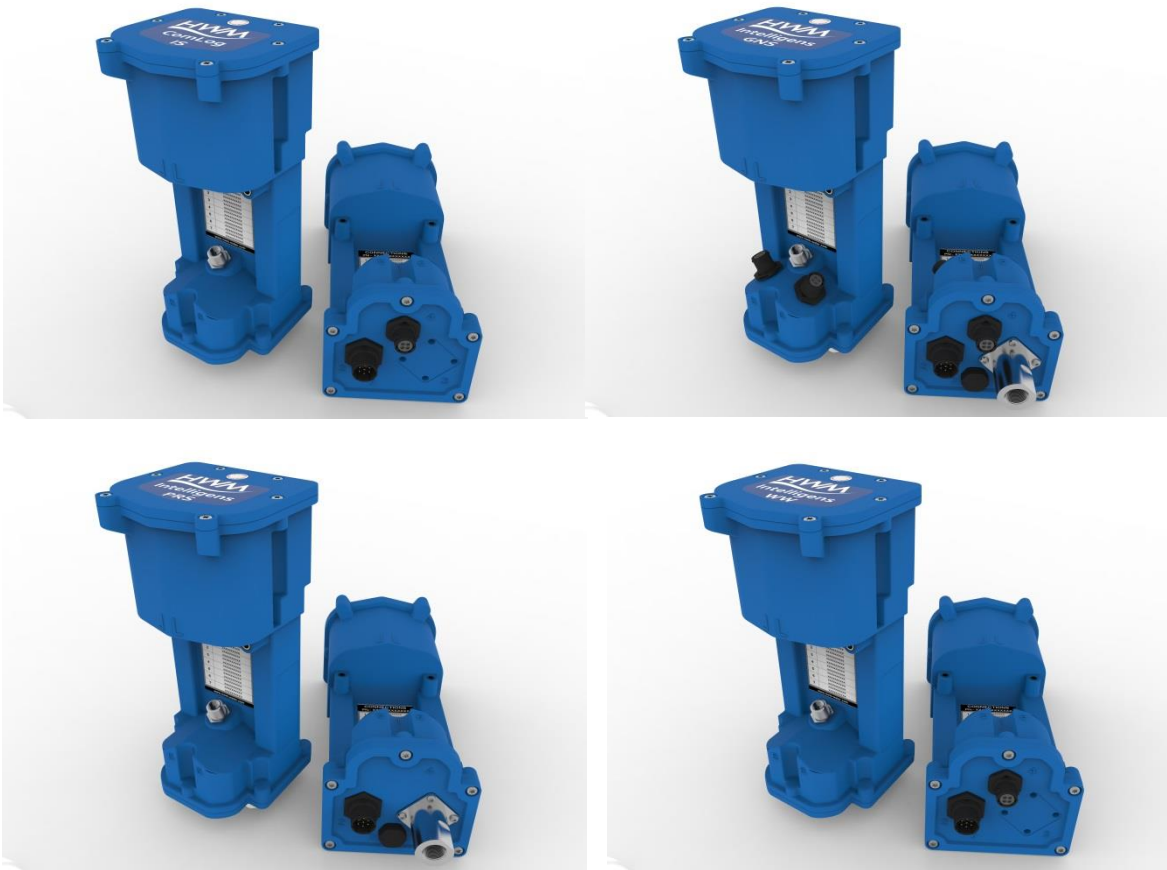# Intelligens / COMlog™ IS logger User Manual 1/2
Basic User Guide for a HWMOnline™ installation

Device supplied may differ from the image above depending on input/output configuration

> ⚠️ **Warning:** Always read this manual in conjunction with the Safety Supplement which contains important safety and operating information.
> Please read, understand and follow the instructions in the manuals.

TABLE OF CONTENTS

Introduction

Thank you for choosing an HWM data logger(s), we trust it will provide you with many years of service.

The individual configuration of your logger(s) may differ slightly from the detailed descriptions that follow, but any additional setup information that you need, should be available from our website.

Unpacking

As you unpack your new logger, 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.

- Intelligens data logger
- Software Installation Tool (IDT) from http://www.hwmglobal.com or CD-ROM
- External GPRS Antenna (optional)
- COMMS(-Y) USB/IS - Serial Communications lead (optional)
- Connection cables (optional)

Please dispose of your waste packaging responsibly.

Before proceeding to site for physical installation, please take the time to configure your logger 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 valid HWM-water.com account with username & password.
- A valid HWM DataGate™ account with username & password. See DataGate™ setup later in this manual.
- A PC with Windows 7/8 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.
- The SIM card installed into the logger and a good GPRS signal* for the chosen network (Roaming SIMs are also available). This is already done for you if you ordered a data package with the logger. See the appendix if you have purchased a data pack & SIM separately. *See section on Antenna Installation Considerations, page 17.

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 http://www.hwmglobal.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 logger.

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.

2 – Connect to PC

1 – Connect to Logger

Installation and site hardware Diagnostics Tool (IDT)

Once you have installed the IDT, connect USB cable first to the logger (7 pin socket) and then to your PC.

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

Reading the logger

1. Run the "IDT" program.

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

Toolbar

Software version no.*

User Mode

Configuration mode selection tabs

Main setup window

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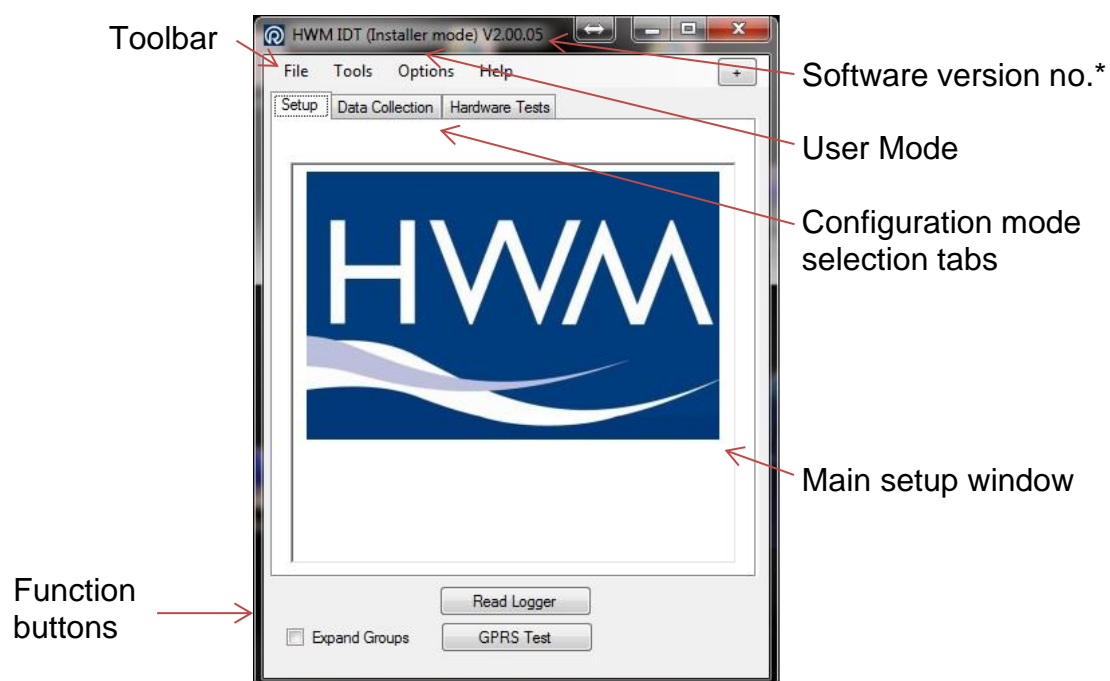
*Note actual software version numbers may differ from the ones shown throughout this user guide

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

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

If there is a more up-to-date version of the logger firmware available on your PC, you will see the message "Update Available".
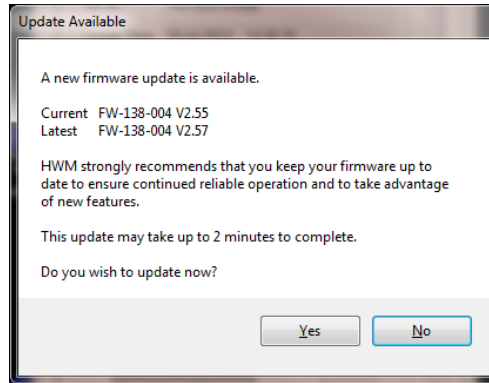
Click <<Yes>> to update the logger, the process will take approximately 5 minutes, however the logger will be restarted so you may wish to transfer any logged data first, in which case click <<No>>.

