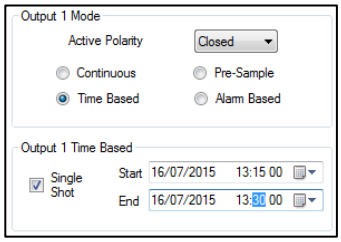
Continuous forces the output port permanently to the chosen condition.



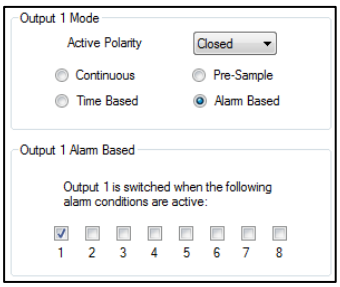
Pre Sample forces the output port to the chosen state the entered time before or after the Logging time.
Example:
Logging time of 00:05:00, Pre-sample switch on duration set to 00:00:10 and Post Sample set to 00:00:05 would switch the output port ten seconds before the data is logged and held for 5 seconds afterwards.



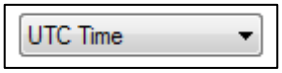
Time Based provides a one time switch at the date and time entered.



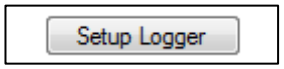
Alarm Based switches the output port when the selected alarm condition is active.



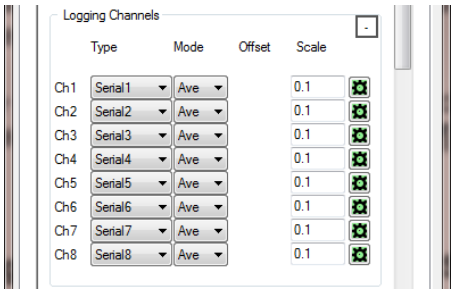
3. Final steps – By default the device is set to UTC (Coordinated Universal Time, equivalent to GMT), however you can choose either an offset from this time, or for the device to use your PC time.



When you are happy with all the settings click the <<Setup Device>> button to program the device.



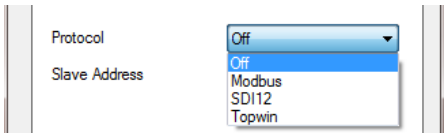
Serial sensor configuration options (SDI-12 or RS485/Modbus)



Each serial input channel is allocated to a logger channel for sending to the data system.

If the mode is set to **Ave**, then the serial sensor is polled at the **Sampling interval**, if the mode is set to **Spot** then the serial sensor is polled at the **Logging interval**.

To configure each serial channel, click the cogwheel symbol. This will reveal the pop-up menu below:

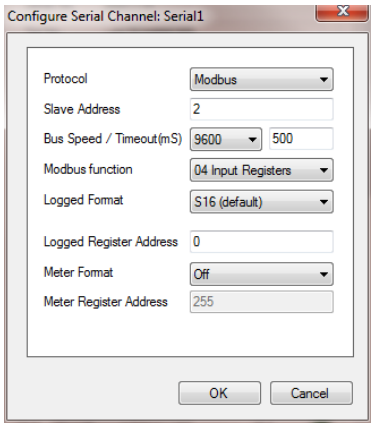


First set your Serial input type. (Note Topwin is a special type of sensor and can normally be ignored).

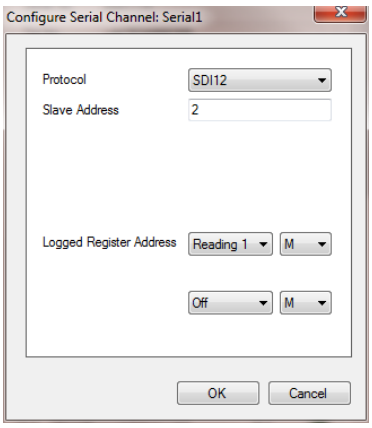
Next configure the settings for each data type according to the user manual for your sensor.

