# HWM

## User Guide: IDT (app for mobile devices) - Logger User Interface.



**HWM IDT**

**Warning:**

⚠️ Please read, understand, and follow any instructions in the relevant manual for your logger or that were shipped with the equipment.
Where a logger is for use in a potentially explosive atmosphere, also refer to the relevant additional safety (Ex) documents for the equipment.

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# 1 PART1: ----- INTRODUCTION -----

## 1.1 DOCUMENTATION AND SUPPORT

IDT is available in two versions: IDT (PC version) and IDT (app for mobile devices). This user guide covers the latter. Any subsequent reference to "IDT" within this manual will refer only to the mobile app version.

IDT is currently available on mobile devices employing the Android and also iOS operating systems (from the Google and Apple corporations respectively).
Where the manual uses the phrase "mobile phone", it implies the use of any mobile / cellular device with suitable functionality.

This manual uses screenshots from an Android-based device. Some small differences in appearance or operation may exist between Android and iOS devices. The user interface uses controls that are widely used on each device; the user should find familiar.

Note: The system periodically has new features and changes released, thus you may observe slight changes in pictures from those shown in this manual.
Most users will be able to automatically download updates of the app from the usual app download servers.

Note: Your chosen tablet or mobile phone device may present the information slightly differently in layout or appearance. When your device is being used in landscape mode, information may be shown using additional columns.

HWM provides support by means of our customer support webpages:
https://www.hwmglobal.com/help-and-downloads/

Should you have any questions that are not covered by this manual or the system's online help, please contact the HWM Technical Support team on +44 (0) 1633 489479, or email:    cservice@hwm-water.com

Most HWM logger devices supported by the app will have some similarities in the setup process. For the purpose of providing an explanation to accompany a description of IDT settings, the document will refer to a generic logger device, but some distinction between the logger groups may be included to help the user to determine whether the text is relevant (or non-applicable) to their logger.

Acknowledgements:

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## 1.2 LOGGER DEVICES SUPPORTED BY THE IDT APP

The IDT tool is designed to support a variety of HWM products. This user-guide covers its use with logger products. However, not all sections will apply to every logger, as the

functionality will vary from one logger family to another. The loggers can be loosely classed into three different groups:

Group 1:    Basic loggers. These are designed to be left on site for basic logging operation. When the task is complete, the user returns to extract the data from the logger using the IDT tool.

Group 2:    Loggers that include a modem that can be used communicate to a remote sever. These loggers have the ability to periodically call into the server to automatically deliver their data. The loggers can also be programmed to monitor logger input channels for specific conditions, and (when met) trigger an event. The event can be used to start-up other activities within the logger.

Group 3:    Loggers that also include a modem but offer some alternative features to the 'Group 2' loggers. The alternative features sometimes require different setup steps.

Note:   The grouping of loggers is for the purpose of this user-guide only and has no other significance.

The IDT app can be used with the following logger families (Group 1):

- LoLog 450, 500, Vista

The IDT app can be used with the following logger families (Group 2):

- (Not currently supported)

The IDT app can be used with the following logger families (Group 3):

- COMLog2-IS
- ISLog
- Permanet-SU
- StopwatchGSM

## 1.3 SYSTEM OVERVIEW

The IDT app (Installation Diagnostic Tool) is installed onto a mobile phone, or similar device. It uses a Bluetooth radio link to communicate with compatible HWM logger devices (Group 3 loggers), but for other loggers a communications cable will be required. The app provides a graphical user interface for the purpose of Setup, Installation, Diagnostics, and Testing of a HWM logger.

HWM logger devices produce data. The data needs to be obtained from the logger in order to be viewed. For 'group 1' loggers, the data is obtained manually. For the other logger groups, the logger is usually deployed to a site with the intention of it interoperating with a central server for the purpose of storing data centrally; the server acts as a data receiver and data warehouse.
HWM provides software for this purpose, for example the DataGate server software. Other servers can be set up using HWM software as the front-end to act as the receiver and decoder of logger messages.

If logger data is stored on a central server, it can be integrated with other server software that provides the ability to view the data. This provides the ability for the

viewing platform to present the data to the user in various formats, some more meaningful way than just tables of raw data.

e.g., HWM provides the following web-based viewing platforms:

- DataView (includes a General-purpose graphical data view)
- PermaNETWeb (monitoring for potential water pipe leaks)
- PressView (water Pressure Reducing Valve performance viewing website)
- SpillGuard (monitoring system for potential water spills / floods)

A server usually has to be prepared to receive data from the logger device and can make the received data available to other users who are authorised to use the system. The central server can similarly provide an authentication service to the IDT app in order to verify that a user is registered on the system and has suitable permissions to access the settings of a logger.

Alternatively, the user can view logger data locally using the app and the mobile phone display, but features are limited in comparison to use of a logger device with a server.

Logger devices are normally partially pre-configured for use within the factory, with the user occasionally having to make limited on-site adjustments. (Discuss any requirements with your HWM representative prior to ordering). IDT can provide access to many, but not all, device settings. Some settings are exclusively factory set.

The data-warehouse often operates on the principle of a logger being installed for a time period onto an installation site. i.e., It is site-based.
The links that bind a logger to a site can be manually configured (by an administrator) or partially automated by the use of another app by the installer (e.g., the HWM deployment app).

## 1.4 LOGGER – TYPICAL OPERATION

A typical logger device will behave as follows:

The logger's main task is to make periodic measurements and store the results. In addition, the logger may have daily tasks at set times, such as uploading its un-sent data over the internet. When sending data, the logger waits to receive confirmation from the server that the data was received without error; If confirmation is not received, it will re-send the data at the next call-in time. The task of logging does not stop during any communications.

Some loggers include an interface (referred to as a modem) that provides access to the internet via the cellular mobile communications network. A SIM card is used to give access of the network. Setup of the logger for use with the cellular network and SIM card network provider is required, as is the availability of a suitable signal from the network.

The loggers are powered by a non-rechargeable battery, which implies their service life is limited before the battery must be replaced. The installer should bear this in mind when making any changes to settings; keep tasks to the minimum required in order to give best battery life.

Most logger devices are shipped from the factory in an inactive state to preserve the life of the battery and will require activation during installation. Once activated, the logger will go into the state of "Recording" and begin repetitive logging of the various sensors fitted to the unit, according to its configuration and settings.

A typical logger can operate using two periods, known as the "sample period" and also the "log period". It will periodically sample the sensors at the *sample rate* to create temporary measurement samples. After taking several measurement samples, some statistical functions can be optionally applied to produce a *datapoint* that is logged (saved) at the *log rate*; these form the recorded (logged) measurements. The log period is always a multiple of the sample period.

The datapoints are stored in the memory of the unit. For loggers with a modem, at a set time, the unit calls into the cellular data network in order to contact the server; the data is then uploaded.

The logger makes measurements (as described above) which are saved into an area of memory which is referred to as the "primary recording". In addition, if the logger has the feature enabled, it can also be set to occasionally save data into a "secondary recording" memory area (e.g., data sampled at a higher frequency). This is additional data. (Note: This is not available on all supplied units and must be arranged through your sales representative before placing an order; it also has implications concerning expected battery life of the unit. The feature is not supported by 'group 1' loggers).

The loggers (except those in 'group 1') can be programmed to monitor data for certain patterns or conditions and can send a message to the server if it should detect a match. Commonly, this is used for setting a condition that can be an indication of an "alarm". Alarms can be sent to a limited set of users, but a better way of handling (and preserving battery power) is to send the message to the server, which often has the facility to fork the message and send it to multiple users.

## 1.5 LOGGER SECURITY: SECURE AND UNPROTECTED MODES

(Note: This feature is not applicable to 'group 1' loggers).

At the time of leaving the factory, the loggers will be pre-configured to the requirements of the customer, including any *security settings*. The logger can include a setting that determines whether it operates as either a "Secure" or "Unprotected" device. The loggers can communicate their security requirements to the IDT app. The setting will influence the cooperation of the device with the HWM IDT App tool.

When required, this manual will refer to a logger as being either a "secure" or "unprotected" logger.

The "Secure" mode restricts unauthorised users from making changes to the logger settings and or accessing logged data.

Secure loggers:

- Must be correctly registered on the Datagate server with appropriate ownership settings.

- Require the IDT user to successfully authenticate with the Datagate server (periodically).
- Block connections from unauthorised IDT users.

Unprotected loggers:

- Do not require registration on the DataGate server to be used with IDT.
- Can be connected to and have settings modified by anyone with the IDT app. (The user can implement a measure of security by programming the device with a user-defined PIN number; Factory default units need no PIN to gain access).

Loggers set as "secure" therefore require DataGate (or a compatible server) for IDT to operate with them.

## 1.6 ACTIVATING THE COMMUNICATIONS LINK

Group 1 loggers:

These loggers have a communications interface that will require a cable. The communications link is automatically activated when both ends of the cable are attached and IDT is used.
(Note: The connection requires a tablet; it is incompatible with a mobile phone).

Group 3 loggers:

The logger will include a Bluetooth radio interface, used for short-range communication. The IDT app similarly utilises the Bluetooth radio interface of a mobile phone for communications. No communications cable is required.

For the IDT app to communicate with logger devices, both ends of the Bluetooth communications link must be active.

Refer to section 2.4 for details regarding activating the mobile phone side of the link.

Since the radio interface uses power but is infrequently needed (it is only required when someone is attending to the logger on-site) it is normally on standby and has to be activated for temporary use. Refer your logger user-guide for specific details.
If communications is lost during the use of IDT, it may be due to the logger deciding the radio link is no longer being used and putting it back into standby; Re-activate the link if required. Another explanation is that the mobile phone is out of range of the logger, and the installer should keep the two devices closer together.

Where several loggers are within radio range, the user will need to select one using IDT.

## 1.7 PREPARING A MOBILE PHONE (OR SIMILAR DEVICE) FOR USE WITH IDT

The HWM IDT app is available for both Android and iOS-based mobile devices.

The examples used in this guide will show an Android device, but similar methods, views and behaviour will exist using an iOS (Apple) device.

The mobile phone must have Bluetooth-Low-Energy (BLE) compatibility, GPS, and Internet capability.

### 1.7.1 Installing the HWM software (IDT App and HWM Deployment App)

The mobile device (for 'group 3' loggers) or tablet device (for 'group 1' loggers) must be prepared by installing the HWM "IDT" app.

On an Android device, scan the QR code (shown opposite) or search for "HWM global" using the "Play-Store" application. Select the "IDT" app and install it.

"IDT" is the "**I**nstallation and **D**iagnostic **T**ool" for various HWM loggers.

Note: The IDT app can employ the use of the "HWM Deployment App" for collecting and uploading details of logger deployment to the DataGate server, so this may also be installed.

On an Android device, scan the QR code (shown opposite) or search for "HWM global" using the "Play-Store" application. Select "HWM Deployment App" and install it.
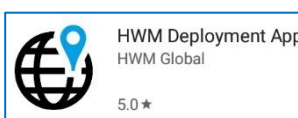
For iOS-based devices, the Apple App store can be used to obtain the above two apps, or scan the QR codes shown below:

**Note: For Apple / iOS, the IDT App can only be used with loggers from 'group 3'.**

## 1.8 LOGGER CHANNEL TYPES AND DATA INTERPRETATION

The IDT app has an *adaptive user interface*. For example, although it can be used with several types of logger, it recognises the logger type that it is communicating with and adapts the content of its screens so that it presents only the options relevant to the

logger model in use. Similarly, it presents only options that make sense based on any previous setup selections.

A typical logger model family may have many possible configuration options, but only certain options will be fitted for a customer order. These will have the appropriate electronic interfaces, including any connector options, built into the unit during its manufacture.

Some interfaces are single purpose, and both their functionality and channel allocation are fixed. These will have only a few setup steps. ('Group 1' logger input interfaces all behave like this).

The installer (as part of channel setup) also has to set the logger to interpret the data into its real significance (i.e., what each measurement represents).

Other electronic interfaces are multi-purpose in nature. For these, the logger has to use an appropriate software driver to make an interface work. The combination of both an electrical interface and a software driver put together form a "channel type". During manufacture, the logger will include (factory-only) settings that define what channel-types are built into the unit. IDT uses this information to adapt its display to show only relevant and sensible options to the user.

Sometimes an electronics interface can support several alternative types of channel (each requiring a different driver). The user can make just one selection from the set. IDT will subsequently exclude the other options from being available; the interface use has been already committed.

When the logger makes readings from an interface, it obtains data. Data is simply a numeric value. IDT provides a means to identify a specific stream of measurement data; this is done by assigning an outgoing "channel number" to each data stream.

Steps for channel setup to measure from an interface and save data will include:
(IDT can be used to make or check the required settings).

- Assigning a channel number and channel type for an interface.
- Setup the logger to be able to interpret raw data from a channel into its real-world significance (including any calibration requirements).
- Determining how often to make the measurement, and if any mathematical operations should be applied to the raw measurement data (e.g., averaging several samples).
  This will create "data-points" (the values saved as logged data).

Note: The logger will usually have settings pre-programmed by the factory prior to shipping. However, the installer has responsibility for confirming the settings are appropriate for use at the installed site.

If you have specific requirements this can be discussed with your HWM sales representative at the time of ordering the loggers.

## 1.9 LOGGER SETUP REQUIREMENTS FOR USE WITH A DATAGATE SERVER

When a logger is set up for use in conjunction with the DataGate server, there are certain requirements for inter-operability between them. These include:

- All loggers must be previously entered into the DataGate system (registered using their SMS number and linked to a dummy site) by an 'Admin' user.
- Loggers that are listed within 'group 1' have additional administrative requirements for identifying them; refer to the logger user-guide for further details.
- Loggers having modems (i.e., those from 'group 2' and 'group 3') must be set up to be able to communicate with the DataGate server, using appropriate credentials.
- DataGate and the logger must agree on the way data is presented to the server.
  - Channel numbers in use and the channel content from the logger must agree with the expectations of the server, in order to correctly receive and process the data.
  - Number formats and the units of measure in use must match between logger and server.