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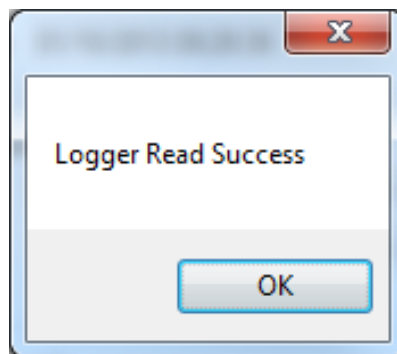
Configuring the logger

1. You will now see the main setup menu (expanded for illustration purposes) The menu is structured in sections for easy setup:

   i) Logger Details including ID and SIM card phone number

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

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

   iv) Logger 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 logger time zone selection

   Main function buttons

Note that the IDT is regularly updated so may not match the picture above

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

i. **Logger** – enter the site ID that you wish for the logger, 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 logger, 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 logger 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 logger 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 logger 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 logger. 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 logger is to send its data.

The fall back times specified here instruct the logger 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 logger 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 logger 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 logger 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.

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 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.
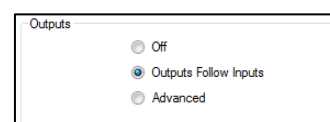
Tamper Alarms

After you have configured the main pulse input channels of your logger, 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.
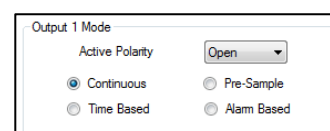
Sensor Power or Control Outputs (optional)

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 logger.

Advanced output options:
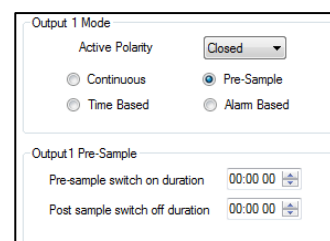
Continuous forces the output port permanently to the chosen condition.
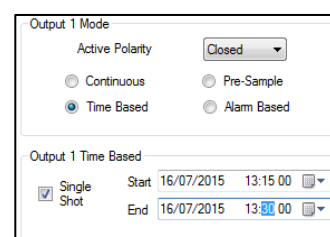
Pre Sample forces the output port to the chosen state the entered time before or after the Logging time.
Example:
Logging time of 00:05:00, Pre-sample switch on duration set to 00:00:10 and Post Sample set to 00:00:05 would switch the output port ten seconds before the data is logged and held for 5 seconds afterwards.
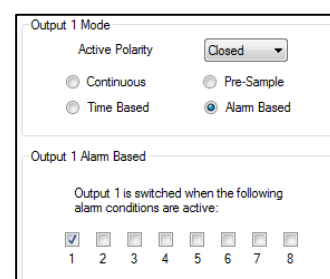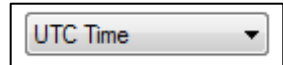
Time Based provides a one time switch at the date and time entered.

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

11

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

UTC Time ▼

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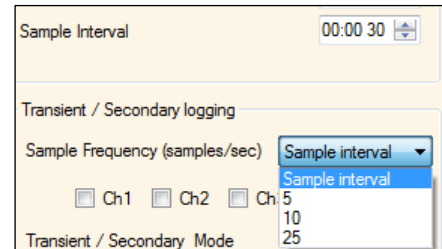
Setup Logger

Enhanced Recordings (optional)

The logger 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 logger monitors a sensor and if the value exceeds that programmed then the logger makes a recording.
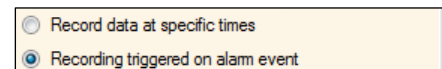
1. Choose your Sampling Frequency. You can select either the base system Sample Interval, this is the rate that the logger normally samples at before making its average calculation, or you can choose one of the available faster Sampling Frequencies.
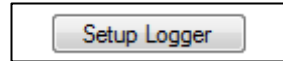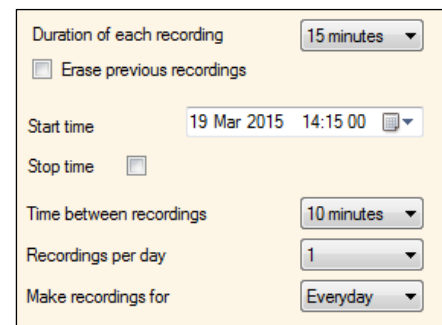
2. If available, choose the channel you wish to sample. Note that the faster sampling rates are fixed to the primary analogue recording sensor, e.g. Pressure, so you cannot select any other channels.

3. Now choose your operating mode.
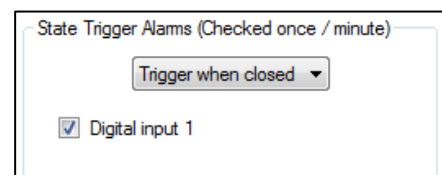
Recording at Specific times

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

2. Choose the repetition settings.

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

Recording triggered by an external State Switch

1. Choose which switch state should trigger the recording.

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

3. Logger 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.

13

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 logger 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.
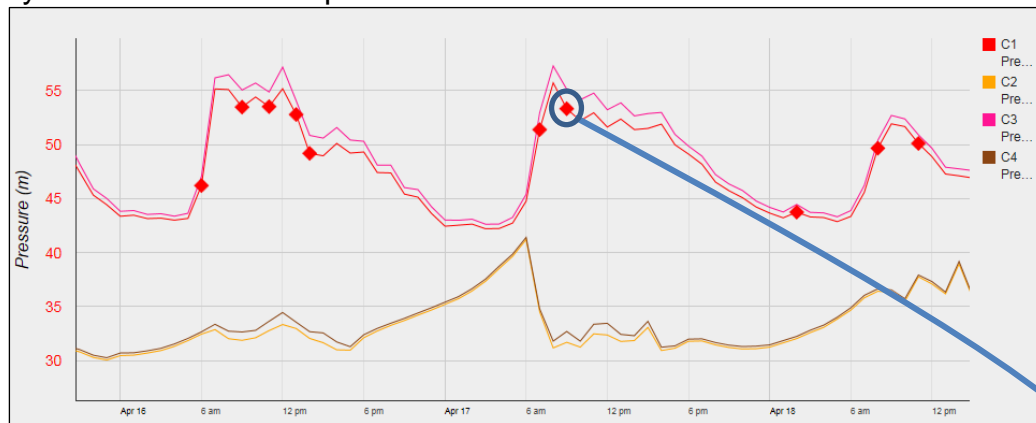
Click the diamond to provide a close up view of the faster recording
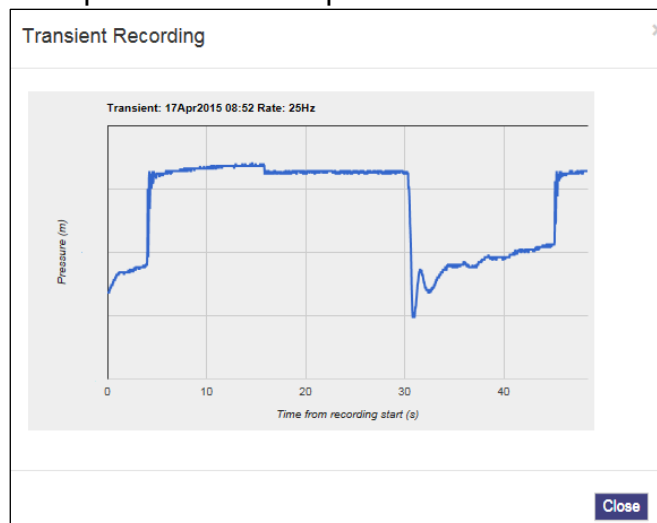
Data Communications Confirmation – GPRS Test

It is important to confirm that your logger 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 logger in the field.

1. Connect an appropriate GPRS antenna to the FME socket on the logger.

Antenna cable
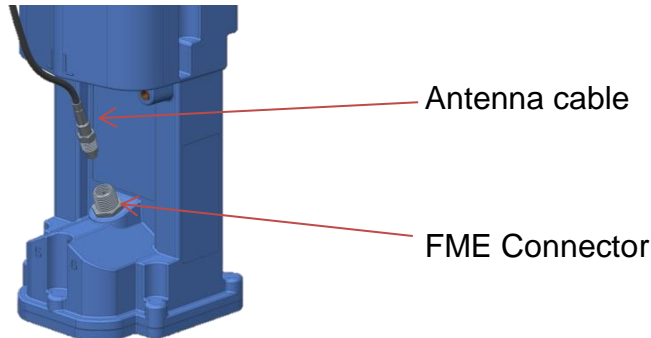
FME Connector

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 logger as in steps 1 to 3 above.

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

Read Logger
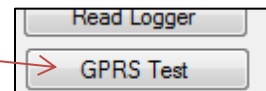
GPRS Test

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.

GPRS Connection Test - V1.11

Status :
Type :
IMSI :
Operator :
CSQ :
APN:
IP Addr. :

Information

GPRS connection test completed successfully

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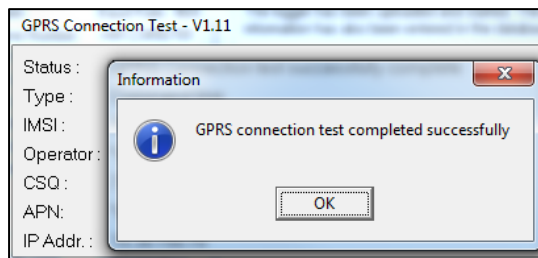
The test will take a few minutes and will confirm that the communication is successful.