Examples:

RS485/Modbus



SDI-12



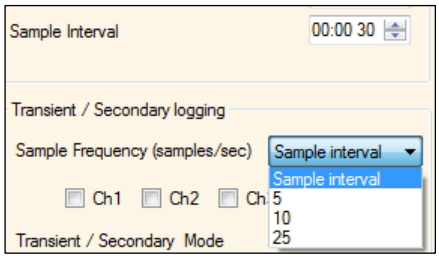
Important note for SDI-12. Due to differences in the way the Address is reported, some sensor manufacturers quote an integer style address and some quote an ascii style address. This means that the actual address can be one below the address in quoted in the manual or the configuration software.

e.g. Lufft UMB Weather Station device reports Device ID1 (default) which corresponds to SDI-12 address “0” (SDI-12 default)

Enhanced Recording options

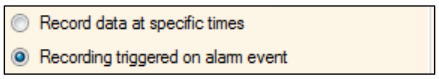
The device is capable of making additional recordings at higher than normal sampling rates. It works in two basic modes, Recording at specific times to allow you to manually set events to be recorded at higher speed and Recording triggered on alarm event where the device monitors a sensor and if the value exceeds that programmed then the device makes a recording.

1. Choose your Sampling Frequency. You can select either the base system Sample Interval, this is the rate that the device normally samples at before making its average calculation, or you can choose one of the available faster Sampling Frequencies.



2. If available, choose the channel you wish to sample. Note that the faster sampling rates are fixed to the primary analogue recording sensor, e.g. Pressure, so you cannot select any other channels.

3. Now choose your operating mode.

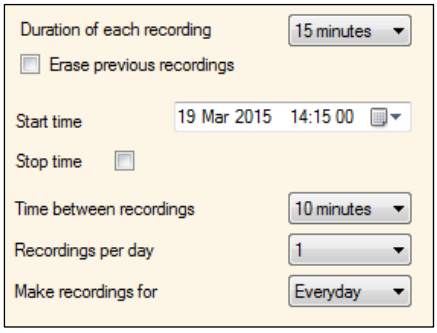


Recording at Specific times

1. Choose the duration of the recording or set the Stop time for a specific time period.

2. Choose the repetition settings.

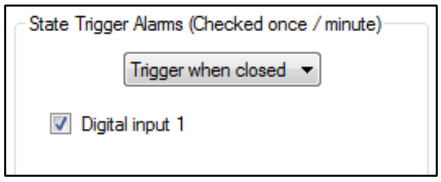
3. The device will make recordings and send them to the data system at the pre-determined times.



Recording triggered by an external State Switch e.g. Float switch

1. Choose which switch state should trigger the recording.

2. Choose which digital input that the switch is connected to.

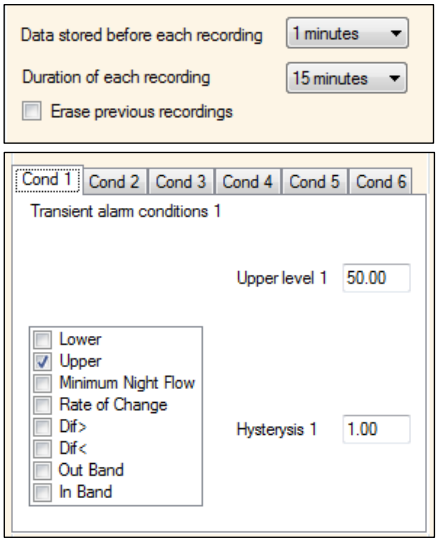


3. Device will now start the accelerated recording when the switch is closed. Note that the state switch is sampled **once per minute** regardless of the sample rate setting. If faster rates of state checking are required, the standard alarms should be used.