## 2 USING THE IDT APP / MODES OF USE

## 2.1 IDT – USER-LEVELS

IDT can be set to various user-level "views" including:

- "Basic" (no user-level is shown on the display).
  … This gives basic details and is sufficient for most uses.
- "Advanced" ("User level: Advanced" appears on the display).
  … Additional options are available for advanced users.
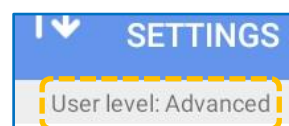
Both user-levels are available and can be selected within the app from the Settings screen.

To change, navigate to the settings screen and tap the 'User level' line.
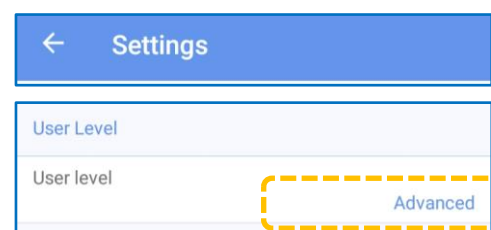
## 2.2 IDT - MODES OF USE

IDT may be used in two modes of operation:
- Operated *with* the use of the DataGate server.
  IDT refers to this as the option to "Log in".
- Operated *without* the use of the DataGate server.
  IDT refers to this as the option to "Log in without DataGate".

Using IDT *without the DataGate server* removes access to some of the capabilities of IDT:

- The user is not required to authenticate themselves with a username and password.
- A regular internet connection is not needed since there is no communications from IDT to any server during use. (IDT requires occasional internet connection for obtaining any updates, including obtaining updates for the logger firmware).
- The user will be unable to manage or access the data of secure loggers (applies to 'Group 3' loggers only).
- The user will be unable to store the logger data on the server for future reference (applies to 'Group 1' loggers only), although the user can share data via the clipboard or e-mail.

Using IDT *in conjunction with the DataGate server* adds certain requirements for use and gives the user access to the comprehensive functionality of IDT, including:

- An internet connection is required initially for the authentication process and also at other times for communication to the server.
- The user is required to authenticate themselves with a username and password.
- Logging in gives the app a token which enables IDT to be used for up to 48 hours, after which the user is required to log in again.
- The User and loggers are required to have been setup on DataGate correctly to give the required permissions, such as logger ownership.
- The user is given the ability to manage secure loggers (as well as unprotected loggers). (Applies to 'Group 3' loggers only).
- IDT can retrieve data from loggers and upload it to a server for storage.

A list of the loggers you have permission to access to is also transferred at login time; this is also required for the HWM Deployment app, in order for it to record changes in the logger location into the DataGate database.

### 2.2.1   Use of IDT without Logging in
It is possible to use IDT without going through the login process, but restrictions will exist, (see also section 2.2).

('Group 3' loggers only). It will not be possible to see any secure logger, only unprotected ones.

Note:  It will not be possible to go through the deployment process (using an app to record site installation details) *without* logging into DataGate.

After the initial splash-screen (which shows the IDT logo), the user will have the option to either log in or select to use the app without DataGate. If the user chooses to "Log in without DataGate", the app will, in future, bypass the "Log In" page.



LOG IN

Log in without Datagate
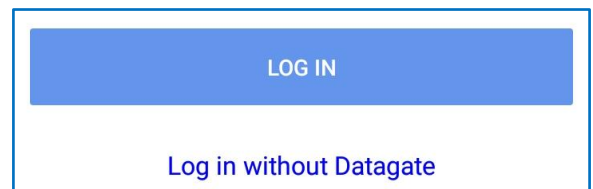
Note:  Bypassing the log-in page still allows app communication with unprotected loggers. These can be set to communicate with DataGate if so desired.
It is simply *the app* that does not communicate with DataGate.

If you have selected the "Log in without DataGate" option, skip to section 2.3.

### 2.2.2 Logging in and initial actions

Locate the IDT icon and launch the app.

The initial screen is shown.

After several seconds, the "Log In" screen appears.

After launching the app for the first time, the Log In screen has to be configured to point to the correct server.

Tap the settings control.

Type the URL of the DataGate server being used.
(This will be provided by your system administrator).

To verify the server details are valid, tap on "TEST CONNECTION".

This tests the URL, to verify it is valid and that a server is reachable using the entered details. It does not authenticate the app or its user for using the system.

Ensure the "Connection test successful" appears.

Tap the back-arrow to return to the Log In window

Enter your DataGate username and password for your mobile phone app.

The password visibility can be turned on and off with the view control.

Tap the "LOG IN" button, and the app will attempt to log into DataGate as an authenticated user.

Following a successful login, DataGate downloads some information to the IDT app.

Note: The Username is case-sensitive.

## 2.3 DEVICES (INITIAL SELECTION SCREEN)

If login and authentication was successful, the app will show the "Devices" window.

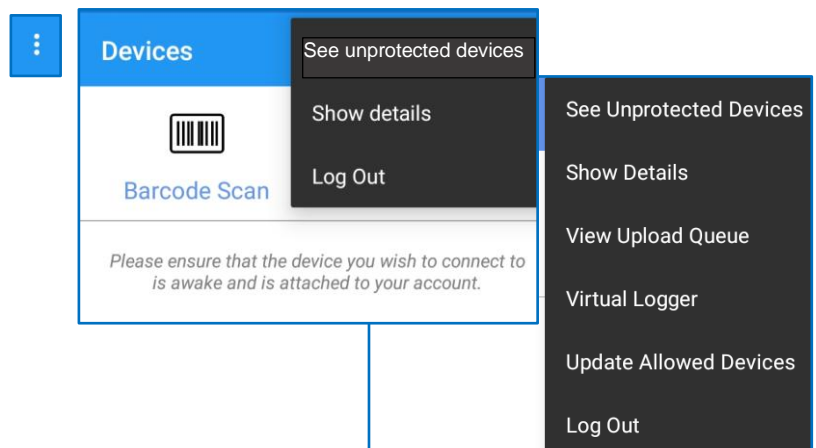(This will also be shown if you have previously selected to use the app without DataGate, as in section 2.2.1).

**Devices** ⚙ ⋮

▯▯▯ Barcode Scan ✳ Bluetooth Scan

*Please ensure that the device you wish to connect to is awake and is attached to your account.*

('Group 1' loggers only).
When a tablet is directly connected to an IR Reader, the initial Devices selection screen will also show a "USB Connections" area which lists the IR Reader.

⑁ USB Connections

IR READER

Note: Tap on the options control to access an options menu.

⋮

(The menu can vary).

**Devices**

See unprotected devices

Show details

Log Out

▯▯▯ Barcode Scan

*Please ensure that the device you wish to connect to is awake and is attached to your account.*

See Unprotected Devices

Show Details

View Upload Queue

Virtual Logger

Update Allowed Devices

Log Out

## 2.4 SELECTING A LOGGER DEVICE

Three methods exist to select the logger that IDT should communicate with:

- Connection via a cabled connection (wired selection). See section 2.4.1 (This is available on 'Group 1' loggers only).
- Bar-code scan (automatic selection). See section 2.4.2. (This is available on 'Group 3' loggers only).
- Bluetooth scan (manual selection). See section 2.4.3. (This is available on 'Group 3' loggers only).

If using a logger from 'Group 3', select and un-pack the logger and ensure its communications link has been activated (see section 1.6, and the relevant section of the logger user-guide). The logger will broadcast its presence over the Bluetooth radio link.

### 2.4.1 Wired Selection
(This method can be used for a 'Group 1' logger that uses a USB port of a tablet to connect with a cabled connection to an IR Reader).

Position the IR Reader over the logger you wish to connect to.

From the IDT Devices screen, tap the "IR Reader" line.

Give permission for the IDT app to use the IR Reader that is attached.

**HWM IDT App**
Allow HWM IDT App to access IR READER?

CANCEL          OK

Wait for a few seconds whilst the IDT app reads the logger program and status via the IR Reader cable.

(If the connection to the logger is successful, the app will load the main options screen, as shown in section 3).

**Connecting to device**

Please wait while the device details are acquired

### 2.4.2 Automatic Selection using barcode scan

From the Devices window…

Tap the "Barcode Scan" icon.

Barcode Scan          Bluetooth Scan

The app may request permission to use the camera for photos and video. Tap on ALLOW.

Allow **com.hwm_global.IDT** to take pictures and record video?

DENY          ALLOW

The phone's camera will activate, and the phone will display what is within its view.

Locate and view the logger barcode using the camera. The red line in the displayed image should be positioned over the barcode.

The app will continuously attempt to read the bar-code, changing focus settings until it comes into clear view.

When the phone reads the barcode successfully, it will check that it has permission (a serial-number match) to use the logger. If it has no permission, it will not move from the barcode scan window.



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IDT next confirms the logger is physically present by trying to detect it. It therefore starts a scan and looks for Bluetooth devices in the area.

If it finds the logger signal, it connects with it.

**Connecting to device**

Please wait while we aquire the device details

If the logger device is not discovered, an error message is displayed. (The phrase "re-swiping device" means to re-activate the logger's communications link).

Follow the guidance message and then tap OK.

**Could not connect to device**

Please try re-swiping device and check that you have been granted premission to use it.

OK

If the logger radio link disappears, you may get an error message … re-activate the logger communications link and try again.

When successful, the identity of the logger is shown, along with controls to access various options.

This is the main options page.
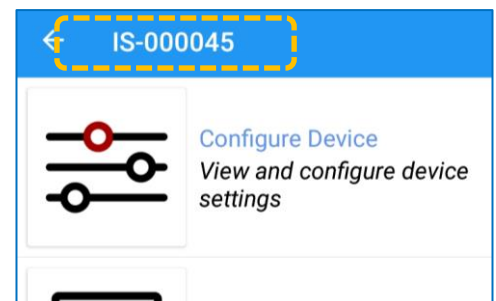
Could not connect to device

IS-000045

**Configure Device**
*View and configure device settings*

The IDT app automatically communicates with the logger and obtains its configuration and settings. (Skip to section 2.5)

### 2.4.3  Manual Selection using Bluetooth scan

From the Devices window… Tap the "Bluetooth Scan" icon.

**Devices**

Barcode Scan    Bluetooth Scan

*Please ensure that the device you wish to connect to is awake.*

A scan will commence and list some of the Bluetooth-enabled logger devices found. The scan can pick up several types of logger, as long as they are within communications range.

Your logger can usually be identified by comparing with information on its label (e.g., serial number).
If your logger is not listed, try re-activating the logger communications link.

Barcode Scan    Bluetooth Scan

IS-000045

> If you are not using DataGate:

- All loggers you have access to appear in black text.

> If you are logged into DataGate:

- Secure loggers that you own are listed with black text.

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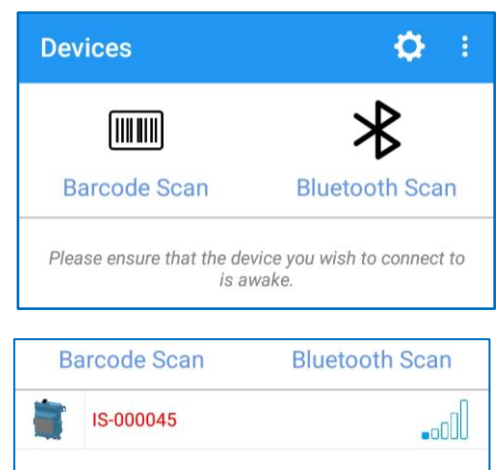
- Unprotected loggers that you "own" (on DataGate) are listed with red text (providing "show unprotected devices" is selected from the local menu).
- Loggers that you do not own are not listed.

Note: Use of the options control gives the ability to *show details*: MAC address (Android only) and dBm.

| Barcode Scan | | Bluetooth Scan | | |
|---|---|---|---|---|
| | | MAC Address | | Signal (dBm) |
| | IS-000020 | 00:80:25:D1:F0:FE | | -92 |
| | IS-000045 | 00:80:25:D1:F1:24 | | -88 |

Confirm (using the serial number) the correct logger device is listed on IDT.

Tap on the line to select it. IDT will connect with it.

**Connecting to device**

Please wait while we aquire the device details
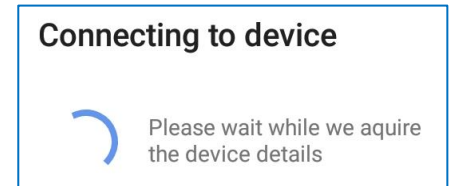
The identity of the logger is shown, and IDT displays some graphical controls that give access to the various options.

This is the main options screen.

The IDT app automatically communicates with the logger and obtains its configuration and settings.

← **IS-000045**

**Configure Device**
*View and configure device settings*
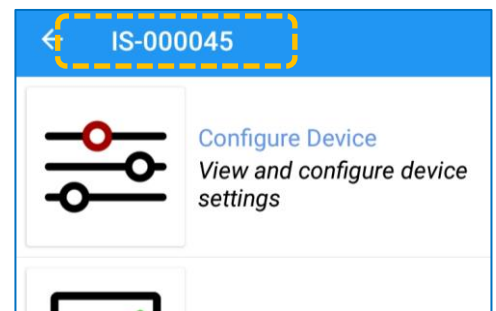
## 2.5 LOGGER FIRMWARE UPDATE

New software releases (firmware) for loggers are occasionally released from HWM.

Before reaching the main options page, IDT automatically checks the existing logger firmware version. If a newer one is available, the user will be offered the option to update the logger using the file saved in the phone. This is recommended.

Tap the "New firmware available" line to start the upgrade, which takes approximately one minute.
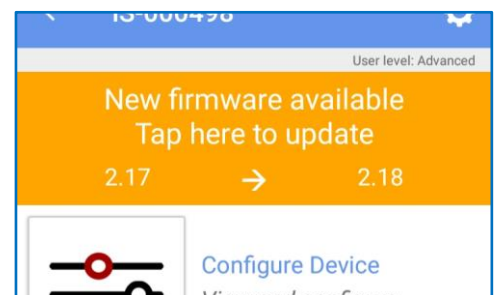
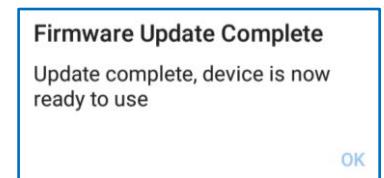(Note: The IDT App does not support this facility for 'Group 1' loggers).

Progress is shown.

(Loading → Restarting Device → Firmware Update Complete).

The main options screen is then shown.