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 logger will call into the data warehouse once per day using an SMS message; relocate the logger 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 placement notes section.
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.

Antenna installation considerations

The method of installation at site should be carefully selected.

Signal strength within the cellular network can vary dramatically even within the same cell; proximity to the transceiver, type of antenna, position and angular orientation of the antenna, all have a significant effect on the ability of a device to reliably communicate with the cellular network. To ensure reliable GSM/GPRS data communications it is essential that the most suitable antenna is selected and it is mounted in the most appropriate location.

Installing a device without considering the type of antenna and its installation constraints can lead to disrupted and unreliable data communications and accelerated battery consumption. The following gives practical advice on how to minimise potential problems.

General Considerations

- Always perform multiple signal strength tests moving the antenna to different positions (please see below for description of signal strength test results).
- When fitting the "puck" antenna to a cabinet, always fit it to the top wherever possible. Ensure the surface is as clean as possibly prior to attaching the antenna with the adhesive pad and that the nut on the inside of the cabinet is fully tightened.
- When performing Signal Strength Tests ensure that the chamber lid/cabinet door is in as close to normally closed position as possible to ensure an accurate result.
- If the device is installed in an underground chamber consider, where possible, locating the antenna in a secure position outside the chamber.
- Ensure that the antenna connector is in good condition and correctly tightened (finger-tight is not sufficient for the type of connectors used). Adequate tightening of the connector reduces the risk of water ingress and thereby signal attenuation as a result of changes in impedance.
- Never attempt to modify the dielectric seal of the antenna connector, it is designed to keep moisture away from conducting parts which lead to corrosion and attenuation.
- Consider using secondary environmental protection for the antenna connector such as self-amalgamating tape.
- Use the shortest possible antenna lead.
- Where long transmission leads are required, consider using a low-loss alternative to corrugated copper cables, e.g. Times Microwave white braided coaxial cable.
- The signal emitted from any antenna submerged under water will be significantly attenuated; place the antenna in a location where it will not become submerged.
- Always ensure that the latest firmware is installed in the device.

Installation Process Decision Tree

Identify Chamber type

↓

Small Cabinet/ Chamber | **Side/Hydrant Chamber** | **Large Chamber / Building**

↓

Choose the appropriate antenna and position it within the chamber
Ensure antenna terminal is tightened and wrapped in self amalgamating tape to seal

↓

T-Bar or Puck
Fix to Logger top or topside of cabinet lid, ensuring that the antenna is as high as possible, 8-10 cms can make a big difference in signal strength on underground assets.

**T-Bar on logger
I Bar on chamber wall**
Try the T-Bar and I-Bar on chamber wall – use the best performing antenna in the position that yields highest signal strength.

**Carant on bracket
T-Bar on logger
I Bar on chamber wall**
Try the Carant antenna attached to a bracket facing down – do not fit this if the chamber is likely to flood regularily. Try T/I-Bar as per Side/Hydrant chamber

↓

Perform Signal test with chamber lid/door as close to closed as possible

↓

Signal > 14
This is a sufficient signal strength for good communications

Signal 7-14
1) Try an alternate network logger/SIM card
2) Try an alternate antenna location
3) Try an alternate antenna
Use best antenna/location combination.

Signal <7
1) Try alternate antennas / positions as per 7-14
2) Try to locate an I-Bar externally (above ground) where considered safe to do so.
3) Recommend site for above ground Antenna installation. Take supporting photographs.

↓

Complete GPRS test to confirm correct communication
Ensure antenna terminal is tightened to and wrapped in self amalgamating tape to seal
Phone office (if possible) to confirm data is arriving

Cellular Network Signal Strength (as measured by CSQ Test)

  0-7   Insufficient, the device may be able to register with network but will not be able to send or receive data reliably.
  7-14   Marginal, depending upon the ambient conditions data transmission may be possible, important to select the correct antenna and install it in the most suitable location.
  14-21 Adequate, Data transmission should be reliable.
  21+   Ideal, Strong signal strength data transmission will be reliable.

Antenna Options

Carant Monopole antenna – For most installations the Carant antenna will give the best performance.
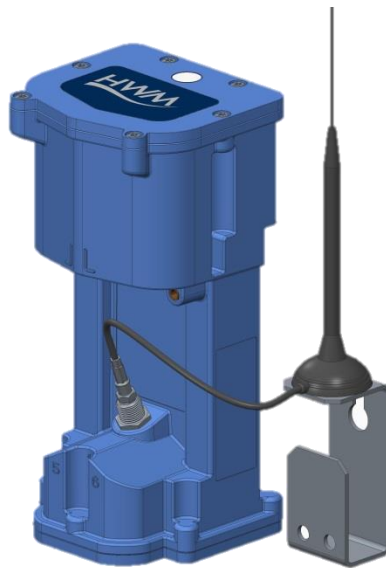
Carant Installations Considerations

For optimum performance the antenna requires a metal grounding plane, consider installing a metal bracket made of a ferrous material to attach the magnetic base of the antenna.
- Install the antenna near to as close to the surface in large underground chambers, ensuring that the lid will not interfere with the antenna when being opened/closed.
- This antenna is vertically polarised, it should always be installed in the vertical orientation.
- Never bend the radiating element of the antenna
- The Carant can also be attached to an installation bracket mounted to an existing marker post

Puck – This antenna is designed to be fitted into the top of a cabinet or post

First drill an appropriate hole in the top of the post, then fit the antenna.
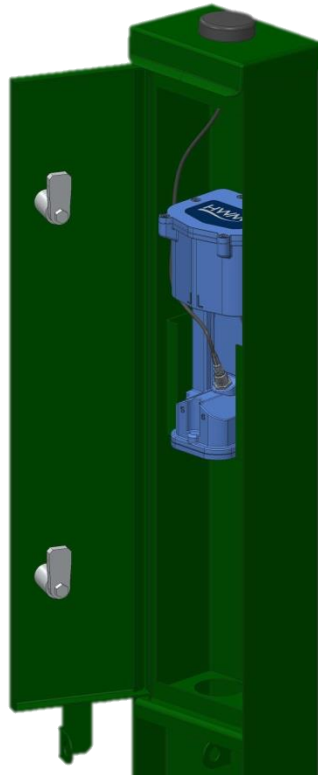
Puck Installation Considerations

- Ensure the top of the post is clean and that the adhesive pad is firmly located to prevent water getting into the cabinet.

T-Bar – This antenna is ideal for installing on top of the device especially in locations with restricted space.
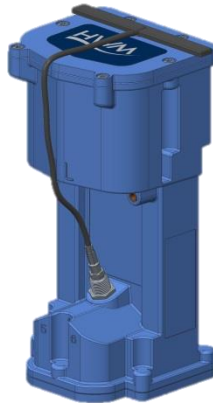
T-Bar Installations Considerations

- Adhere the antenna to external structures using marine quality adhesive (such as the brand 'Goop').
- Keep the antenna cable as short as possible, 0.5m.
- Avoid attaching the T-Bar to a metallic surface as this can adversely affect signal strength and performance, however it may be better than underground

I-Bar – The physical construction of this antenna makes it ideal for attaching to structures external to subsurface chambers.
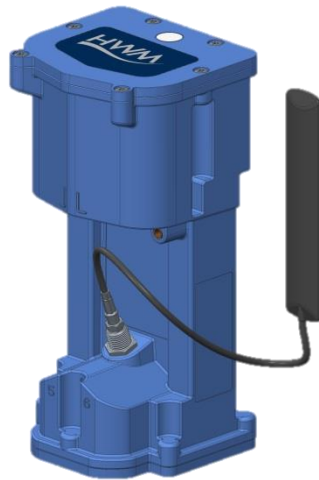
I-Bar Installations Considerations

- Antenna can be attached to the side wall of a small chamber or to the top side of the chamber lid.
- With the use of a longer cable version (or an extension cable where absolutely necessary) and a sealing compound, this antenna can also be fitted in the ground, on marker posts, in cracks or brickwork near to the chamber.
- If the antenna is to be placed outside the chamber care must be taken to physically protect both the antenna and cable from damage. This can be done by burying the cable or installing a suitable conduit.
- Avoid attaching the I-Bar to a metallic surface as this adversely affects signal performance

Button – The button antenna is designed for mounting into chamber lids.

Button Installations Considerations

- Antenna needs to have the chamber lid drilled out as the top surface of the antenna needs to be 0.5mm below the surface of the lid to prevent damage.
- Use a 31mm core drill to make a suitable countersink in the lid to fit the antenna.