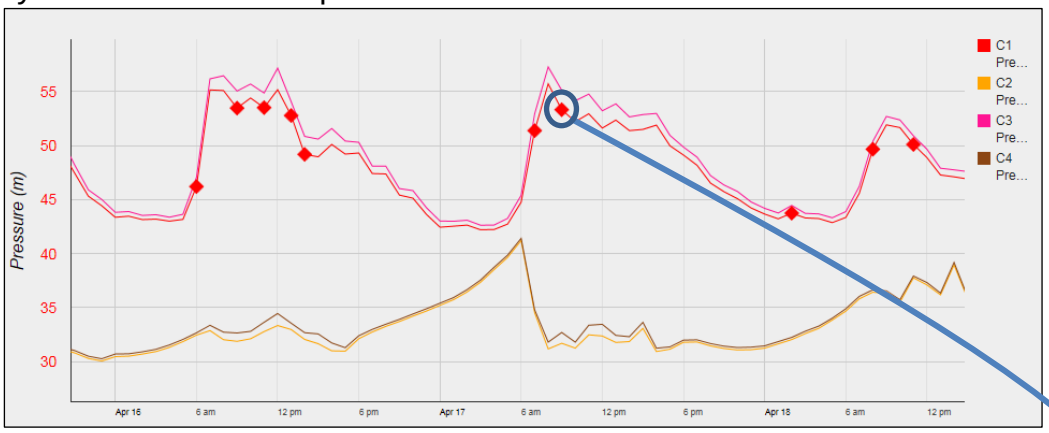
Recording triggered on alarm event

1. Choose the amount of data to be stored before the alarm is triggered and duration of the recording.

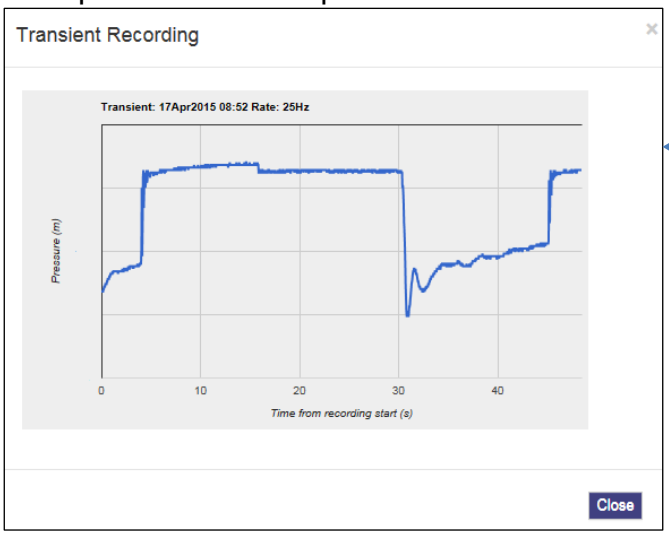
2. Configure your alarm condition to trigger the recording. In this example, the device will trigger a recording of 16mins (including 1m from before the trigger) when the alarm for the primary analogue channel (e.g. Pressure) passes the upper level of 50.0



Additional notes:
The data will be displayed on HWMOnline as additional traces on the graph for a Sample Frequency setting of Sample Interval. For higher Sample Frequency rates the primary trace on HWMOnline will display a diamond symbol to indicate the point where a transient occurred.