IS-000498

User level: Advanced

**New firmware available**
**Tap here to update**
2.17 → 2.18

**Configure Device**
*View and configure*

**Firmware Update Complete**
Update complete, device is now ready to use

OK

# 3  IDT – MAIN OPTIONS PAGE

The main options page is shown below.

This page functions as a menu. Selecting an option on this page will open up a new sub-page with further options.

Controls are displayed for the user to select how they wish to use IDT app:

**Configure Device:**
The user can use the app to check the device configuration (settings) or re-configure the device.

**Test Device:**
The user has access to some tests, to be able to confirm the logger device is operational within its installed environment.

**Logged Data:**
This shows when data is present. The user can access measurement data held within the logger device.
(Access is temporary; data is not stored by the app).

**Firmware Selection:**
The user can modify the device firmware.
(Roll-back is rarely used, only if advised by HWM)

**Deploy Device:**

Note: This option is only available when IDT is used with DataGate.
Tapping the Deploy Device option will launch the HWM Deployment app and passes details of the logger to it.
The user is able to record the installation location of the device.
(The HWM Deployment app is then used to complete the task of selecting the site of deployment and an administrative update of the DataGate system).
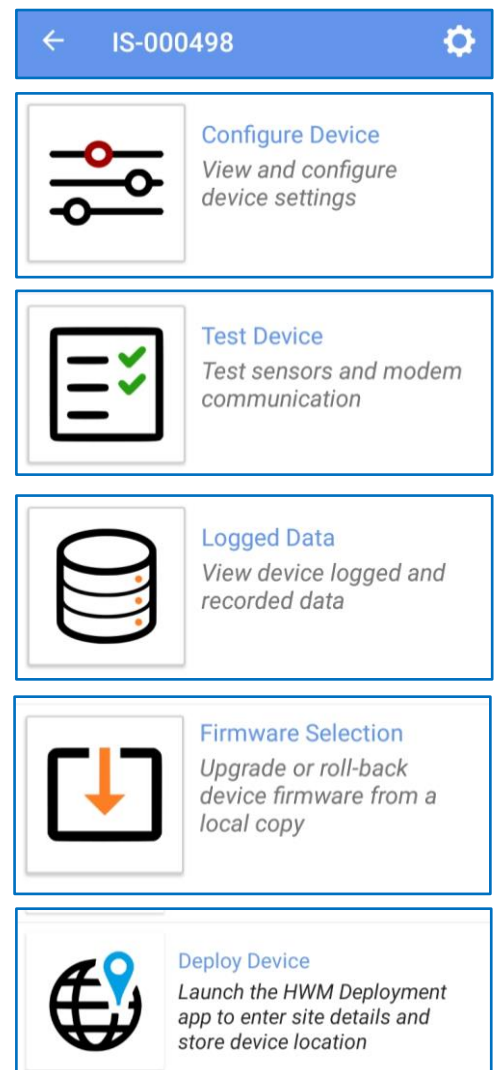
## 3.1 DISPLAYING LOGGER DEVICE INFORMATION

### 3.1.1 ID information / Telephone number (SMS)

From the main page, tap on the "Configure Device" selection.



A new menu page will open with various configuration options. Select "Device Information".



A new page will open with a read-only area showing various logger parameters, including the firmware version, serial-number, and its current time.

The refresh symbol on this page updates the displayed Logger Time.

(The Logger time can be used to check the UTC offset has been set correctly; see section 3.1.2).

The 'settings' section allows the user to:

- (Optionally) input a unique identifier in the ID field.
- Modify the "Telephone Number" of the logger.
  Note: This acts as an identifier of the logger to the DataGate system, so **caution** should be taken.
  Only modify this field if advised by HWM.
  (Modification of this field is not permitted by IDT for some loggers. For 'Group 1' loggers the field may even be blank).



The logger telephone number displayed (also known as an 'SMS number') is not read from the SIM card but has to be independently programmed into the logger memory.

Where applicable, it should match the number that appears on the logger front-panel label, (see example opposite).



The telephone number is usually pre-programmed into the logger by HWM prior to shipping and should remain unchanged. This is the case even if the SIM is changed.

### 3.1.2 Time-zone (UTC offset)

The logger communicates to DataGate using the global time reference, (called "UTC"; Coordinated Universal Time).

IDT allows the user to program loggers using local time. The logger needs to know the offset of the local time zone from UTC so it can communicate the correct timestamps for data to the server. This can be set by the user by tapping the "UTC offset" line.
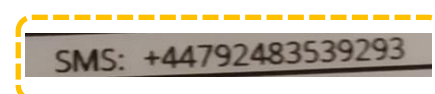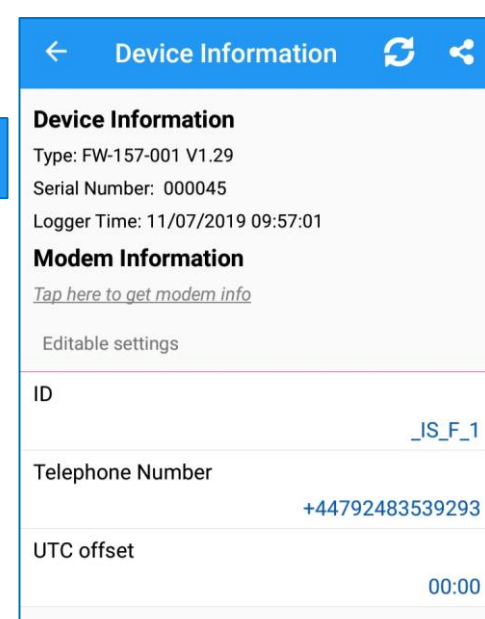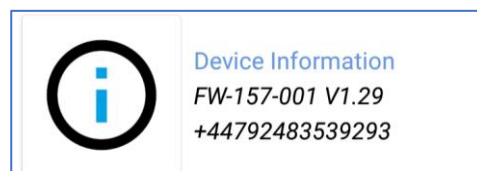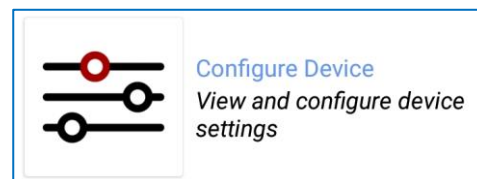
For 'group 3' loggers, when a user adjusts the UTC offset, the setting does not *immediately* change the displayed "Logger Time". The update only takes effect after the logger next calls into the server; the server then changes the logger's time. This allows the server to be able to correctly interpret logger timestamps during any UTC offset change.

E.g. If your local time is 4 hours behind UTC / GMT then set this field to " - 04.00".

### 3.1.3  Logger mode / Security PIN

(Skip this section if using a 'Group 1' logger; It is not applicable).

The "Mode Settings" area contains miscellaneous controls that affect device operation.

**Device Mode** should be "normal"; this is unavailable to edit for most users and is password protected.

**Shipping mode** is used to render the device inactive and is used for shipping the unit and for long term storage. (Refer to section 6.1). If 'shipping mode' is 'off', the logger will be in a recording state.

| Mode settings | |
| --- | --- |
| Device Mode | Normal |
| Shipping Mode | Off |
| Device Pin | Disabled |

**Device PIN** gives the user the option of setting a user-defined PIN on an Unprotected device.
Tap on the line if you wish to set a PIN.
The PIN can be up to 8 characters in length.
Once set, IDT will not allow access to the device without a valid PIN being entered.
If you forget the PIN, the device can only be recovered using a HWM Master PIN; the PIN is unique to each device.

| Device Pin | |
| --- | --- |
| | |
| | CANCEL     OK |

### 3.1.4  Status (Logger recording status)
(This section is applicable to 'Group 1' loggers only).

The "Status" line indicates the recording status of the logger.

Here, the logger is indicating that it is "stopped".
(This state is often used for long-term storage and for shipping the logger in an inactive state).
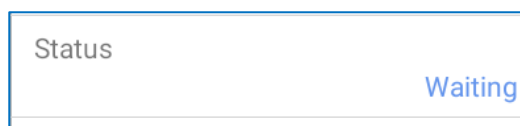
| Status | |
| --- | --- |
| | Stopped |

To change the current state of the logger, tap on the "Status" line.

The logger status will change between:
Stopped → Waiting → Recording (… and → Stopped, if required).

If changing from the 'Stopped' status, IDT will write the program settings back to the logger and then cause the logger to re-start.

After the logger has been re-started, it initially goes into a state of 'Waiting', usually only for a short interval.

Status

Waiting

Once in the 'Waiting' state, tapping the Status line will refresh the displayed information and display an advisory message if still waiting for the start time.
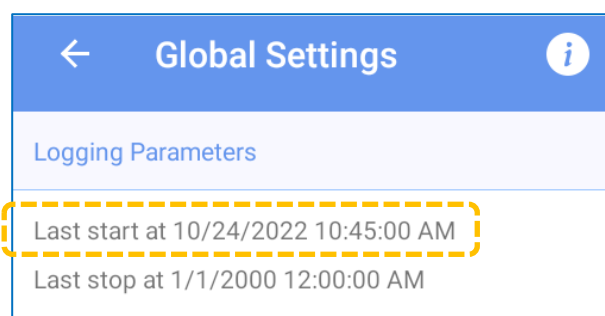
IDT App Version - 3.0.0

Logger waiting for start time. Please check your device's channel logging settings for more information

OK

The standard logger behaviour is to commence logging at the earliest possible time, but it must start at a suitable '15-minute' time boundary. (E.g., If restarted at 10:26 the logger will not start until 10:30 or 10:45).

The expected start time can be checked on the Global Settings page (see section 3.3).

← **Global Settings** ⓘ

Logging Parameters

Last start at 10/24/2022 10:45:00 AM
Last stop at 1/1/2000 12:00:00 AM

Upon reaching the start time, the logger will move into a state of 'Recording' and begin its regular repetitive program cycle of measuring from sensors and logging the results.
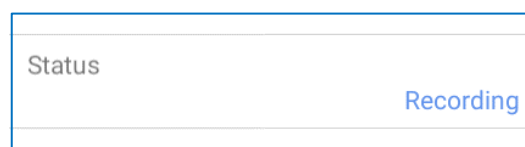
Status

Recording

Note:   Tapping on the Status line when the logger is in a recording state will put the unit into a "stopped" state, suitable for long-term storage. Collect any required data from the unit before doing this.

Every time a change is made to the logger program, it is immediately uploaded to the logger. For changes that affect the channels, or the log period, the logger will also undergo a re-start. The most common practise is for logging (data recording) to begin immediately, although this can be deferred to a later time if required.

To defer the data recording start time, navigate to the Global Settings page.

The standard logger behaviour is to commence logging at the earliest possible time, by setting the "Start Logging Immediately" slider control to 'on'.

Start logging immediately
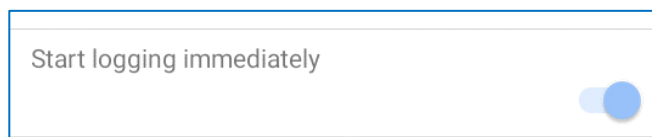
If the logger re-start is required to be deferred to a later time, move the slider to the 'off' position and then set the required time and date for the data logging to begin.

Start logging immediately

Start Time

10/24/2022 2:00:00 PM
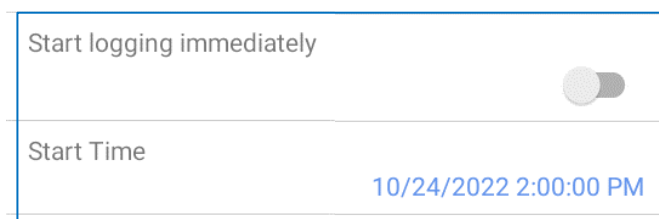
When programming a logger start time, it should be noted that the logger may move the time forward to the next suitable time boundary.

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Note:  A re-start of the logger deletes any previously stored data and begins storing fresh data. It is therefore important to retrieve any data from the logger prior to either stopping the logger or making any program changes.

### 3.1.5  Modem Information
(Not applicable to 'Group 1' loggers).

Modem details can be shown by tapping the "... get modem info" line.
These can be forwarded to expert users for assistance by tapping on the share control.

**Modem Information**
Modem:  GE866-QUAD
Firmware:  16.01.200
IMEI: 356850083066769
IMSI: 204043807139293
ICCID: 8944538531002822936
CSCA: "+316540791031",145

## 3.2  DISPLAYING / EDITING CALL-IN SETTINGS

(Not applicable to 'Group 1' loggers).

From the main options page, tap on the "Configure Device" selection.

**Configure Device**
*View and configure device settings*

A new page will open with various configuration options. Select the  "Call Settings" option.

The current call settings of the logger will be displayed.

**Call Settings**
*mobiledata*
*inbound.hwmonline.com: 23024*

Tap on any line to change the setting; the change is made to the logger immediately without having to confirm it.

The page is divided into 4 areas of settings (1 for IDT in "Basic mode"):

- Call-in settings (also available in Basic mode)  ; Refer to section 3.2.1.
- Data Destination settings                        ; Refer to section 3.2.2.
- SIM settings                                     ; Refer to section 3.2.3.
- Modem settings                                   ; Refer to section 3.7.1.

### 3.2.1  Call-in settings
The Call-in settings for an IDT user-level of Basic are shown opposite.

The Call-in settings affect when the logger calls in with measurement data.

Additional settings can be accessed at a user-level of Advanced.

← **Call Settings**

Call-in Settings

Call Mode
Frequency

Call Frequency
01:00

⋮

Continue to call in when there is no data to send
No

Fast call rate (min)

Note: These settings should be carefully chosen since every call-in uses some power from the battery.
*To prolong battery life, keep the number of call-ins per day minimal.*
*3 calls per day (maximum) are recommended.*

IDT provides some warnings and restrictions to limit very excessive call-levels being set by a user (e.g., at hourly intervals or less).



Warning: setting too high a frequency can have a serious impact on your loggers battery life

OK

Call mode:

- Select "Time" to have the logger call-in at fixed times.
  (Then set the required call times).
- Set to "Frequency" to have the logger call in regularly after a set period of collecting measurement data.
  (Then set the required period between calls).

Continue to call when there is no data:

- This should usually be set to "No"; It is to save battery power.
  It takes effect when measurements are made infrequently; if there is no new (or unsent) data then do not call in.