These are available from specialist tool suppliers.
- Once fitted, cover the top of the antenna with a resin epoxy such as Marine "Goop"

Installation pictures:

Installing your logger at site

Having performed all the steps in the previous sections, you should now be confident that your logger is configured for your purposes and is communicating correctly in a controlled environment. The next step is to physically install you logger on site.

Every site installation is unique with various types of connections, positioning or environmental conditions possible, the following recommendations will assist in a reliable installation.

- Keep the equipment neatly arranged in chambers so that cables are not crushed.
- Do not allow logger or battery to rest on the connectors as crush damage to cables can result.
- Ensure connections to any pulse cables are good and watertight (see page 25).
- Use wall mounting brackets were possible to keep the logger in clear space.
- Where space is tight, consider shortening flow cables to avoid squashing excess cable into small chambers.
- Position loggers away from sources of electrical interference such and motors or pumps.

Connecting the pressure

Before connecting the pressure to the logger you need to set the atmospheric zero point on the pressure sensor.

Using the IDT software, read the logger and then select the Hardware Tests tab. Ensure you follow all the safety instructions in the Safety Supplement.

Click the [Re-Zero] button to start the zeroing process.

Once the new zero level is set, proceed with the physical connection to the logger.

The logger is fitted with a ¼in BSPT thread. Ensure you follow the appropriate network guidelines for sealing the connection.

⚠ **IMPORTANT**: Always hold the metal body of the sensor with a 19mm A/F spanner; do not hold only the case.

Connecting to the logger

When making a connection to the logger where a simple plug to plug is not available, you will often need to splice bare tails together. It is important that a waterproof connector housing is used, such as the "Tuff-Splice" enclosure available from HWM.

Fig. 1
Splice wires using supplied crimp connectors.

(DO NOT STRIP WIRES BACK).

Fig. 2
Insert spliced wires into the gel filled tube.

Fig. 3
Close Tuff-Splice lid for secure seal.

Final Connection

Note that Long data connections should always be made using screened cable. The use of screened cable will ensure maximum rejection of interference from outside sources. Always use a common ground point without creating ground loops.

⚠️ **WARNING**

Always refer to the safety notes provided in the Supplemental User Manual 2/2 and the port parameters of the equipment you are connecting to the logger.

Always use HWM connection cable CABA9420-Y (Y indicates cable length)

Connections :

Blue	Flow/Status Digital Input1
Yellow	Flow/Status Digital Input2
Violet	Flow/Status Digital Input3
Brown	Flow/Status Digital Input4
Green	Ground

Connector Pin assignment

Connector	Pin A	Pin B	Pin C	Pin D	Pin E	Pin F	Pin G
Digital Input	Input 1	Input 2	Input 3	Input 4	GND	CNFG_TX	CNFG_RX
Controlled Output	Output 1	Output 2	GND				
External Power	V+ in	GND					
External Pressure	Sensor Power +ve	Sensor SDA	Sensor Power -ve	Sensor SCL			
External Temperature	Sensor Power +ve	Sensor output +ve	Sensor Power -ve	Sensor output –ve			
HWM SonicSens	N/C	SDAT	GND	SCLK			

IMPORTANT: The Intelligens / COMLog™IS data logger must only be used in conjunction with HWM connection cables

Taking a reading from the logger and hardware diagnostics

You are now ready to confirm that the logger is measuring real data from the sensors by taking an Instantaneous Value.

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.

Go

3. The IDT will now display its measurements for a period of 10 minutes to allow you to diagnose any issues with cabling.
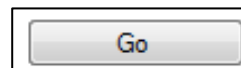
Ambient and external probe temperatures → 22.40°C 24.60°C — Internal Temperature

Primary battery and external supply voltages → 7.00V 11.60V — Battery Voltage

Measured Pressure → 15.30 — Pressure1 / 4-20mA

Flow Channel pulse info
[Rate] [Count] [%age of Logger range] →
0006.7 2390 18% — Flow 1
0010.0 3257 27% — Flow 2
0006.7 2390 18% — Flow 3
0010.1 3258 28% — Flow 4

Sonic Sense measurement → 1087.00 mm — Sonic Read

Time until test stops & Manual Stop button → Stop in (430)   Re-Zero

Shortcut to Sonic Sense setup program → SS Config   Power Window

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

Copy Logger   Read Logger
Expand Groups   GPRS Test

HWM IDT (Installer mode) V2.00.05
File   Tools   Options   Help   +
Setup | Data Collection | Hardware Tests
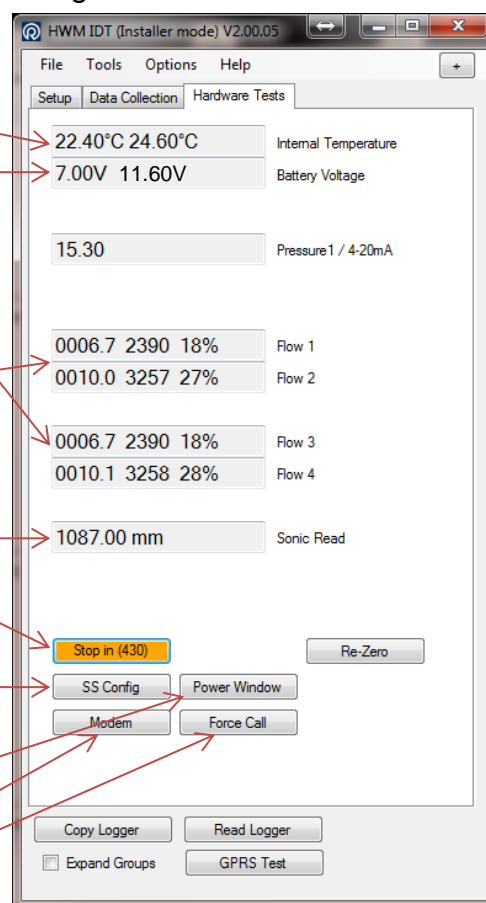
When you are ready to stop the test just click the <<Stop>> button.

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 logger'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 28.

5. Pressing <<Force Call>> forces the logger to send its data in immediately. Useful for when you wish to shift a logger 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 logger to send you an SMS test message.
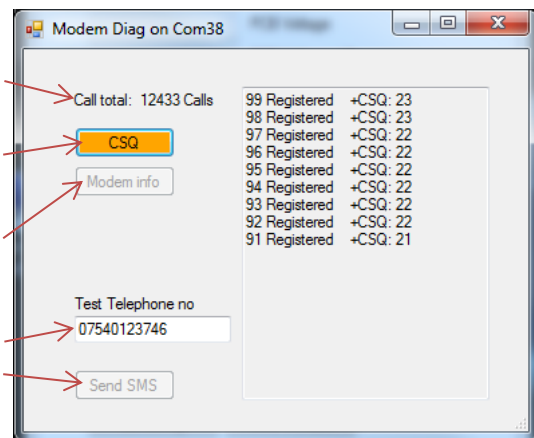
7. If you click the <<Data Collection>> tab you will now see a set of tools for downloading data from your logger for later uploading to the data server. It can also be of assistance for diagnosing problems.
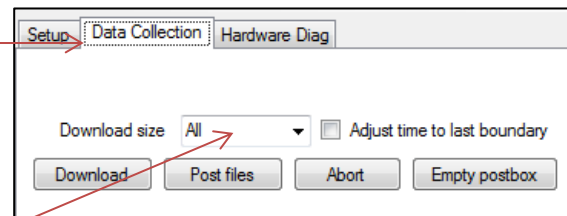
   a. From the Download size selection, choose how much data you wish to retrieve, from everything the logger has stored to any un-sent data since the last time the logger called in.

   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.
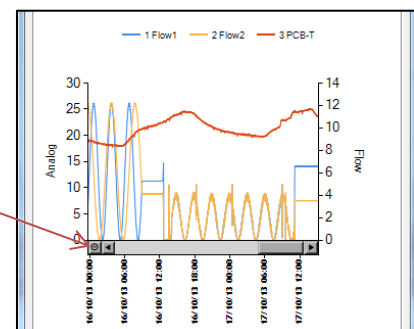
   d. If your logger is in a location where GPRS communication is not possible, you can now upload the data when you are next connected to the internet. Simply click <<Post files>> and all the data you have downloaded to your PC will be uploaded in one go. If you are downloading more than one logger in 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 logger 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 logger (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 logger will send a message back to you with details of its current status.
   Example response from a logger:
   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	Logger type number
V01.00	Firmware version in Logger.
CSQ: nn	Signal strength nn (nn = 6 to 30)
10.9V	Operating voltage
yourid	Your Logger ID
RT hh:mm ss dd-mm-yy	Real Time Clock setting
ST hh:mm ss dd-mm-yy	First Time the logger was started
LR hh:mm ss dd-mm-yy	Last Time the logger 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 logger 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 do not accept incoming text messages. Check with your service provider if you are unsure.

Installation checklist

Before you leave site, review the following items to be sure that the installation is going to be a good one.

☐ Have you calibrated and zeroed your pressure transducer?