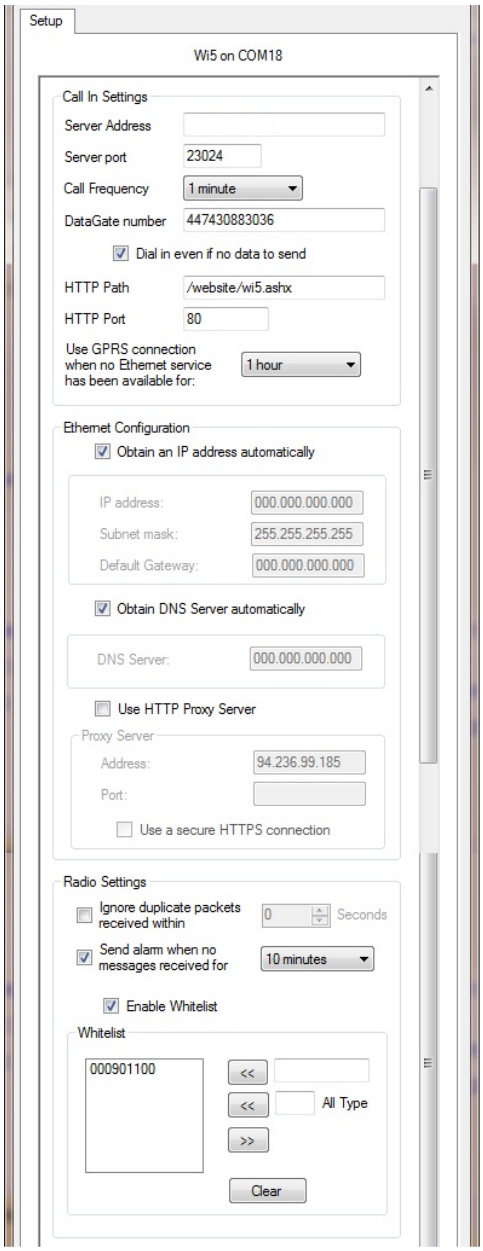


Click the diamond to provide a close up view of the faster recording



Wi5d configuration options

The HWM Wi5d data concentrator uses many of the same features as other data devices, but there are a few key differences which are detailed below:



Server address details and call frequency for the Wi5d to send its data.

Data path for the receiving Toran system

For dual mode systems, if there has been no Ethernet service for a period of time, data will be sent by cellular network.

Ethernet configuration details

Network Proxy settings if required for your network

If using a radio network with repeaters, you can set the Wi5d to ignore duplicate received messages to reduce network traffic.

If no messages received by the Wi5d send an alert

Set up a whitelist so only the individual radio transmitters or transmitter types specified in the list are relayed.

Push clear to empty the whitelist and open the Wi5d to all transmitters.

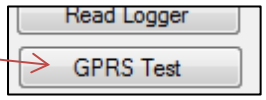
Data Communications Confirmation – GPRS Test

It is important to confirm that your device is communicating with the data server before you leave site (or to be confident, your office), so you should undertake a GPRS test before you leave the device in the field.
Note not all devices are supported by GPRS test.

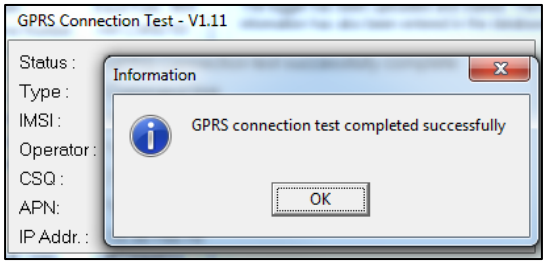
1. Connect an appropriate GPRS antenna to the FME socket on the device.
   Note: If this is the final Antenna connection, ensure that the connector is tightened with spanner or pliers to prevent water ingress to the antenna plug as this will reduce performance. Do not over tighten.

2. Run the IDT and read your device as in steps 1 to 3 above.

3. Now click the <<GPRS Test>> function button.



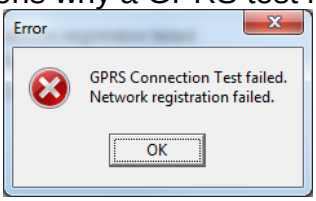
4. The GPRS Test program will now automatically execute a communications check with the data server, DataGate™ and deposit a test message that can be checked later on.



The test will take a few minutes and will confirm that the communication is successful.

Troubleshooting a GPRS test failure.

There are a number of reasons why a GPRS test may fail,



the following points should be checked before calling HWM support for assistance:-

Possible Problem	Solution
Network Busy due to excessive traffic. Commonly occurs around schools.	Retry the test after a few minutes.
GPRS signal not available at your location. Not all Cell masts carry GPRS traffic	The device will call into the data warehouse once per day using an SMS message; relocate the device if more frequent communications is required.
Network signal not strong enough. You need a CSQ (reported by the GPRS test) of at least 8 for reliable communications.	Relocate the antenna if possible or try alternative antenna configurations. Ensure antennas are vertically orientated where possible. See antenna installation guide.
APN settings incorrect.	The GPRS tester knows about a large number of cellular networks and will try as many settings as possible and correct any error automatically. If there is still a failure, then you need to check with your network operator that you have the correct settings for your SIM.