← Call Settings

User level: Advanced

Call-in Settings

Call Mode
Time

Call Times
07:00

Continue to call in when there is no data to send
No

Fast call rate (min)
5

If the logger is unsuccessful at the first attempt to call-in (e.g., the network is busy), it will re-try at the next earliest call time, until it is successful. A logger can send in data from several previous days if it needs to (e.g., if the data could not be sent because the site was temporarily flooded, and the antenna signal was degraded).

The selection method can vary according to what is call-mode details are being set (time or frequency). Tap on the part of the field you wish to change (i.e., hours or minutes), then make the adjustment.

When the Call-mode is set to "Time":

- Controls are available to delay the Fixed call-in times by a short random time; this can be used to reduce the peak load on the server.
- Fixed call-in times can be added. (Logger has a typical limit of 8).
- Fixed call-in times can be deleted.

When the Call-mode is set to "Frequency":

- The logger calls-in at the chosen interval, starting at midnight.
- If less than 1 hour, the logger calls in hourly, and the minutes setting governs the time past the hour when the call-in is made.

### 3.2.2 Data Destination settings

- Set the URL (sever address) and port number as required for your server.
  (Check with your system administrator).
  (Settings shown are for illustration purposes only).
- The SMS backup number is the telephone number that the logger can use to send messages to the server. (Settings shown are for illustration purposes only).
  The SMS (text message) service is a fall-back connection path only used if the internet cannot be accessed for some time. Not all loggers or SIM cards support the SMS messaging service.

### 3.2.3 SIM settings

- Confirm the settings match those of your mobile-network data service provider.
- Edit any that are incorrect.
  (Settings shown are for illustration purposes only).

The APN (Access Point Name) is the name of the gateway being used by the mobile service provider to access the internet. If required, enter a username and password.

## 3.3 TIMING INTERVALS FOR MAKING MEASUREMENTS

These settings determine what time periods the logger uses for its background activity of gathering data. (See also section 6.6).
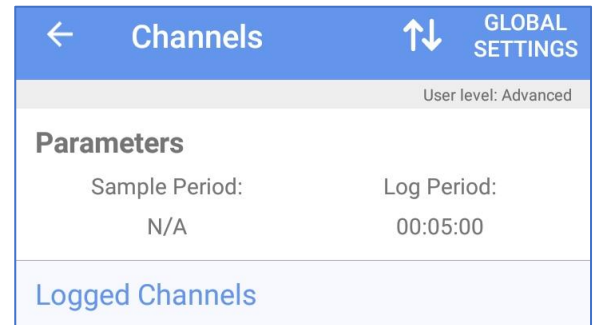
From the main options page, tap on the "Configure Device" selection.

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A new page will open with various configuration options. Select the "Channels" option. (Information displayed will vary with logger model).

| | Channels |
|---|---|
|  | *No: 1* |
| | *Combos: 0* |
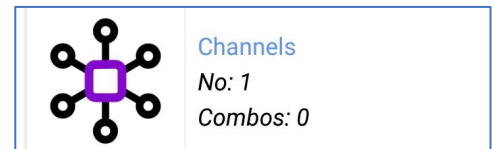
The "Channels" summary page is displayed.

Tap on the "Parameters" line, or the "Global Settings" link.

← **Channels**      ↑↓  GLOBAL SETTINGS

User level: Advanced

**Parameters**

| Sample Period: | Log Period: |
|---|---|
| N/A | 00:05:00 |

**Logged Channels**

A new page is shown, called "Global settings".

← **Global Settings**      ⓘ

User level: Advanced

Logging Parameters

Last start at 03/09/2020 09:30:00
Last stop at Never

The page gives details of when logging was last started (or, if recently activated, is due to start).

Sample Period

00:00:30

The "Last stop" time will usually be a default value (as shown) unless the logger is currently in a stopped state.

Log more than once per day

🔵

There is a slider switch which determines if the logger "logs more than once per day" or if it produces just a single log value per day.

Log Period

00:05:00

Pulse Input Frequency

Most general-purpose loggers should be set to log more than once a day.

Pulse sample rate:

High Speed
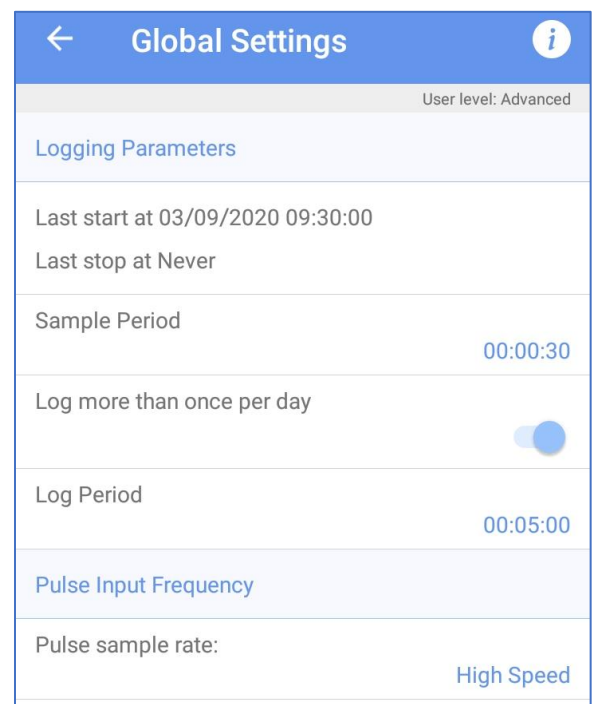
Note:  When 'once a day' is selected, the time of measurement is additionally required.
      (For 'group 1' loggers, there is no 'Logging time' field, and the logger will make and log a measurement at midnight).

Log more than once per day

⚪

Logging time

09:30:00
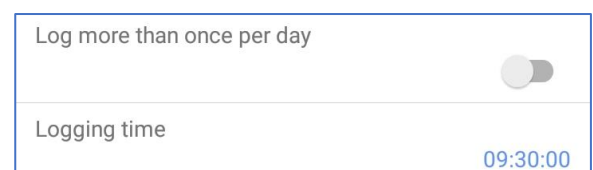
The "Sample period" line will not be shown when the logger model auto-configures this, based on the log-period setting.

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Where shown, "Sample Period" sets the time interval between making measurements on most of the interfaces.

Sample Period
00:00:30

| 00:00:01 | 03:00:00 |
| 00:00:02 | 04:00:00 |
| 00:00:03 | 06:00:00 |
| 00:00:05 ... | 08:00:00 |
| 00:00:10 | 12:00:00 |
| 00:00:15 | 1 Day |

The value can be selected from one of the many available options.

The "Log Period" sets the time interval between storing values and is set in a similar manner to that described for the sample period.

Log Period
00:05:00

The Log period must be a multiple of the sample period. If the user does not select an appropriate value, IDT will automatically adjust the input.

The data value stored is known as a "datapoint", normally produced at the log period rate. The value is formed by (optionally) applying some mathematical function on a set of raw data measurements (made at the sample rate); the samples obtained between the log period intervals.

Note: "Sample Periods" for 'group 1' loggers are displayed as "N/A" or "Never" in IDT because it is adjusted by the logger software. Background sampling of the sensors still occurs so that the logger can make an accurate assessment of the average value between producing the datapoints. (The 'N/A' and 'Never' descriptions can therefore be disregarded).

Sample Period:
N/A

*Sample Period: Never*
*Log Period: 00:15:00*

Loggers with a pulse collection type of interface (e.g. digital flow interfaces detect and count pulses output from meters) have to respond rapidly to the input signals.

Pulse input interfaces are sampled at a much higher rate than regular channels and (except for 'group 1' loggers) have their own control for selecting timing.

Pulse Input Frequency

Pulse sample rate:
High Speed

Select the most appropriate setting based on the expected maximum pulse rate and also the minimum pulse-width.
Where appropriate, battery life can be extended with the "power save" setting option.

**Pulse sample rate:**

High Speed (16ms min pulse)

Power Save (500ms min pulse)

## 3.4 CREATING (OR MODIFYING) A LOGGER CHANNEL

**Note:** Loggers are usually shipped from the factory pre-configured to the requirements of a customer order. The steps described here therefore only need to be followed for setup of a new channel or modifying existing settings.

As discussed in section 1.8, a channel requires:

- A way to identify the channel and its data-stream.
    (IDT gives the channel a "channel number" for this purpose).
- A "channel type" (electrical interface and software driver)
    (IDT uses "input selector" and "sensor type" for this purpose).
- A means of interpreting data obtained from the sensor.
    (IDT uses such things as "input multiplier" and "units" for this purpose).
- Settings to govern when and how datapoints are produced for storage.
    (IDT uses the "log period" and "Logging mode" for this purpose).

The actual fields that are needed are *dependent on the type of sensor* and what a measurement from it represents. There is also some variation in the fields required dependent on the model of logger; 'group 1' loggers are relatively basic in design and less setup steps are required than for the 'group 2' and 'group 3' loggers.

Furthermore, 'group 2' and 'group 3' loggers can also use the measurement channel datapoints to derive indirect data streams (in the form of additional channels) or other indirect information. For example, a meter pulse input can produce:

- A stream of data measured *direct from the sensor interface*.
- A stream of *indirect data* derived the direct data stream.

Here,    Meter pulses indicate consumption of a volume of fluid.
    Indirect data can be in the form of flow (when timed)
    or a calculated meter reading (if the initial meter reading is known).

Examples will be given of the considerations needed and steps taken to set up a logger channel for typical sensors. This is for introduction purposes only; many sensors will follow a similar setup procedure. However, some sensors (or logger behaviour with the sensor) can be more complicated and require further discussion. (Refer to section 7 for further details of sensor setup).

The first example is based on an interface can detect if a switch is open or closed. A typical application of this interface is for the detecting output pulses from a gas or water meter. The logger input in the example will usually be labelled as either 'Flow' or 'Pulse', and IDT will similarly refer to the input by including 'Flow' or 'Pulse' in the description.

Note:  The wiring of the interface will not be considered here. However, it is important to know the characteristics of the equipment that the logger is being connected to, since flow meters can have several "flavours" of output pulse signals. e.g.:

1. Uni-directional flow is represented by a single output from a meter.
2. Bi-directional flow can be represented (in several ways) by using two outputs from the meter, and therefore requires two signals within the input to the logger.

A typical gas meter has uni-directional flow, with a single pulse output. The rate of gas flow is derived from the pulses by requiring the logger to count the number of pulses obtained during a fixed interval of time; this is to be repeatedly logged.

### 3.4.1 Example 1: Flow Channel (using a logger from 'group 1')

To check for the number of pre-programmed channels that the logger may have, refer to the "Channels" option line.

"No: 2", indicates that the logger has 2 channels set up.

> **Channels**
> *No: 2*
> Sample Period: Never
> Log Period: 00:15:00

To check what channels exist tap the "Channels" line.

The "Channels" page will open.

A summary of the channel settings is shown below the "Logged Channels" line.

> ← **Channels**
>
> **Parameters**
>
> **Logged Channels**
>
> 1  Pressure
>    Multiplier: 0.1 - Average
>
> 2  Flow
>    Units/Pulse: 100 - Average

The numbers on the left are the assigned channel numbers for the data streams. (On 'group 1' loggers these cannot be changed from factory settings).

Tap a line if you wish to view more details or to edit the settings.

When a logger has no channels set up, there are none shown in the "Channels" page, nor is there a "Logged Channels" line. (See blank area in the diagram opposite).

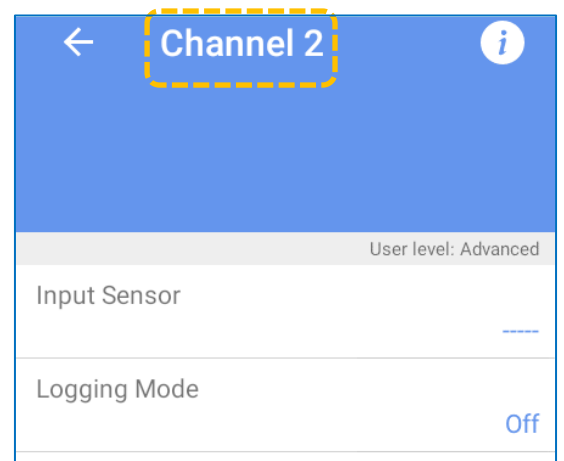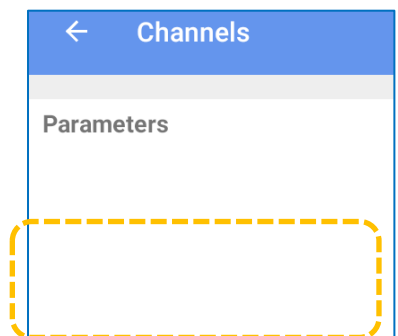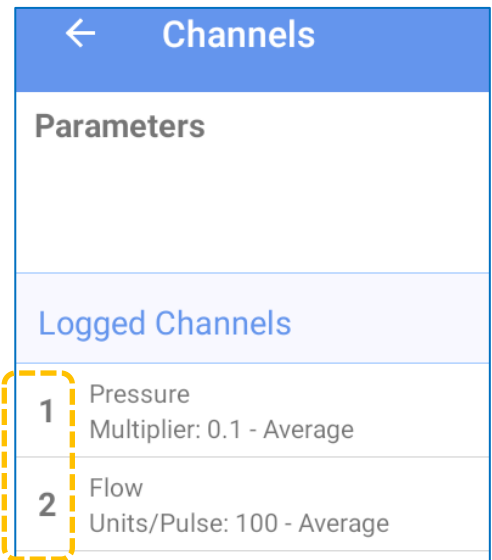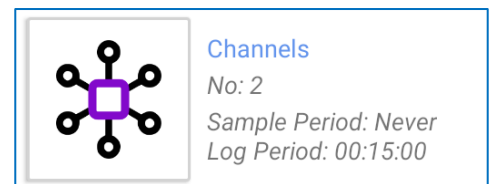The channels can be added, as per the instructions that follow.

> ← **Channels**
>
> **Parameters**

From the "Channels" page, Tap on the " **+** " symbol. (The symbol is blue if a channel can be added, but grey if no further channels are available).

> **+**

A channel number is allocated for the data stream, and a page is loaded with the current settings.