☐ Have you run an instantaneous value to confirm data quality?

☐ Have you set all necessary calibration factors?

☐ Have you run a GPRS test to confirm communications quality?

☐ Have you confirmed the GPRS message was received by DataGate™?

☐ Have you sealed any joins in the pulser cable?

☐ Have you confirmed an SMS message with the chamber lid/door closed?

☐ Have you recorded all your site information, serial nos, photos, etc?

☐ Have you closed all open chambers and recorded any damage?

☐ Have you left all wiring tidy and safe – not tied to ladders?

☐ Have you removed all your installation tools?

☐ Have you recorded the GPS location of the logger?

You have now completed your site installation and confirmed that the logger is operating and transmitting its data to DataGate™ (or your local data server). The next section deals with how to use DataGate™ and HWMOnline™.

Using HWMOnline™

HWMOnline™ is a web viewing and management package for viewing the data for your fleet of loggers.

HWMOnline™ uses the data stored in the DataGate™ data warehouse to display charts for the data recorded by the loggers and other useful information like the location of the loggers.

If you have HWMOnline™ as part of your package, you will use the same username and password that was provided to you by your HWM account manager.

Viewing your data

1. Open a new web browser window and navigate to
   www.hwmonline.com
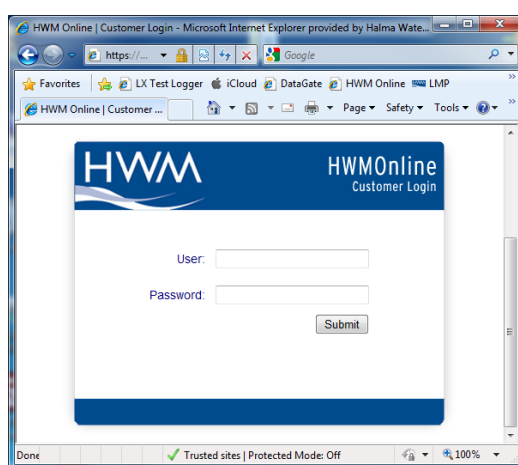
You will be asked to enter your Username and Password details.

2. Once logged in successfully, you will see the main window below

Logger selection dropdown   Time period to view

Submit request

Choose Units for axes

Search for a logger
(Click the spyglass to execute the search)
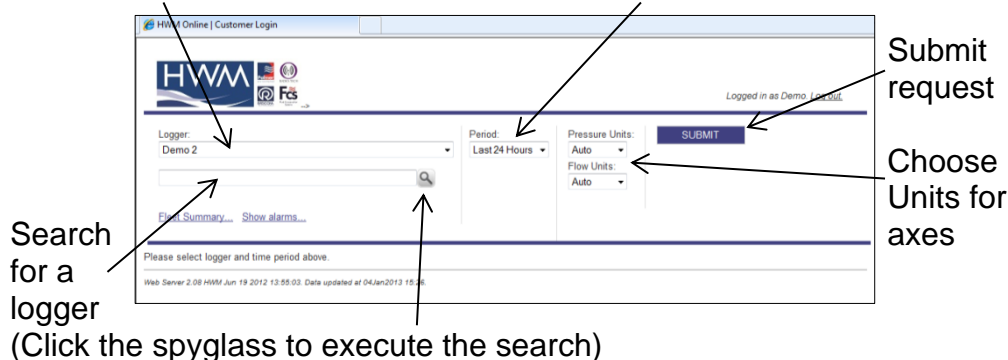
3. Chose the logger you wish to view and the appropriate period & units and click <<SUBMIT>>
   HWMOnline will then retrieve your data from DataGate™ and display it on the page.
   Note: If your logger has not been able to communicate with DataGate™ then the message "No Data Has Been Received For This Location." will appear. Investigate the cause of the communication issue of contact HWM support for assistance.

4. The page below shows a typical result of a site query:-

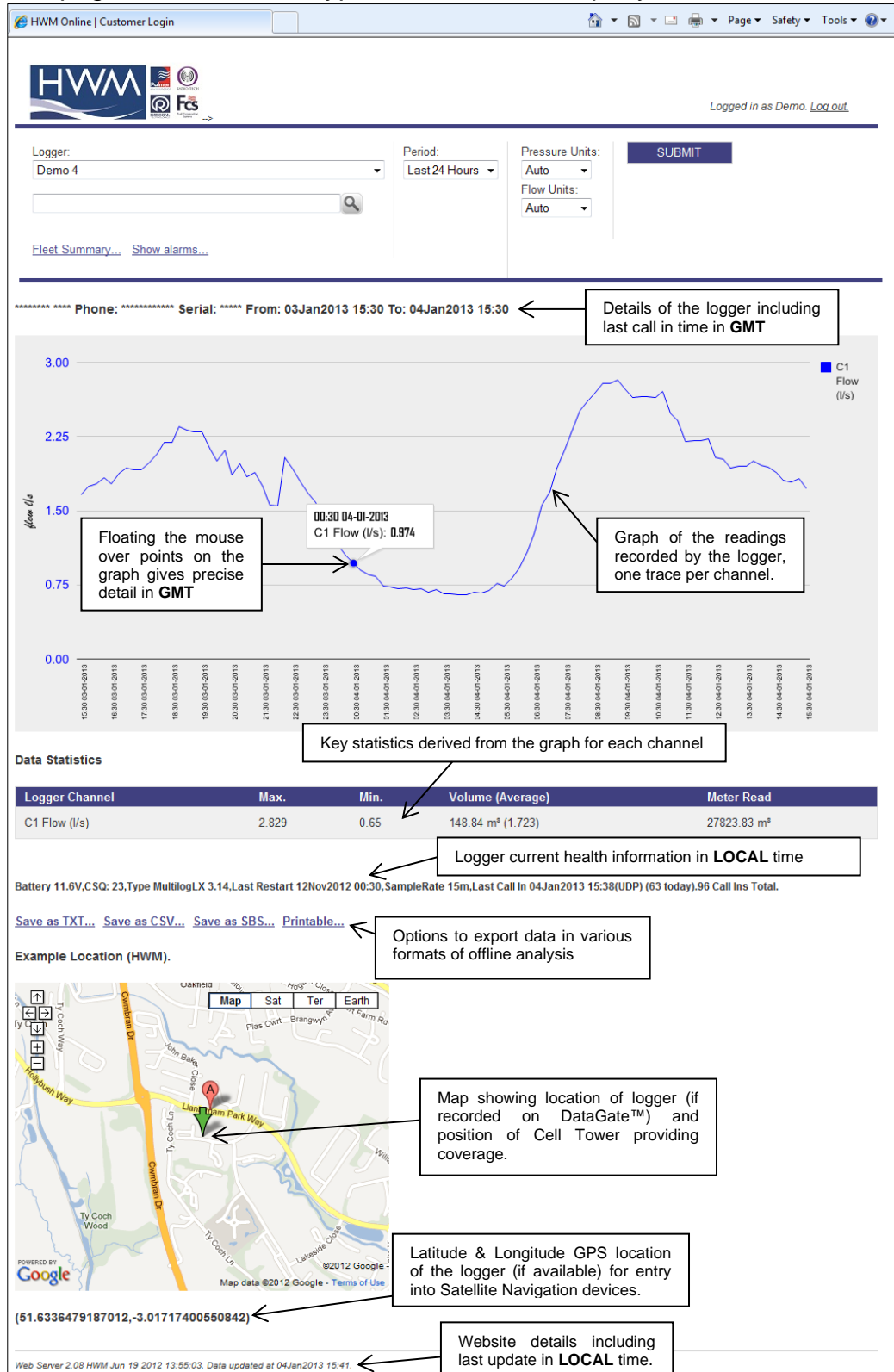**Details of the logger including last call in time in GMT**

Floating the mouse over points on the graph gives precise detail in GMT

00:30 04-01-2013
C1 Flow (l/s): 0.974

Graph of the readings recorded by the logger, one trace per channel.

Key statistics derived from the graph for each channel

Data Statistics

Logger Channel	Max.	Min.	Volume (Average)	Meter Read
C1 Flow (l/s)	2.829	0.65	148.84 m³ (1.723)	27823.83 m³

Logger current health information in LOCAL time

Battery 11.6V,CSQ: 23,Type MultilogLX 3.14,Last Restart 12Nov2012 00:30,SampleRate 15m,Last Call In 04Jan2013 15:38(UDP) (63 today).96 Call Ins Total.

Save as TXT...   Save as CSV...   Save as SBS...   Printable...

Options to export data in various formats of offline analysis

Example Location (HWM).

Map showing location of logger (if recorded on DataGate™) and position of Cell Tower providing coverage.

Latitude & Longitude GPS location of the logger (if available) for entry into Satellite Navigation devices.

(51.6336479187012,-3.01717400550842)

Website details including last update in LOCAL time.

Web Server 2.08 HWM Jun 19 2012 13:55:03. Data updated at 04Jan2013 15:41.