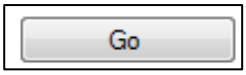
If you continue to experience problems with communication, you may need to check the network coverage in your location.

Taking a reading from the device and hardware diagnostics

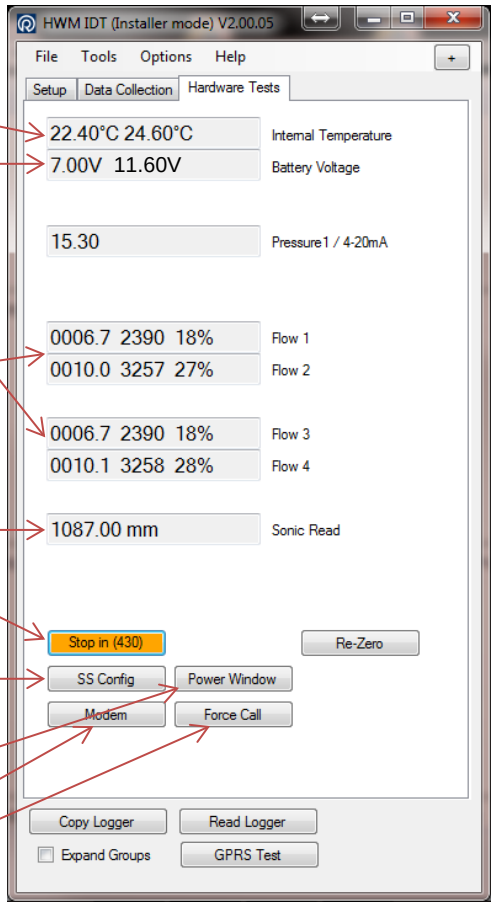
You are now ready to confirm that the device is measuring real data from the sensors by taking an Instantaneous Value.
Note that the IDT will display hardware parameters based on the configuration of your device, so the screen below shows a typical example.

1. From the IDT menu bar, click the <<Hardware Tests>> tab.

2. Click the <<Start Test>> button to start to check the operation of your installed system.



3. The IDT will now display its measurements for a period of 10 minutes to allow you to diagnose any issues with cabling.



Ambient and external probe temperatures
Primary battery and external supply voltages

Measured Pressure

Flow Channel pulse info
[Rate] [Count] [%age of Device range]

Sonic Sense measurement

Time until test stops & Manual Stop button

Shortcut to Sonic Sense setup program

Open 10m power window button
Modem Diagnostics
Force a data call now

When you are ready to stop the test just click the <<Stop>> button.

Note: If the flow readings do not meet your expectations, then check your connections and your calibration factors have all been entered correctly. If you still have incorrect readings, you may have a faulty pulse unit on the meter which will need to be replaced.

4. A “Power Window” allows you to keep the device’s modem turned on for a period of 10 minutes. This allows you to close the chamber lid and send a text message to it to confirm that communications is still OK.
See final site checks on page 21.

5. Pressing <<Force Call>> forces the device to send its data in immediately. Useful for when you wish to shift a device to a new site.

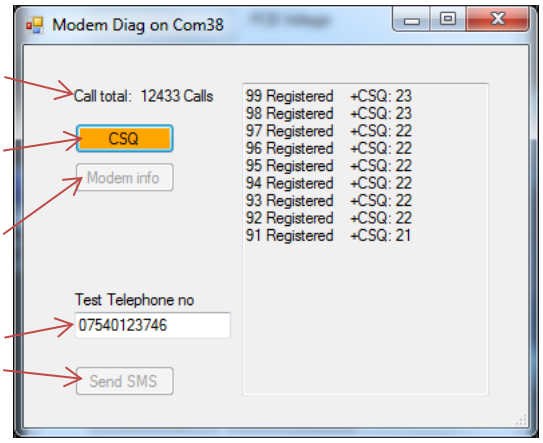
6. The <<Modem>> button allows some more advanced diagnostics to be performed on the modem.