Initially there is no Input Sensor selected. (Shown here as "-----", the channel is disabled).
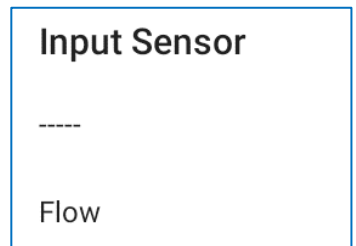
> ← **Channel 2**            ⓘ
>
>                    User level: Advanced
>
> Input Sensor
>                              -----
>
> Logging Mode
>                              Off

To select an electrical interface for an input sensor, tap on the "Input Sensor" line.

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A pop-up box is shown on the screen for the user to select which input to use for this channel.
(Here, the logger offers either to disable the input, or to use a "Flow" sensor input).

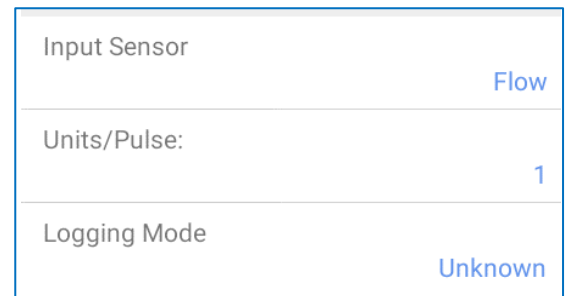Tap on the Flow line to make the selection.

**Input Sensor**

-----

Flow

Note: Where a 'group 1' logger has an unused interface, the related channel can be temporarily disabled (removed) to reduce battery power consumption and the saving of zero/null or erroneous data. Select '-----' to remove the channel.
For 'group 1' loggers the channel can be easily re-enabled by adding it back, as described in this section.
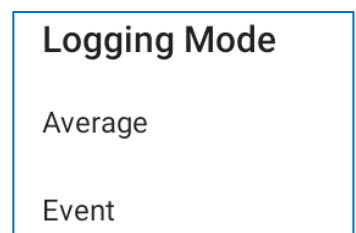
The input sensor of "Flow" has now been selected

(For operational details of the interface, refer to the logger user-guide).

| Input Sensor | |
|---|---|
| | Flow |
| Units/Pulse: | |
| | 1 |
| Logging Mode | |
| | Unknown |

Now select the logging mode.

- Choose "Average" when connecting to meters that are producing frequent meter pulses.
- Choose "Event" when connecting to meters that are producing infrequent meter pulses.

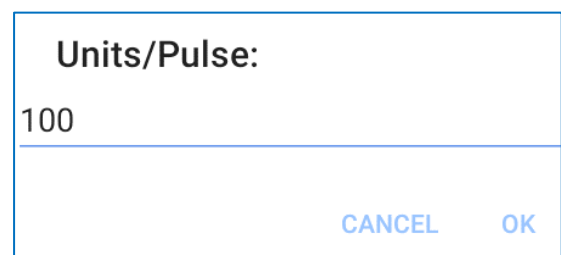**Logging Mode**

Average

Event

Notes: "Average" counts pulses between log periods, and from that it calculates the flow rate.
"Event" waits for the log period to pass and then waits for the next pulse. It can then calculate an average value of the flowrate and record it by backfilling any datapoints that were missed whilst waiting for the pulse to arrive.

The "Units / Pulse" field can be edited by tapping on the line and entering the appropriate value.

(E.g., If you wish to record consumption in litres, and the meter generates one pulse per 100 litres consumption, then set this field to "100".
Tap on OK to confirm the change).

**Units/Pulse:**

100

CANCEL       OK

Tap on the "accept" button to commit the changes to the logger.

IDT will take a few seconds to modify the program settings within the logger. It will then re-start the logger, so the logger will be making a new recording; This is required because the operation of the channels has been changed.

Tap the left arrow to return to the Channels screen, and check that the channel is now present and has correct settings.

| 1 | Pressure<br>Multiplier: 0.1 - Average |
|---|---|
| 2 | Flow<br>Units/Pulse: 100 - Average |

For setup details of other channels, refer to the relevant sub-section within section 7.

### 3.4.2 Example 2: Flow Channel (using a logger from 'group 3')

A gas meter pulse represents a volume of gas that has travelled through the meter.
To accept the meter pulses, the logger is required to have a suitable interface. On some loggers, the interface that handles pulse inputs may be labelled as "Single Bidirectional Flow" or "Dual Unidirectional Flow" or similar. For other loggers, interfaces may be unlabelled, but their type can be found from examination of the model-number of the logger (refer to the logger user-guide if required). They are often supplied as a pair of pulse input pins on a single connector. IDT will refer to each of these as a ***pulse input***.

Setup of the channel is like the method described in section 3.4.1, but the logger offers more flexibility with the use of the pins on the connector. The setup of the interface therefore requires more steps (see also sections 7.4 and 7.6). Once the installer has made selections from the options, the logger then uses the most relevant driver with the chosen settings.

When set as a flow channel, the logger will count the number of pulses obtained on specified pins during a fixed interval of time; this will be repeatedly logged.
If the logger has the option enabled in the factory, an up-to-date meter reading can also be obtained (if the initial meter reading is entered) by accumulating the total number of meter pulses.
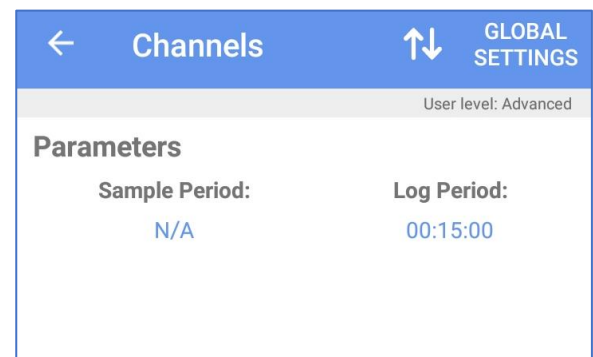
Tap the Channels icon to begin setup of a channel.

("Combos: 0" is a summary of the total number of programmed 'combos' that exist, here '0').

| Channels |
|---|
| *No: 1* |
| *Combos: 0* |
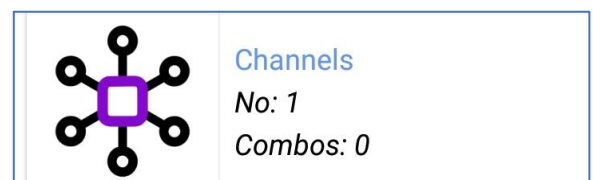
A summary of any channels and trigger-action combos (discussed in section 3.5) that are already configured is shown on the page.

(Here, the list is empty).

| ← Channels | ↑↓ GLOBAL SETTINGS |
|---|---|
| | User level: Advanced |
| **Parameters** | |
| Sample Period:<br>N/A | Log Period:<br>00:15:00 |

Tap the " + " line to add a new channel.

+

The new channel is enumerated by IDT; here it is channel "1". (Outgoing channel numbers are not fixed but need to match DataGate expectations).

There are two tabs, select the "BASIC" tab.

Tap the "Input Sensor" line.
(Currently, it shows "<Disabled>"; it is unconfigured).
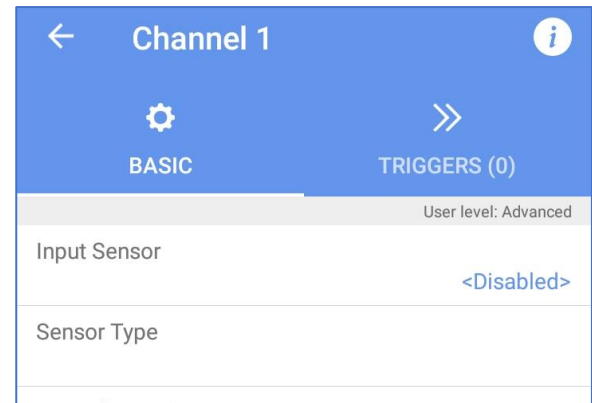
A pop-up selection box appears listing all installed sensor interface options.

Notes:

- The list will show available interfaces.
  (It will vary according to logger model-number and also any requirements specified at the time of the logger being ordered).
- Selecting "<Disabled>" will delete any current configuration of the channel, including any calibration data.
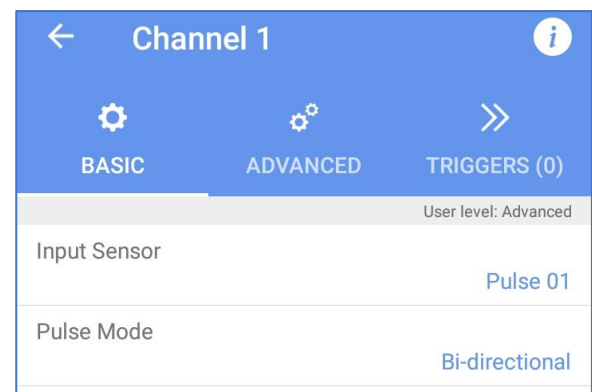
For this example, (a uni-directional gas meter), a uni-directional flow sensor will be required; this uses only 1 pulse input pin.
Select a Pulse pin from the selection list by tapping it. (e.g., "Pulse 01").
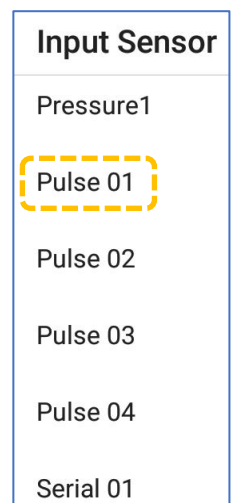
The selection commits the electrical interface for use by the logger.

The screen updates to show the selected interface.

For this particular type of interface, multiple software driver options exist, and hence a new setting line is displayed, "Pulse Mode".

Tap on the Pulse mode setting and select from the available options.

For this example, a uni-directional flow sensor is required.
Therefore select "Uni-directional".

This selection commits the relevant pins of the interface connector for a specific use. In this example, the software driver will count meter pulses that appear across the relevant pins of the connector.

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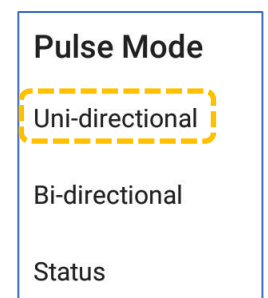
The selections made are shown in the channel configuration screen.

The software is now prepared to count pulses but has no idea of whether it is measuring the flow of electricity, water, or something else.

The next steps are to identify what the pulse count is representing.

Tap on the "Sensor Type" line.

| BASIC | ADVANCED | TRIGGERS (0) |
|---|---|---|
| | | User level: Advanced |
| Input Sensor | | Pulse 01 |
| Pulse Mode | | Uni-directional |
| Sensor Type | | |

A list of options is presented.

Select the type of measurement being made.
(In our example we are measuring gas. ... Therefore, choose "Gas").

**Sensor Type**

Count

Electricity

Flow

Flow (US)

Gas

Next tap on "Recording Unit" and select a unit of measure from the list.

(Units of measurement listed will vary according to earlier-made selections).

(In our example this has to match the units used by the specific gas meter installed. e.g., $m^3$ for the meter shown opposite).
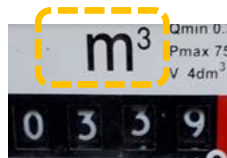
**Recording Unit**

m³

ft³

| BASIC | ADVANCED | TRIGGERS (0) |
|---|---|---|
| | | User level: Advanced |
| Input Sensor | | Pulse 01 |
| Pulse Mode | | Uni-directional |
| Sensor Type | | Gas |
| Units/Pulse: | | 1 |
| Recording Unit | | |
| Logging Mode | | Spot |

A relevant calibration factor for a gas-meter is units per meter pulse. (Other types of equipment may require a different type of calibration factor).

Tap on "Units/Pulse".

This selects the pulse significance of the meter.

| Sensor Type | | Gas |
|---|---|---|
| Units/Pulse: | | 1 |
| Recording Unit | | m³ |

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Enter the correct setting based on the equipment you have attached the sensor to.

e.g.   If the meter pulse represents 0.1 m$^3$ of gas, the units/pulse should be set to 0.1.

**Units/Pulse:**

0.1

CANCEL     OK

(By repeatedly counting the number of pulses from the meter over fixed time periods, the logger is able to determine the flow rate through the meter).

Next select the required logging mode.

The available options depend on what is being measured.

| Recording Unit | |
| --- | --- |
| | m³ |
| Logging Mode | |
| | Spot |

For example, "Average" will produce a datapoint (logged data) that is an average of the measurement samples it has made since it last produced a datapoint.

However, for a gas flow measurement, the shown options are less. (IDT presents only useful options based on any previous selections).

**Logging Mode**

Average

Min

Max

Spot

Time closed

Time open

**Logging Mode**

Minimum

Maximum

Spot

For a gas flow reading, the channel should be set to "Spot".
The result will be the pulse count (i.e., total flow) since the last datapoint was produced.

The completed settings are now shown within IDT but have not yet been saved.

Tap the "ACCEPT" button.
IDT will save the channel settings to the logger.

| ⚙ BASIC | ⚙ ADVANCED | » TRIGGERS (0) |
| --- | --- | --- |
| | | User level: Advanced |
| Input Sensor | | Pulse 01 |
| Pulse Mode | | Uni-directional |
| Sensor Type | | Gas |
| Units/Pulse: | | 0.1 |
| Recording Unit | | m³ |
| Logging Mode | | Spot |

Select the "Advanced" tab.

Check the selection within the "Global pulse sample rate". ("Global", here, means that the selection is a single setting *applicable to all pulse channels* within the logger).

| BASIC | ADVANCED | TRIGGERS (0) |
| --- | --- | --- |
| | | User level: Advanced |
| Global pulse sample rate | | Unknown |

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The setting may be changed here, or on the "Global Settings" screen; see section 3.3.

Select the fastest sample rate needed by the set of pulse channels in use.