(i) Note: The resolution of the graph reduces the more data you display. If you wish to zoom into an area of interest, use the "Custom" time Period and enter the precise range you wish to view.

Viewing information about your logger fleet

HWMOnline can also be used as a fleet management tool.

1. From the Home screen click the "Fleet Summary…" link.

2. The summary screen below appears:-

Details regarding your loggers

Options for creating a custom report

3. From this screen you can either choose a logger to view or you can create a bespoke report containing details of your whole fleet of loggers.

Tick the appropriate boxes in the "Generate Fleet Report" area and then click the <<SUBMIT>> button. Depending on how big your fleet is, this may take a few minutes to create. You can then choose to save the report file or open it immediately in MS Excel.

Experiment with the settings until you find a format that you like, then tick the <<Save Defaults>> box so HWMOnline™ will remember the style for the next time.

A note about security settings

HWMOnline is hosted as an https:// site. If you do not see the maps on your browser, check your internet security options and add HWMOnline as a trusted site:-

Select "Tools", "Internet options" and "Security".
Click "Trusted sites", then the <<Sites>> button
Click <<Add>> to add HWMOnline as a trusted site, then <<Close>> & <<OK>>.
You may need to restart your browser.

Appendix 1 – Battery Replacement

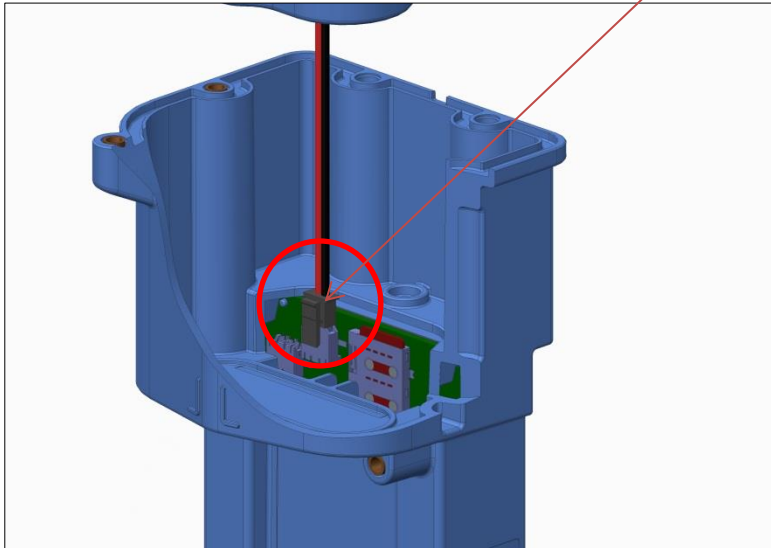| ⚠️	**Warning:** ALWAYS USE BATTERY PACK INTBATTPACK/7V2/H95 AND **NEVER** OPEN THE UNIT IN AN EXPLOSIVE GAS ENVIRONMENT

1) Remove the lid, then lift out the battery
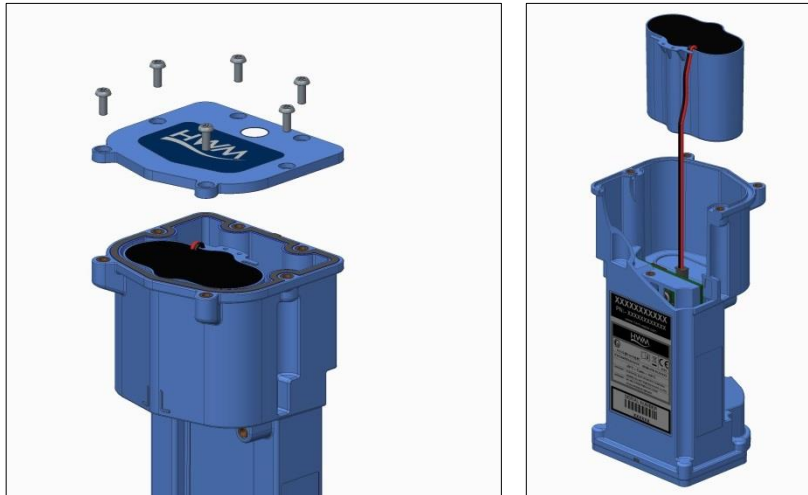
2) Disconnect and remove the old battery, press the clip on the top of the plug to release it.

3) Fit the new battery pack and refit the lid ensure the rubber seal is seated in the groove before tightening the screws.

Appendix 2 – Fitting your own SIM card

<table>
<tr><td>⚠️</td><td>Warning:

DO NOT OPEN WHEN EXPLOSIVE ATMOSPHERE IS PRESENT.
DISCONNECT THE BATTERY <u>BEFORE</u> REMOVING OR INSERTING A SIM CARD</td></tr>
</table>

1. Remove the lid of the logger taking care not to damage the seal.
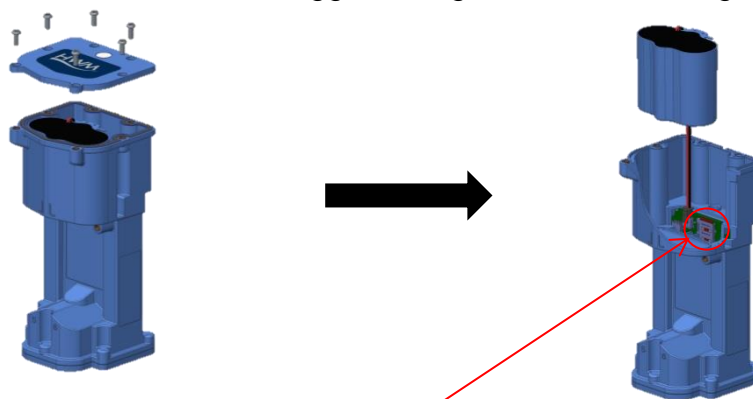
2. Lift out and disconnect the battery, the SIM card slot is located beside the battery plug.
    IMPORTANT: The SIM card in the intrinsically safe product is **NOT** hot swappable. Failure to do this can result in permanent damage to your logger.

3. Insert the SIM with the shaped corner facing down and away from the battery connector.

4. Refit the battery and lid ensuring the screws are retightened to 1.2Nm to ensure the logger remains water tight.

5. Proceed with programming the logger and ensure you enter the new SIM phone number into the software (page 8) including the '+' symbol and the international dialling code with no spaces.
     e.g. +4477xxxx.
    This is an important step as the logger sends an SMS message to itself once a month to synchronise its clock. If the wrong phone number is entered, this can result in an international SMS message being sent.

Appendix 3 – Technical specifications

|		
Sensor Input Options	Digital	Up to 4 user configurable pulse/status inputs
		Reed switch contact closure type or other pulse input
		Up to 128 pulses per second
	Pressure Internal	100mBar to 35Bar 0.15% FSD available on request Female ¼ BSPT thread
	Pressure External	100mBar to 70Bar 0.15% FSD available on request Female ¼ BSPT thread
	Temperature	PT100 -40°C to 140°C (2/3/4 wire compatible)
	Level Detection	Ultrasonic Level Detection 2.5m or 5m using HWM "Sonic Sens"
Control output ports	Digital	2 independent configurable outputs. e.g. pulse replication (option)
Logger Features	Memory	Non-volatile primary recording 2 million readings (larger sizes available on request) Future proof in field local and remote upgradable software
	Analogue	Variable sample rate 5s to 24hrs (*please note that this may affect battery life and communications cost)
	Alarms Logger ID	Lower/Upper Limit, Min Night Flow, Rate Of Change, Channel Difference, In/Out of Band alarm types. 6 programmable condition sets available sending SMS alarm message to a mobile phone Event logging with alarms
		Up to 7 alphanumeric characters. Also readable factory set serial number in firmware
	Clock	On board 24 hour synchronized real time clock with date facility
	Internal Cellular modem	GPRS to HWM DataGate or customer specific FTP server, multiple messages per day User replaceable SIM card
		Quad band modem supplying 850/900/1800/1900MHz bands (3G option) LTE: LTE cat M1, LTE cat NB10T
		GPRS can send data down to every 5 mins (*please note this will affect battery life)
	Dimensions (mm)	200H x 97W x 88D
	Weight	1kg
	Operating Temp	-20°C to +60°C (-5°F to +140°F)
	Ingress protection	IP68
	Power	User Replaceable battery pack operational for 5 years + under standard operating conditions*, complete with low battery alarm External power input available for a suitable ATEX certified power source (option)

* Typical battery life expectancy is based upon achieving network registration regularly and with ease. If the GPRS-enabled network registration is unachievable, the GPRS logger will convert to SMS-only operation after 24 hours and will attempt to re-establish GPRS communication when possible. A signal strength test should be performed during installation.