Indicates total number of calls made

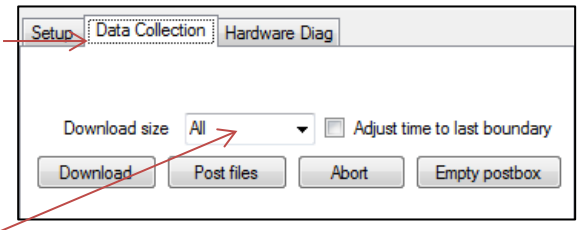
Provides the current signal strength

Provides the IMSI & IMEI numbers for the modem

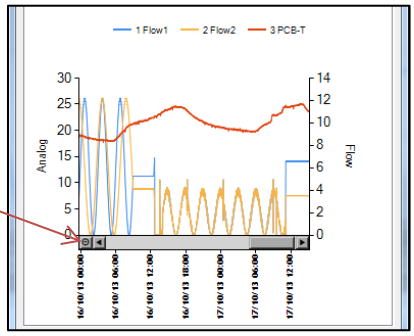
Enter a mobile phone number here & click <<Send SMS>> to instruct the device to send you an SMS test message.



7. If you click the <<Data Collection>> tab you will now see a set of tools for downloading data from your device for later uploading to the data server. It can also be of assistance for diagnosing problems.



   a. From the Download size selection, choose how much data you wish to retrieve, from everything the device has stored to any un-sent data since the last time the device called in.
   b. Click <<Download>> and the data will commence downloading. If you wish to stop the process, click <<Abort>> and the download will cease.
   c. A small chart will now be displayed showing the data downloaded. By using your mouse to draw boxes in the graph area you can zoom into areas of interest. Click the small circles at the end of the drag bars to zoom out. By hovering your mouse over the points on the graph, you will see the exact value recorded.



   d. If your device is in a location where GPRS communication is not possible, you can now upload the data when you are next connected to the internet. Simply click <<Post files>> and all the data you have downloaded to your PC will be uploaded in one go. If you are downloading more than one device in a route, all data is stored and transmitted together. If you decide that you do not wish to post the data you have downloaded, click the <<Trash Files>> button to remove the downloaded data from your PC.

Final site commissioning checks

Having made all the configuration checks, checked all the wiring is good, verified the instantaneous values are what you need and confirmed communications with a GPRS test, there is one last check that you can make with your mobile phone to confirm everything is working as it should.

1. In the Hardware Diag tab, click the <<Power Window>> button to power up the device for 10 minutes.

2. Close the chamber or cabinet such that everything is in its final positions.

3. Now using a standard mobile phone, send a text message to the SMS number of the device (see page 7 for the number) including the international dialling code if needed.
   The text message should read **TTTT#**

4. After a few seconds/minutes (depending on the network operator) the device will send a message back to you with details of its current status.
   Example response from a device:
   TTTT138-002 V01.70CSQ:1010.9VyouridRT hh:mm ss dd-mm-yy …

5. To decipher the message returned, please refer to the table below:

Message	**Description**
TTTT	Original command text without #
138-002	Device type number
V01.00	Firmware version in Device.
CSQ: nn	Signal strength nn (nn = 6 to 30)
10.9V	Operating voltage
yourid	Your Device ID
RT hh:mm ss dd-mm-yy	Real Time Clock setting
ST hh:mm ss dd-mm-yy	First Time the device was started
LR hh:mm ss dd-mm-yy	Last Time the device was re-started
Ch1 (A) 0029.0	Channel 1 29.0 units
Ch2 (A) 0002.2	Channel 2 2.2 pulses/sec

6. If the CSQ: value in the message is OK then the installation is complete. The device will automatically go back to sleep after 10 minutes.

7. There can be delays in the SMS network, so the response to your message may not be immediate. If you have had no response in 10 minutes, re-open the chamber and using the modem diagnostic send yourself a test SMS. If this gets through then improve the location of the antenna and try again.

Note: Some Roaming SIM cards and certain types of device do not accept incoming text messages. Check with your service provider if you are unsure.

Notes:

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