Tap the "ACCEPT" button.
IDT will save the channel settings to the logger.
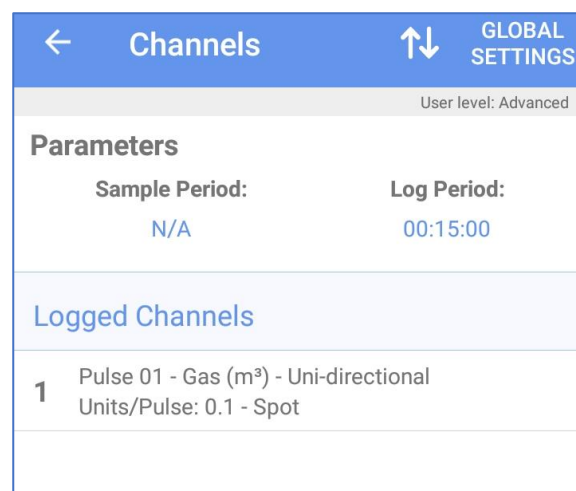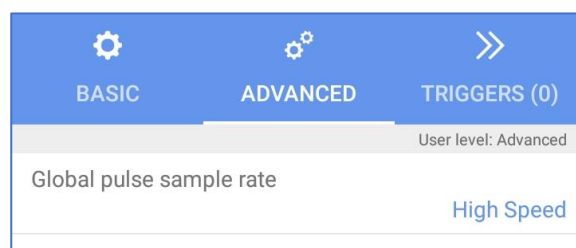
Then tap the "back" button.

The channel is now set up and will appear in the Channels list.
("1" shown here represents channel 1. Datapoints will appear as the outgoing Channel 1" data stream sent to the server).

Where multiple channels have been set up, they will all be shown here as a summary of their settings.

(To edit settings, tap on the relevant line).

Further discussion of setup of a logger for automated gas meter readings will not be discussed here, except to summarise:

- Because the context of the channel use is connection to a gas meter, additional options become available for a logger to be used in that application…
- The current meter reading can be taken and recorded in the logger as part of the setup of "meter readings" settings within IDT. It is linked to the Uni-directional flow (Pulse input) channel.
- The logger may offer the ability to regenerate meter pulses on an output channel. This allows the pulses to be passed to other instruments using a logger output interface. Enable this feature if required.

For further information refer to section 7.6.

## 3.5 SETTING TRIGGERS AND ACTIONS FOR A CHANNEL

(Skip to section 3.6 if using a 'Group 1' logger; Triggers and Actions are not applicable).

Once channels are set up, a steady stream of data is made by the logger at both the log rate and also (stored temporarily) at the sample rate. Trigger-Actions can now be created.

A "Trigger" is a monitoring function within the logger. It monitors for a single condition or combination of conditions to occur on the data produced by selected channels. If the condition(s) are met, the logger can be set to take one or more actions (e.g., inform the server of the event, thus indicating a potential alarm condition).

The conditions being monitored are referred to as a "Trigger" by IDT. Any subsequent action is referred to as an "Action" by IDT. The Trigger-Action(s) are sometimes referred to as "combos" (short for "Combination").

Within any trigger-action combo, either a *single condition*, or a *set of several conditions* can be used to evaluate the trigger result. Where multiple conditions are set, Boolean logic functions (AND or OR) can be applied.

This section will use an example of setting a trigger-action for a sensor.

### 3.5.1   Example 3: Introduction to Triggers and Actions

A channel has been set up, with samples and datapoints being obtained as summarised in the diagram opposite.

Trigger-actions are summarised with the number currently set within the logger being shown on the bottom line. The logger has no trigger-actions set, as indicated by "No: 0".
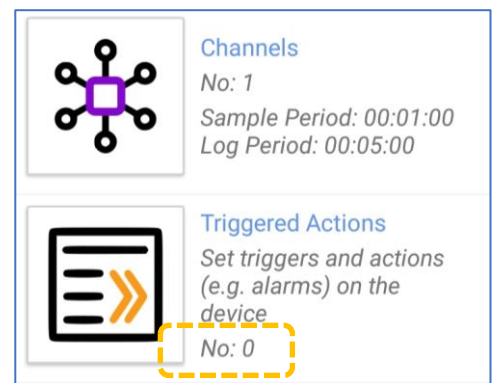
The requirement for our example is for a trigger to be setup, looking at the data from a sensor using channel 1, and used to inform the server (send an alarm message) for when the trigger condition is met. Similarly, we wish to inform the server (send an alarm clear message) when the trigger condition is no longer met. We require the trigger to be activated at a value of 50 or more and to be removed at a value of 40 or less. Both messages are required be sent immediately.

### 3.5.2   Setup of conditions for TRIGGER *start* and *end*

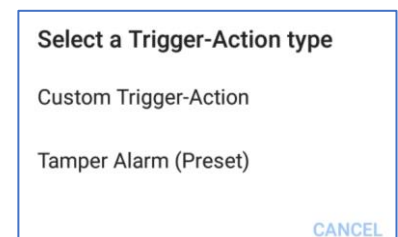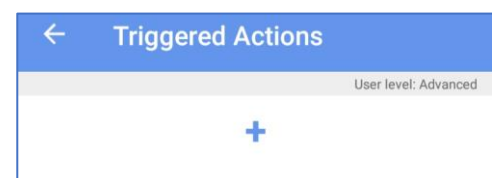To setup the trigger action, tap on the "Triggered Actions" line.

This page summarises any existing trigger-actions.
It also gives edit-access to any listed action.
(Currently none are set).

To add a new Trigger-Action, tap the " + " icon.

Then select a Trigger-Action type.

For our example, tap the "Custom Trigger-Action" line.

(Pre-set alarm types are also listed here but are not relevant to our example).

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A Trigger-Action details page appears, which requires completion. Once completed, tap on "Save" to store the settings in the logger.

The slider-control at the top-right can be used to enable or disable a Trigger-Action.
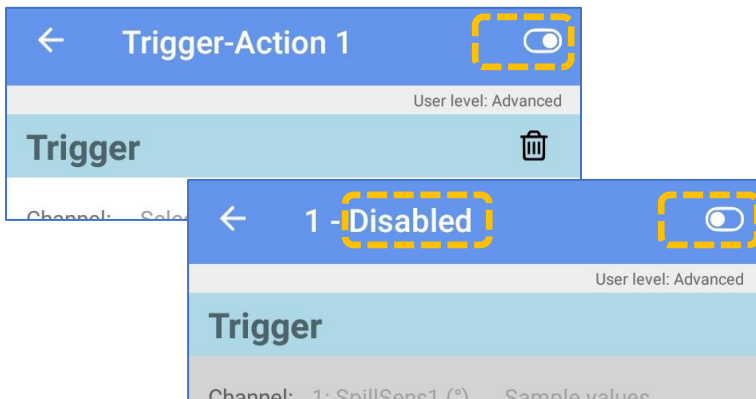




Set the triggering conditions, as follows:

Tap on the location which currently displays "Select a channel".

A list appears showing all currently configured channels.

Tap on a line to select the required channel.

(In the logger used in this example, only one channel has been programmed; it is monitoring data from a SpillSens sensor, which produces angle measurement data).

The channel is selected.

The data values being watched are, by default, the Log values; this can be changed to the sample values if required.
(Tap on the value and make a new selection).



Tap on "Select a condition".

Select a condition to monitor for from the available list.



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In our example, we wish to monitor for an angle exceeding 50°.
The appropriate selection is … Above 'A'.

Note:  IDT display content is adaptive. The list can vary according to the type of channel or other settings.

**Select a condition**

Above 'A'

Below 'A'

Between 'A' and 'B'

Outside 'A' and 'B'

| Changes faster than 'A' | Changes faster than 'A' |
| Changes slower than 'A' | Changes slower than 'A' |
| Consumes more than 'A' | Greater than channel A by more than B |
| Consumes less than 'A' | Less than channel A by more than B |

CANCEL

Add the appropriate value threshold(s).

In our example, we want to trigger when the angle is above the threshold of 50°.
The appropriate selection is … 50.

← **Trigger-Action 1**    ⬤

User level: Advanced

**Trigger**    🗑

Channel:  1: SpillSens1 (°)    Sample values

Above 'A'    A= 50

Select a persistence

Hysteresis: ⓘ    0.0

Tap on "Select a persistence".
Then select the type of persistence that is required before the trigger condition is evaluated as true.

**Select a persistence**

For ≥ 'C' of last 'D' samples

For greater than 'C' seconds

Between times 'C' and 'D'

← **Trigger-Action 1**    ⬤

User level: Advanced

**Trigger**    🗑

Channel:  1: SpillSens1 (°)    Sample values

Above 'A'    A= 50

For ≥ 'C' of last 'D' samples    C= 1    D= 1

Hysteresis: ⓘ    0.0

Complete any other settings required for the persistence.

e.g.   The settings shown will meet the trigger condition on first time the angle is above 50°.

If you try to set an impossible situation, IDT will highlight the error (e.g., red text).

For ≥ 'C' of last 'D' samples    C= 2    D= 1

In our example, we want to trigger when the angle is above the threshold of 50 degrees for 2 out of 4 samples.

(e.g., We may have chosen to use persistence in order to disregard any transient "glitch" measurement conditions.
There is a side-effect to this that the trigger will be slightly delayed).

When selecting some trigger conditions, an additional field (hysteresis) is added.

Hysteresis can be used to provide a different threshold for when the logger releases from a triggered state. Thus, the logger trigger will **start** (or activate) when it first meets the triggering conditions, and it will remain *held in a triggered state* until it no longer meets the second threshold (determined by the hysteresis value); then the trigger will **end** (or clear).

The example shown opposite requires a minimum of 2 of the last 4 samples to exceed the angle threshold (A) to **activate** the trigger.
This requires between 2 and 4 measurement values to evaluate.

Once triggered, it will be held in its triggered state providing the holding condition remains True.

The evaluation for **holding** the triggered state is that a minimum of 2 of the last 4 samples is required to be over the release threshold (i.e., A – hysteresis).
For the settings shown, this is 40; (A = 50, Hysteresis = 10 ;  50 – 10 = 40).

If the holding requirement is no longer met, the logger returns to the normal (non-triggered) state.

### 3.5.3 Setup of ACTIONs related to a triggered condition

A trigger does not do anything on its own; actions should be linked to it in order to accomplish something useful.

To set an action that should begin when the trigger activates … tap on "ADD ACTION ".

(This is not required if only one action is needed).

**ADD ACTION**

Within the action area, tap on "Select an action".

Several options may be listed, as shown opposite:

Logging a channel at a faster rate or calling into the sever more frequently will only occur whilst the in the triggered state. Normal operation resumes afterwards.

Turning a status output on or off will only occur whilst in the triggered state, and for a defined period. Normal operation resumes afterwards. (Note: Only available if a logger has outputs fitted).

Tap on the required action to select it.

In our example we want to generate messages to the server; these are also known as alarms … so select "Generate an alarm".

Select the required condition(s) that should be reported…

Note:
This control determines what messages get sent *immediately*, rather than waiting until the next scheduled call-in time.

The conditions are shown in the setup screen.

When "On activating and clearing" is set, the "send alarm cleared message" is also becomes selected. The server will therefore be informed of when the triggered state is activated and also when it is cleared.

| Report contition | | Action | 🗑 |
|---|---|---|---|
| | | Generate an alarm | |
| On activating | | | |
| | | Report alarm immediately    On activating and clearing | |
| On clearing | | | |
| | | Send 'alarm cleared' message  🔵    Report as tamper alarm  ⚪ | |
| On activating and clearing | | | |
| Never | | | |

(An alternative would be to report the alarm immediately "On activating", and to use the slider control to also send an "alarm cleared" message. However, with these settings the "alarm cleared" message would not be sent until the next scheduled call-in time).

Note:  The "Report as tamper alarm" slider should be deactivated (greyed out); A tamper alarm is not relevant to this type of sensor.

Tap the back-arrow and a summary of the Trigger Actions is displayed.

(Additional trigger-action combos can be added if required, using the " + " button).

When finished, tap the "Save" button to write the combo(s) into the logger memory.

| ← | Triggered Actions | |
|---|---|---|
| | | User level: Advanced |
| 1 | If **CH1** (SpillSens1) is above **50** ° for at least 2 of the last 4 readings -**Then**- generate an alarm | 🗑 |
| | ➕ | |

When a channel is being monitored for a trigger-action combination, this will be shown in the channel summary page, as shown here.

| ← | Channels | ↑↓ GLOBAL SETTINGS |
|---|---|---|
| | | User level: Advanced |
| **Parameters** | | |
| | Sample Period: | Log Period: |
| | N/A | 00:05:00 |
| **Logged Channels** | | |
| 1 | SpillSens1 - Angle (°) Multiplier: 1 - Spot | ≫  x1 |

## 3.6  LOGGER AND SENSOR TESTS

IDT provides access to be able to test some of the logger interfaces and the functioning of attached sensors.

To access the logger test menu, tap on the "Test Device" line.

☑  **Test Device**
*Test sensors and modem communication*

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A new view will open with various test options.
(Only Hardware Test will be shown on 'group 1' loggers; they have no modem to test).

(Signal Test and Call Test are tasks to be performed at the end of logger installation and are covered in section 3.7).

Tap on "Hardware Test".
A "Hardware Test" page will be generated.

If there are recent changes, the logger may have to be restarted; tap the orange warning notice.

Warning: configuration changes detected, results may be inaccurate, tap here to restart device and apply changes

Note: Previous data is saved during a restart for loggers that use the IDT app.

The test requires an interface to be configured for use before tests can be made; a channel must be configured to use the interface. Often the sensor also needs to be attached.

The content of the test page will therefore depend on the logger model number (interfaces available) and configuration (settings).

Each of the interfaces that have been configured for use by a channel will be shown, along with some additional internal sensors.

e.g. The diagram opposite shows a logger with Channel1 configured to use a SpillSens sensor.
The sensor is also fitted.

The hardware in this example can be tested by changing the position of the SpillSens digital float switch.
The example shows a sensor at 22 degrees from vertical; when the angle is changed the display will update to show a new angle; it can be proved to be functioning OK.

The display is updated at 1 second intervals (approximately).

Similar methods will exist for many other interfaces and sensors.