Appendix 4 – Configuration options

Data logger physical port positions
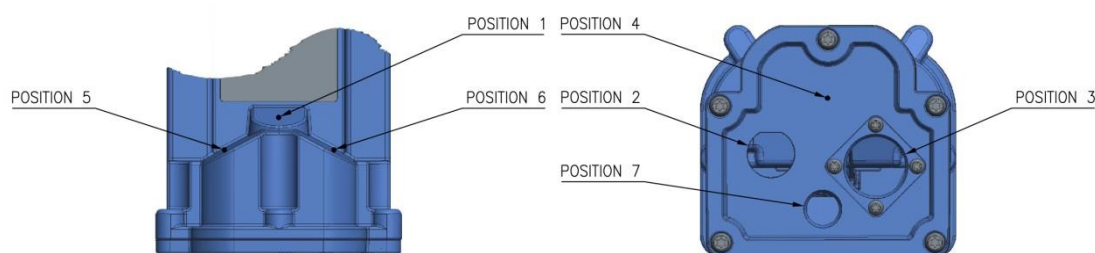
Part Number make-up – H95/xxxxxxx/xxxxxx/IS

H95	/xxxxxxx	/xxxxxx	/IS
HWM Logger Type No	Antenna, Communications & Input/Output Channel Configuration (see tables below)	Modem opt (See table)	Safety Designation

Input Channel Type Matrix (/xxxxxxx)

Select the channel types required from the table below and build the number based on your required case positions in the order – **1 3 4 5 6 2**

Note: Each case position can only be used **once**, for unused positions enter '0'

Channel Type no	Description	Case Position
Antenna option (/xxxxxxx)		
F	Antenna FME socket	1
Pressure measurement (Input 1) (/xxxxxxx)		
1	Internal Pressure Transducer (100mBar)	3
2	Internal Pressure Transducer (350mBar)	3
3	Internal Pressure Transducer (500mBar)	3
4	Internal Pressure Transducer (5Bar)	3
5	Internal Pressure Transducer (3.5Bar)	3
6	Internal Pressure Transducer (10Bar)	3
7	Internal Pressure Transducer (20Bar)	3
8	Internal Pressure Transducer (35Bar)	3
Communications and Antenna options (/xxxxxxx)		
J	3 Pin communications for use with Digital metering options K & K5	4
P	Plastic antenna connector – deletes FME socket	3
Other logger connections (/xxxxxxx) up to 3 can be selected		
1	Single Pulse Replicator Output (Matching input) Bi-directional	Can be fitted in positions 4, 5 or 6.
2	Dual Pulse Replicator Outputs (Matching input) Uni-directional (inc tamper)	
3	External mV sensor connector input (See selection options on page 38)	
4	2 x user configurable Outputs	
B	External power input	
C	External temperature input	
L	Leak Noise Sensor input	
M*	Modbus input from External Sensor Interface	
Q*	SDI-12 input from External Sensor Interface	
S	Sonic Sense input (SonicSens 2 only) (No Longer Available)	
U	Ultrasonic sensor input (SonicSens 3 or SonicSens 2 with adaptor cable)	4
Digital metering inc. Comms if J not selected - (Max 4 channel inputs) (/xxxxxxx)		
0	Standard 7-pin communication connector only	2
1	2 channel input (Pulses/Direction) producing "net flow"	2
A	2 channel input (Forward & Reverse pulses) combined to "net flow"	2
4	2 channel inputs (Pulses/Direction) producing Forward/Reverse flow logged separately	2
8	2 channel input (Pulses) uni-directional pulse input	2
K	Glanded Uni-directional pulse input for meter interface RJ11	2
K5	Glanded Uni-directional pulse input for meter interface RJ11 with Glanded Pulse Replicator Output (Matching input) Unidirectional + tamper	2
9	2 channel inputs configured for Status	2

*Modbus and SDI-12 cannot be ordered together.

Modem types and data option (/xxxxxx)

Modem Type no	Description
CCCxxx	International country letter code
xxxnnn	Customer variant code nnn – contact HWM for details

Example UK & Europe GPRS Data Logger Order Codes	
H95/F100000/UK1/IS	Internal Pressure (100mBar)
H95/F130000/UK1/IS	Internal Pressure (100mBar) & External Pressure
H95/F000001/UK1/IS	Single channel Pulses/Dir "net flow"
H95/F000008/UK1/IS	Dual channel Uni-directional flow
H95/F010001/UK1/IS	Single channel Pulses/Dir "net flow" with 1 pulse replicator output
H95/F020008/UK1/IS	Dual channel Uni-directional flow with 2 pulse replicator outputs
H95/F100001/UK1/IS	Internal pressure (100mBar) & Single channel Pulses/Dir "net flow"
H95/F100008/UK1/IS	Internal pressure (100mBar) & Dual channel Uni-directional flow
H95/F110001/UK1/IS	Internal pressure (100mBar) & Single channel Pulses/Dir "net flow" with 1 pulse replicator output
H95/F120008/UK1/IS	Internal pressure (100mBar) & Dual channel Uni-directional flow with 2 pulse replicator outputs
H95/F63BC11/UK1/IS	Internal Pressure (10Bar) & External Pressure+Temperature+power & Dual channel Pulses/Dir "net flow"
H95/F63BC88/UK1/IS	Internal pressure (10Bar) & External Pressure+Temperature+power & Quad channel Uni-directional flow
H95/F632C11/UK1/IS	Internal pressure (10Bar) & External Pressure+Temperature & Dual channel Pulses/Dir "net flow" with 2 pulse replicator outputs
H95/F632C88/UK1/IS	Internal pressure (10Bar) & External Pressure+Temperature & Quad channel Uni-directional flow with 2 pulse replicator outputs
H95/00PS000/UK1/IS	Sonic Sense input with plastic antenna connector
H95/00PS009/UK1/IS	Sonic Sense input with plastic antenna connector & Dual channel status inputs
H95/F0S0001/UK1/IS	Sonic Sense input & Bi-directional flow "net flow"
H95/F0J00K5/UK1/IS	Single channel uni-directional flow + Tamper
H95/003Q009/UK1/IS	External sensor and SDI-12 inputs with plastic antenna connector

Order Codes – Optional extras	
COMMS USB/IS	USB programming cable
COMMS-Y USB/IS	USB programming cable with flow pulse pass through
HDW9040	'U' - Shape Stainless Steel mounting bracket
HDW9035	'L' - Shape Stainless Steel mounting bracket
EL01	Mounting bracket Earth bonding cable
INTBATTPACK/7V2/H95	7.2V Replacement Battery Pack
CABA9425	RJ11 pulse input cable
CABA9420	4 input pulse/status cable (bare tails)
CABA8472	Sonic Sense connection cable
BREATHER/0	Breather module for use with depth transducers with no desiccant
BREATHER/1	Breather module for use with depth transducers filled with Silica desiccant
AER9005	Puck antenna for cabinet mounting 0.5m
AER9010	Button antenna 0.5m
AER8020	I-Bar antenna 1.0m
AER8025	I-Bar antenna 3.0m
AER8021	I-Bar antenna 1.0m with Plastic Buccaneer connector
AER8022	I-Bar antenna 3.0m with Plastic Buccaneer connector
AER6000	*High Gain antenna 2.5m
AER6001	*High Gain antenna 5.0m
AER6003	*High Gain antenna 8.0m
AER6002	*High Gain antenna 10.0m
AER6004-1	*High Gain antenna 2.5m with Plastic Buccaneer connector
AER6004-2	*High Gain antenna 5m with Plastic Buccaneer connector
AER6004-3	*High Gain antenna 10m with Plastic Buccaneer connector
AER4243	Magnetic Dipole 3m
CABA8510	FME Antenna Extension 10.0m
CABA8510-1	FME Antenna Extension 8.0m
CABA8510-2	FME Antenna Extension 5.0m
CABA8510-3	FME Antenna Extension 2.0m

*Not suitable for 3G service

External Pressure Box physical port positions

Logger connection

POSITION 1
POSITION 2
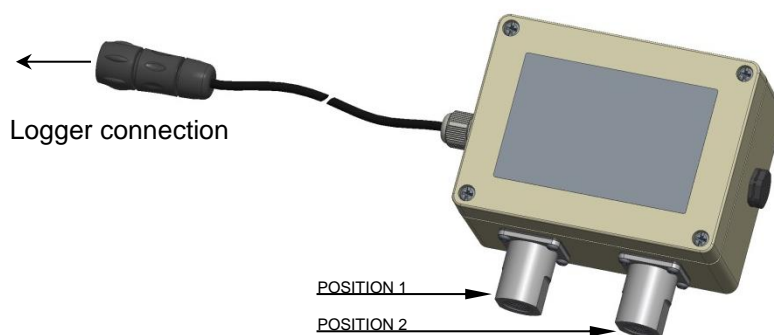
Part Number make-up – EXTPRESS/xy/IS

| EXTPRESS	/xy	/IS
HWM External Pressure Box	x – Position 1, Input 3 y – Position 2, Input 4 (See below for pressure type number)	Safety Designation
0	Not fitted	
1	Pressure Transducer (100mBar)	
2	Pressure Transducer (350mBar)	
3	Pressure Transducer (500mBar)	
5	Pressure Transducer (3.5Bar)	
4	Pressure Transducer (5Bar)	
6	Pressure Transducer (10Bar)	
7	Pressure Transducer (20Bar)	
8	Pressure Transducer (35Bar)	
9	Pressure Transducer (70Bar)	

Example part number: **EXTPRESS/07/IS**

    20Bar transducer fitted in position 2. Configure input channel as Pressure 4 (see page 2.iii)

Note: The External Pressure Sensor must only be used with the Intelligens / COMLog™IS data logger, HWM Part number H95/xxxxxxx/xxxxxx/IS which must include a type 3 entry in the part number.