When powered sensors are in use, a lightning symbol is shown. Tap the symbol to power the sensor constantly (blue) for faster readings (from all channels using this sensor); other powered sensors will be disabled. This will deplete the battery, so minimise the time used. Tap to cancel.
A progress bar gives approximate timing before the start of a sensor read cycle.
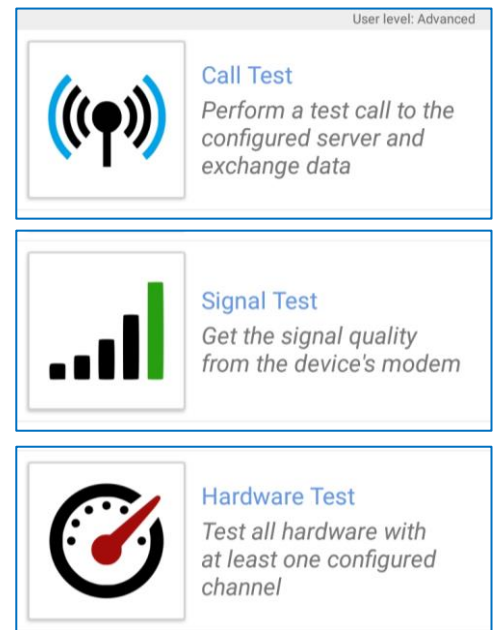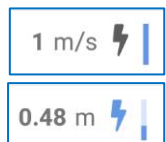
## 3.7  CELLULAR NETWORK SETUP - PROTOCOLS AND TESTS

(Skip this section if using a 'Group 1' logger; It is not applicable. These loggers can only utilise the IDT App and the phone facilities to transfer data to a server.).

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The IDT app can be used to check that the logger can connect to the cellular network and provide information to help the installer to choose the optimal position of the antenna.

- Inspect or modify modem settings (if required).
- Perform the "Signal Test" to confirm the logger connects to the mobile network and find the best location of the antenna.
    - Note: The process is different for 4G networks in comparison with the 2G and 3G networks.
- Perform a "Call Test" to confirm the logger can communicate with the DataGate server.

### 3.7.1 Modem Settings

CAUTION: Most installers **should not modify** these settings (Skip to section 3.7.2 or 3.7.3); They are for expert use only.

(See section 3.2 for how to navigate to these settings).

The loggers have a built-in modem circuit for connection to the cellular network. Depending on the part fitted, IDT can show a different content of control settings within the "Modem settings" section.

e.g. No setting options, shown opposite.

| Modem Settings | |
| --- | --- |
| Modem Type | GE866-QUAD |

or ...

e.g., Many setting options, shown opposite.

These settings are normally best left at the factory default, unless you understand cellular mobile technologies.

For those that do understand cellular mobile technologies, the controls are available to use if you are aware of the SIM capabilities and also the radio services available local to the installation site.

| Modem Settings | |
| --- | --- |
| Modem Type | ME310G1-WW |
| Network Type | 2G & 4G |
| 4G Tech Type | LTE-M → NB-IoT |
| 4G Band Selection | B8, B20 |
| 2G Band Selection | GSM 850MHz + GSM 900MHz + DCS 1800MHz + PCS 1900MHz |
| Operator Lock | None |
| DNS Mode | Mode 1 |

**Network Type** setting determines which network generation should be used to establish a connection.

| 2G |
| --- |
| 4G |
| 2G & 4G |

**4G Technology Type** setting determines which network generation should be used to establish a connection.

| LTE-M |
| --- |
| NB-IoT |
| LTE-M → NB-IoT |
| NB-IoT → LTE-M |

**4G Band Selection** setting determines which frequency bands can be used to establish a 4G connection.

| ← | 4G Band Selection | | |
| --- | --- | --- | --- |
| | | | User level: Advanced |
| B1 | B2 | B3 | B4 |
| B5 | B8 | B12 | B13 |
| B18 | B19 | B20 | B25 |
| B26 | B27 | B28 | B66 |
| B85 | | | |

**2G Band Selection** setting determines which frequency bands can be used to establish a 2G connection.

| GSM 900MHz + DCS 1800MHz |
| --- |
| GSM 900MHz + PCS 1900MHz |
| GSM 850MHz + DCS 1800MHz |
| GSM 850MHz + PCS 1900MHz |
| GSM 900MHz + DCS 1800MHz + PCS 1900MHz |
| GSM 850MHz + GSM 900MHz + DCS 1800MHz + PCS 1900MHz |

**Operator Lock**

The Operator lock screen allows you to lock the logger to a specific Mobile Network Operator.

When set to "none" the logger will try an assortment of operators sequentially until it finds one that accepts the connection attempt.

| Operator Lock | |
| --- | --- |
| | None |

Each Mobile Network Operator can be identified by a 5-digit code – The MCC / MNC code. (MCC / MNC codes can be found from an internet search).



If the code for the operator is known, it can be set from this screen. Tap on MCCMNC line and set the code.

Note:
For the above setting to be functional, the SIM must also support the chosen network operator.

If a specific type of network technology is required, it can be set from this screen. Tap on the Network Type line and select from the list.

Note:
For the above setting to be functional, the SIM must also support the chosen network type.



There is a tool to help with making the above settings:

Tap on the "Start Scan" button.



The logger will scan for local networks.

When finished, tap on each of the controls to make a selection from those listed.
(Contents vary according to what is found to be locally available).

| Operator (MCCMNC) | Network Type |
| --- | --- |
| vodafone UK | 2G |
| O2 - UK | NB-IoT |
| EE | All |
| All | CANCEL |

Note:

For the above setting to be functional, both the SIM and the network operator must also support the selections.

**DNS Mode** (Domain Name System) is factory set to "Auto".

When the logger dials-in it resolves the Domain Name part of the URL by doing a DNS lookup over the network.
The network may not support all DNS protocol versions, so the logger (if set to Auto) tries several types until it finds one that works. It then uses that protocol option for future operation.

| |
| --- |
| Auto |
| Mode 1 |
| Mode 2 |
| Mode 3 |
| Mode 4 |

Alternatively, the user can pre-set this mode using the control.

| DNS Mode | |
| --- | --- |
| | Mode 1 |

### 3.7.2  2G and 3G Networks: Signal Test (signal strength - CSQ)

To access the logger test menu, tap on the "Test Device" line.


Test Device
*Test sensors and modem communication*

Access the "Test Device" menu and then tap on "Signal Test".

This test measures the **signal strength** (CSQ) of the received 2G mobile network signal.


Signal Test
*Get the signal quality from the device's modem*
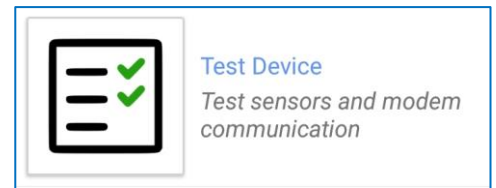
Once connected to the mobile network, the provider details and signal strength indicator (CSQ) are displayed. The default is to show the average value of the last 10 readings, but it can be changed to show the latest value (by tapping on the number).


Network: vodafone UK 2G
Modem:  GE866-QUAD
Firmware:  16.01.204
**19**

*History (tap to highlight)*
10:09:40 Not registered
10:09:46 Not registered
10:09:47 Not registered
10:09:48 Not registered, searching
10:09:49 Not registered, searching
10:09:54 Not registered, searching
10:09:55 Registered (roaming)
10:09:58 Signal Strength (CSQ): 18
10:09:59 Signal Strength (CSQ): 18
10:10:00 Signal Strength (CSQ): 19

Initially, this test should be done with an open chamber. This is to verify that the connection to the mobile network works, and to determine what the local signal strength is.

Then, with the test still running, close the chamber. The CSQ will drop due to the lid of the chamber reducing the strength of the received signal.
Re-position the antenna within the chamber to find the best signal strength (CSQ).
The antenna should finally be installed in the best signal-strength position.

The following guidelines are given for the cellular network signal strength (as measured by CSQ result, with the chamber closed):

**0-7**    **Poor.**
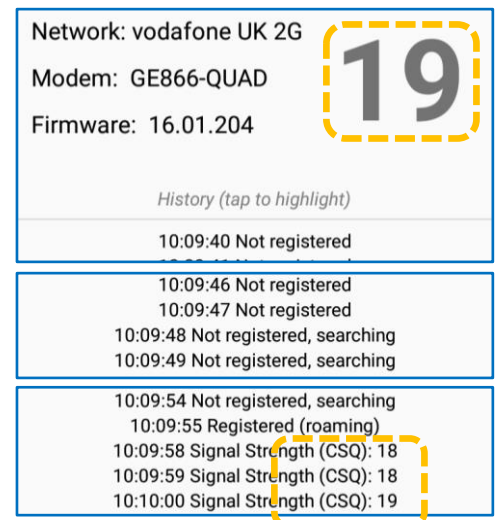(The logger may be able to register with network but will not be able to send or receive data reliably).

**8-14**    **Acceptable**.
(Depending upon the ambient conditions data transmission may be possible. It is important to select the correct antenna and install it in the most suitable location).

**15+**    **Good**.
(Data transmission should be reliable).

Note:   When using a modem with 4G Network protocols (NB-IoT and LTE-M), CSQ levels are replaced with different quality parameters.
(Refer to section 3.7.1 to determine what modem settings are in use for the logger. Refer to section 3.7.3 for 4G Network signal quality assessment).

### 3.7.3 4G Networks (NB-IoT, LTE-M): Signal Tests

Modems that use 4G networks have a different set of parameters for signal quality than those using 2G and 3G networks.

Navigate to the Signal Test screen, as detailed in section 3.7.2.

The CSQ indication is replaced for 4G networks by a "Signal Strength" indication.

(Note: CSQ is missing from the lower listing).



Select "Show details" from the local menu to provide additional information.
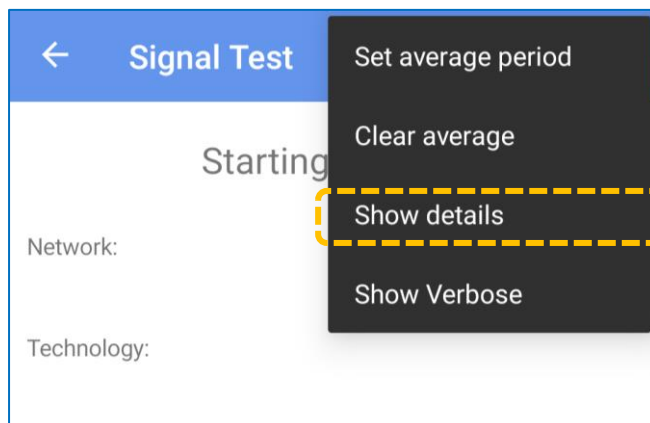


The lower listing will show additional parameters:

- Signal Strength
- Signal Power
- Signal RSRP (dBm)
  (Reference Signal Received Power).
- Signal RSRQ (dBm)
  (Reference Signal Received Quality).

These parameters may be used to assess the suitability of the logger communication with the cellular data network.
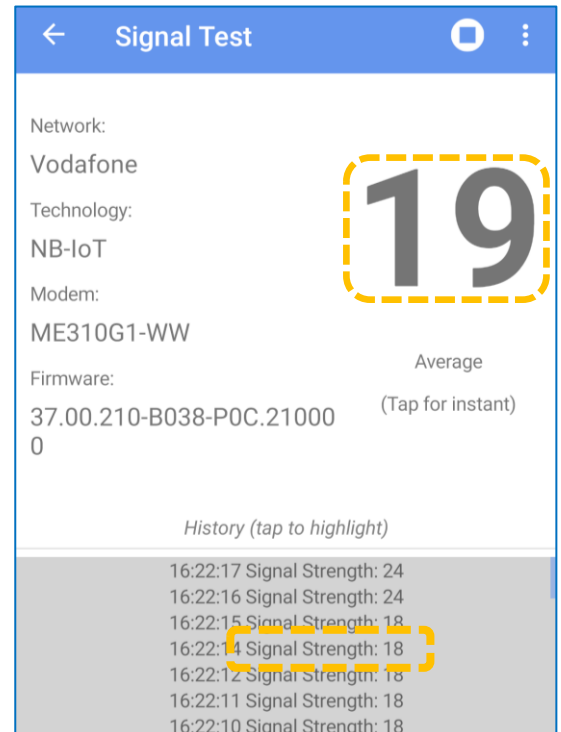
**RSRP value:** The following guidelines are given for the cellular network signal, (as measured with the chamber closed):

>= -80        Excellent.
(Data transmission should be reliable).

-80 to -90       Good.
(Data transmission should be reasonably reliable).
It is important to select the correct antenna and install it in the most suitable location).

-90 to -100      Fair to Poor.
(Reliable data speeds may be possible but drop-outs may occur.
Performance drops considerably as the value approaches -100.
The logger may be able to register with network but will not be able to send or receive data reliably).

Note: The above values are negative. The higher the value (less negative) the better.


**RSRQ value:** The following guidelines are given for the cellular network signal, (as measured with the chamber closed):

>= -10        Excellent.
(Data transmission should be reliable).

-10 to -15       Good.
(Data transmission should be reasonably reliable).
It is important to select the correct antenna and install it in the most suitable location).

-15 to -20       Fair to Poor.
(Reliable data speeds may be possible but drop-outs may occur.
Performance drops considerably as the value approaches -100.
The logger may be able to register with network but will not be able to send or receive data reliably).

Note: The above values are negative. The higher the value (less negative) the better.

### 3.7.4   IDT – Call Test (logger to server)

This test confirms the logger can **communicate with the DataGate server**.

Access the "Test Device" menu and then tap "Call Test".

The call test will automatically start.
(The top-right corner of the display has a control to start and stop the test).

The logger makes a test-call to the data-server over the mobile network.

The call will progress through various stages until it is complete.

Check if it is successful.

If there is some problem with the test-call, some details are available to assist in finding where the problem exists. (Tap the "Details" button to show).

The details can be forwarded to expert users for assistance by tapping on the share control.

Note:   When the equipment is installed below ground level, the Call Test can be made initially with the chamber lid open, to prove it is possible to communicate with DataGate using an unimpaired mobile phone signal.