External Sensor Interface

(used for mV sensors, e.g. pressure/depth)

Logger connection

Sensor

Breather connector
(if required)
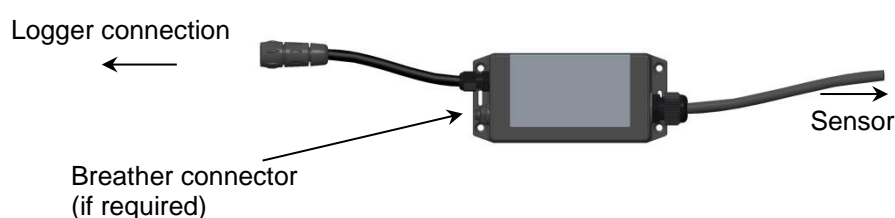
Part Number make-up – ESI2/xy-len/IS

| ESI2	/xy-len	/IS
HWM External Sensor Interface revision 2	(See below for type number pair definition)	Safety Designation
21	Depth Transducer 350mBar (Type 1 - frame mounted)	
22	Depth Transducer 350mBar (Type 2 - wall mounted)	
31	Depth Transducer 700mBar (Type 1 - frame mounted)	
32	Depth Transducer 700mBar (Type 2 - wall mounted)	
41	Depth Transducer 1Bar (Type 1 - frame mounted)	
42	Depth Transducer 1Bar (Type 2 - wall mounted)	

Example part number: **ESI2/21-10/IS**

   350mBar Depth Transducer 10m length. Configure input channel as Pressure **Ex** (see page 2.iii)

Note: The External Sensor Interface must only be used with the Intelligens / COMLog™IS data logger, HWM Part number H95/xxxxxxx/xxxxxx/IS which must include a type 3 entry in the part number.

External Sensor Interface with Battery

(used for powered sensors, e.g. 4-20mA (Radar) or SDI-12 (Doppler Velocity Probe) sensors)

Logger connection

Pass-through connection

Logger connection

Sensor
(plug)
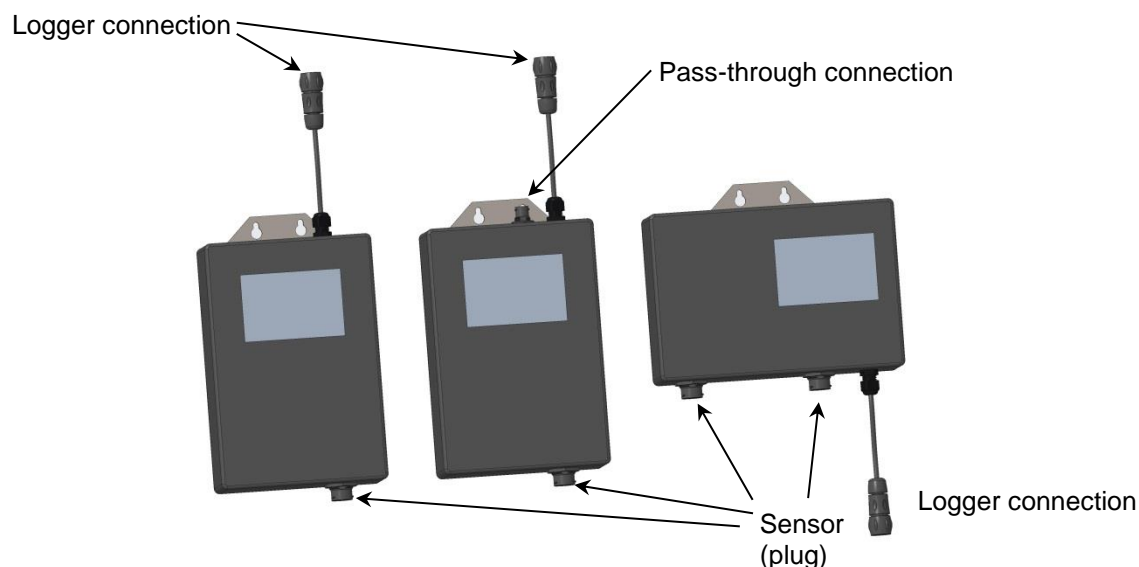
Part Number make-up – ESIB2/xxyy/zz/Vs/IS

ESIB2	/xx		yy		/zz	/Vs	/IS
	xx – Input channel 2		yy – Input channel 1		Pass through / Mounting option	Battery Configuration	Safety Designation
Product generic part number prefix revision 2	00	None	V1	Voltage 0-1V Address 1	See table below for details	See note 3	See note 4
	00	None	V2	Voltage 0-1V Address 2			
	00	None	21	Voltage 0-10V Address 1			
	00	None	22	Voltage 0-10V Address 2			
	00	None	51	4-20mA Address 1			
	00	None	52	4-20mA Address 2			
	52	4-20mA Address 2	51	4-20mA Address 1			
	00	None	M1	Modbus			
	00	None	Q1	SDI-12			

/z – Pass through	z – Mounting option
0 – No Pass through	P – portrait – wall bracket
1 – Pass through	L – landscape – wall bracket
	F – frame mounting – no bracket

Notes:
1. Only the 4-20mA build is currently approved as a dual configuration for intrinsic safety.
2. The pass through option is only applicable to voltage and 4-20mA type builds with single input channels (yy = V1, V2, 21, 22, 51 and 52).
3. Typical battery configuration is 1082.
4. Characters 'IS' are not present for non-intrinsically safe build options.
5. The External Sensor Interface must only be used with the Intelligens / COMLog™IS data logger, HWM Part number H95/xxxxxxx/xxxxxx/IS.
6. The use of voltage / 4-20mA variants requires the Intelligens / COMLog™IS data logger to be equipped with option 3 from the 'other logger connections' options.
7. The use of SDI-12 and MODBUS variants requires the Intelligens / COMLog™IS data logger to be equipped with options Q or M respectively from the 'other logger connections' options.

8. The maximum current available to power sensors in voltage and 4-20mA variants is 24mA. See page 13 for configuration of the sensor power.

Part Number make-up – ESIB2/xxyy/zz/Vs/NIS

Note: These models are not of the 'Intrinsically Safe' construction, and can be used only for non-ATEX applications.

ESIB2	/xx		yy		/zz	/Vs	/NIS
	xx – Input channel 2		yy – Input channel 1		Pass through / Mounting option	Battery Configuration	Safety Designation
Product generic part number prefix revision 2	00	None	Q3	SDI-12 – 12V output – Non IS	See table below for details	See note 2	See note 3
	Q3	SDI-12 – 12V output – Non IS	Q3	SDI-12 – 12V output – Non IS			

/z – Pass through	z – Mounting option
0 – No Pass through	P – portrait – wall bracket
1 – Pass through	L – landscape – wall bracket
	F – frame mounting – no bracket

Notes:
1. The pass through option is not available on these models.
2. Typical battery configuration is 1082.
3. Characters 'IS' are not present for non-intrinsically safe build options. They are replaced by 'NIS'.
4. The External Sensor Interface must only be used with the Intelligens / COMLog™IS data logger, HWM Part number H95/xxxxxxx/xxxxxx/IS.
5. The use of SDI-12 variants requires the Intelligens / COMLog™IS data logger to be equipped with options Q from the 'other logger connections' options.

ESIB / ESIB2 Sensor Connector Pin assignment

Connector	Pin A/1	Pin B/2	Pin C/3	Pin D/4
4-20mA (2 wire)	Sensor +ve	Sensor –ve	Link together for 2 wire sensors	
4-20mA (4 wire)	Sensor PWR +ve	Sensor O/P +ve	Sensor O/P -ve	Sensor PWR -ve
Voltage	Sensor PWR +ve	Sensor O/P +ve	Sensor O/P -ve	Sensor PWR -ve
SDI12	Sensor PWR +ve	SDI12	Ground	N/C
Modbus	Sensor PWR +ve	RS485+ (B)	Sensor PWR -ve	RS485- (A)

HWM-Water Ltd.
Ty Coch House
Llantarnam Park Way
Cwmbran
NP44 3AW
United Kingdom
+44 (0)1633 489479
www.hwmglobal.com

MAN-142-0001-M