Repeat the test later with the lid closed to confirm the signal is not degraded to an unusable level by the chamber lid.
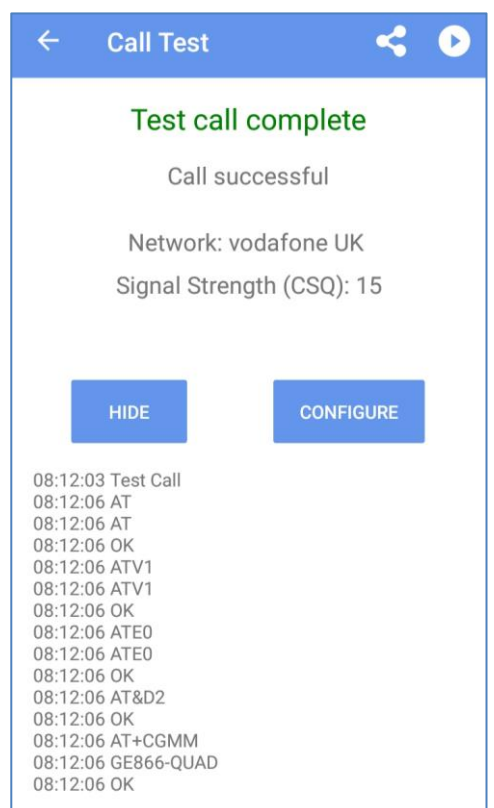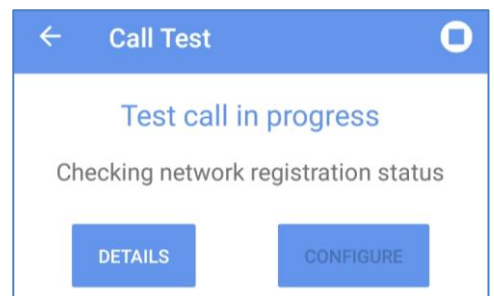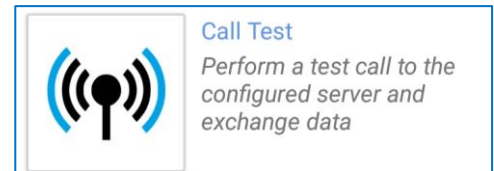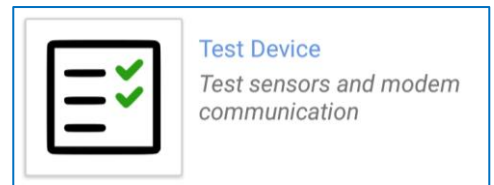
### 3.7.5   Troubleshooting a Call Test failure

**Possible Issues and Checks**

There are a number of reasons why a Call test may fail.

IDT provides some error messages to help diagnose problems:

e.g.:

- SPC low. Please wait for charge.
  (Power boost circuit within the logger requires time to re-charge).
- SIM card error. Please check SIM fitment.
  (SIM must be clean and fitted correctly).
- No networks found. Please check antenna connection and position.
  (Check antenna is undamaged and connected).
- DNS lookup failure. Please check server address.
  (Check with your system administrator that the URL entered as the server address is correct).
- Network registration was denied. Please check that SIM is activated on network.
  (Check SIM card is able to use the selected network operator for data).

(The above list is not exhaustive).


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 and at peak travel times. | Retry the test after a few minutes. |
| Network signal not available at your location. Not all Cell masts carry data traffic. | Relocate the logger to an area that has a data service or change to a different network provider. |
| Network signal not strong enough. You need a CSQ (reported by the Call 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. |
| APN settings incorrect. | 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.

# 4 RECORDING INSTALLATION SITE DETAILS FOR DATAGATE SERVER

When a logger is being used in with the DataGate system, details of the site where the logger has been deployed have to be recorded and entered into the server. This is an administrative function, possibly undertaken by system administrators. However, the IDT app can be integrated with the HWM Deployment app to ease collection of the relevant data and automate many of the administrative tasks.

Tapping the Deploy Device option will launch the HWM Deployment app and pass details of the logger to it. The user is then able to record the installation location of the device.



Deploy Device
*Launch the HWM Deployment app to enter site details and store device location*
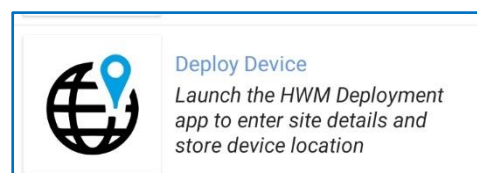
(The HWM Deployment app is used to complete the task of recording details of the site of deployment and the administrative update of the DataGate system).

(For further guidance on the HWM Deployment app, refer to the relevant user guide, MAN-2002-0001).

The data sent by (or retrieved from) the logger will be stored on the DataGate server, linked to the site on which the logger is currently deployed.

Note:   If the logger is removed from the site this should be registered with the DataGate server, as should any subsequent re-deployment of the logger to another site. This will allow the server to link subsequent data to the new deployment site.

# 5 RETRIEVING, STORING, AND VIEWING DATA

Measurement data is initially stored within the logger.

For 'group 3' loggers, the device is usually set up to call into a server, where data is stored. The device keeps track of what has been already sent in order to minimise call length (to save unnecessary power consumption). Data will therefore automatically appear on the server, with site visits only needed for any maintenance tasks.

For 'group 1' loggers, the device does not call into a server, so all data is retained within the logger. To access the stored data, return to the logger after some time and re-connect to it using the IDT app. The data can be temporarily downloaded into IDT and viewed graphically (See section 5.1). However, the graph can only be viewed whilst the IDT app is connected to the logger; the IDT app does not store the data. The data may also be shared with other apps whilst connected; refer to section 5.2. For data retrieval and permanent storage, IDT is required to be used in conjunction with the DataGate server (Refer to sections 4 and 5.3); the data can be manually uploaded to the server using the data modem within the mobile phone.

Data is best viewed with a viewing tool (webpage) that can access the data stored on the server. (Refer to the appropriate manual or instructions for your viewing tool).

## 5.1 VIEWING DATA (WITHIN IDT)

The logger data can be viewed graphically by using IDT to temporarily copy the data from the logger.

Tap on the "Logged data" line.
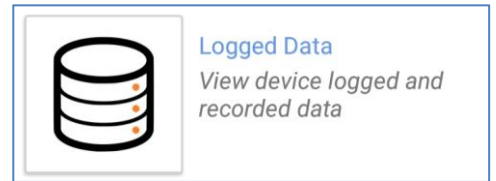


A new screen is displayed. This screen gives access to any data contained in the logger's primary data recording. It will also give access to the logger secondary data recordings if they exist.
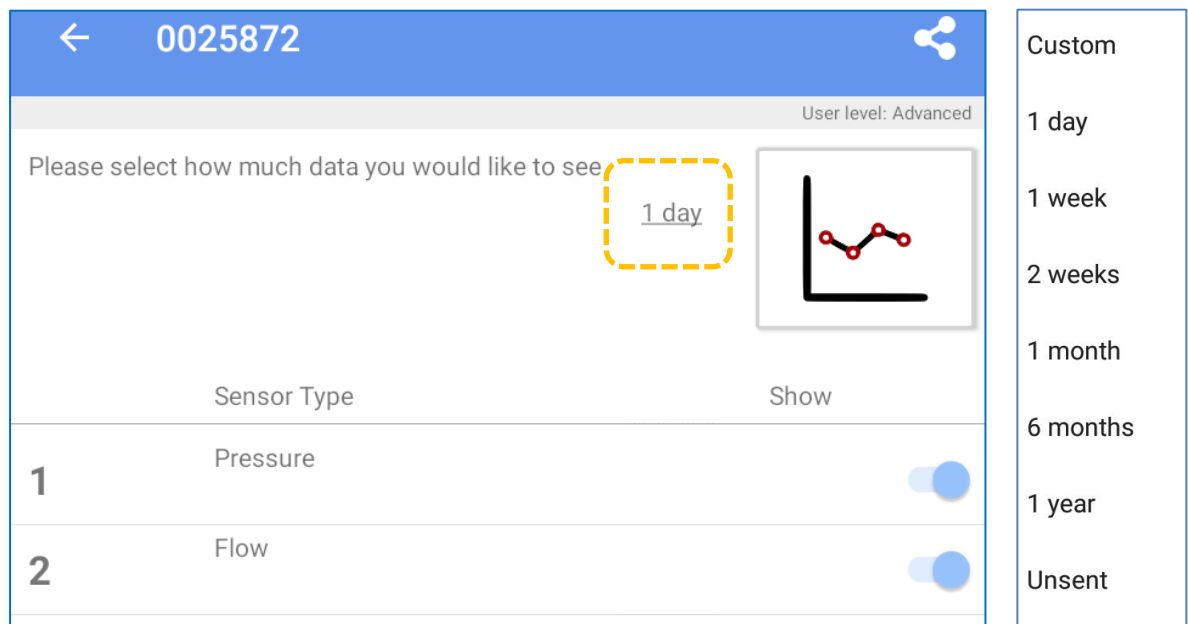
Tap "Channel Data" for access to the primary data recordings.
(For 'group 3' loggers, this line will show the duration of any unsent data (format: d:hh:mm:ss)).

Tap "Secondary Data" for access to the secondary data recordings.
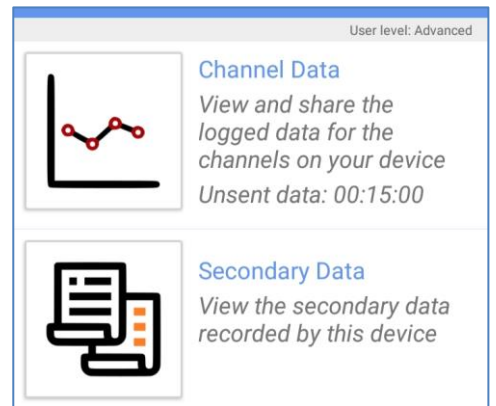


Tap to the left of the graph symbol to select a duration that you wish to see on the graph. (The 'unsent' option is not available on 'group 1' loggers).



The slider controls can be used to include or exclude data from a sensor on the graph.

Tap on the graph symbol to initiate the transfer of data from the logger to a temporary data store in IDT. Once the data is available a graph will be produced.
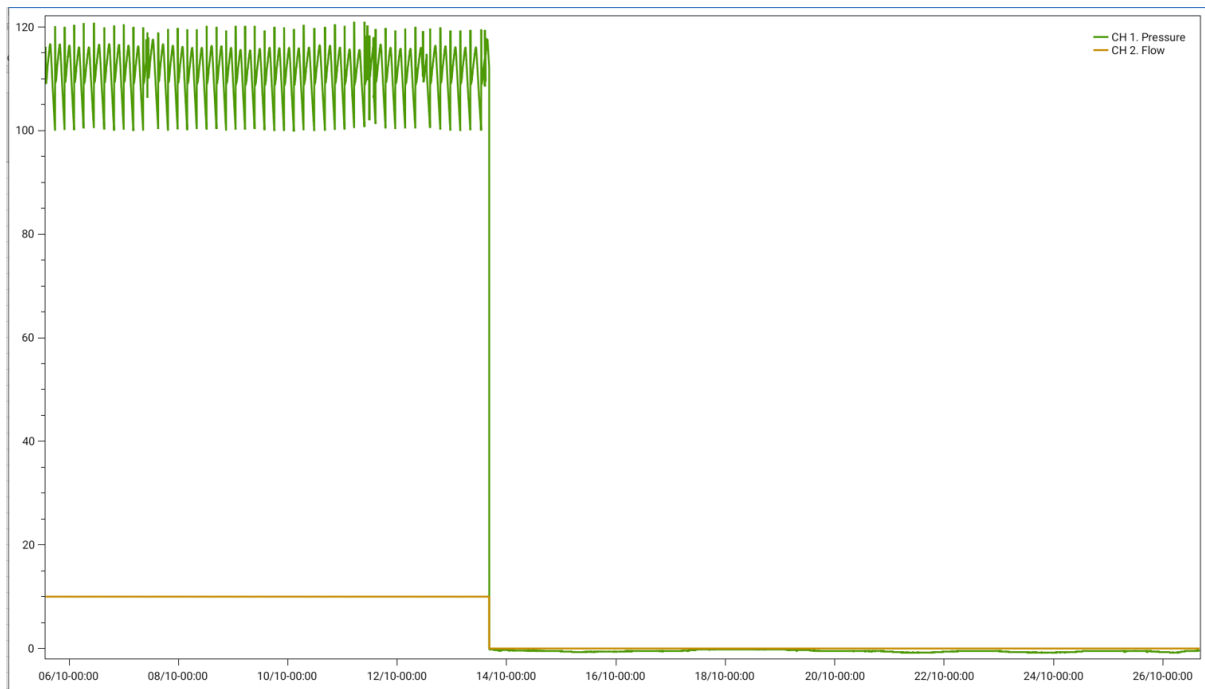
The graph can be examined in more detail using the standard techniques available on your tablet or phone.
(E.g., finger movements to zoom in or out, re-position the graph within the display, etc).
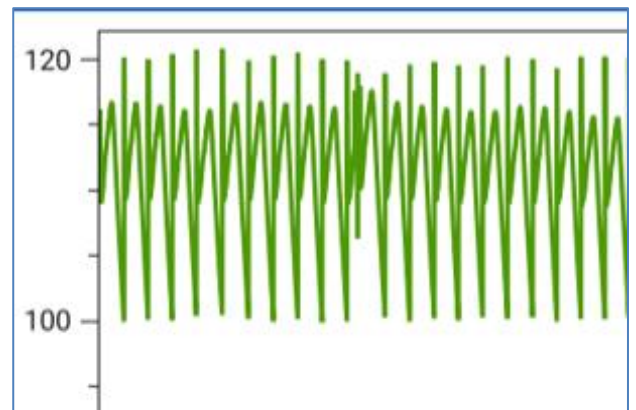


Tap the back-arrow control to exit.

Note:   The graph contents will vary according to the sensors attached to the logger, the type of data produced, how long the logger has been running and other factors.

Once the graph page has been closed, the data is deleted from IDT. However, it is still present in the logger.

## 5.2  SHARING DATA (IN CSV FORMAT)

To share the logger data, follow the steps for viewing data in IDT (see section 5.1) up until the point where the channels and time period that are required have been selected.

Then tap on the "share" icon.
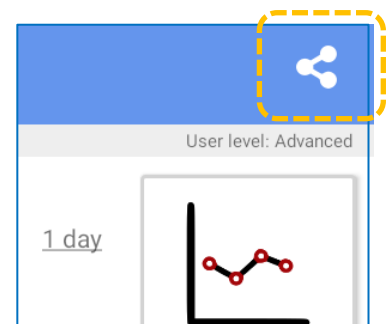
IDT offers the option of either copying the data to the clipboard (to be able to paste the data into another application), or to generate an e-mail with the data.

**Share**

Copy to clipboard

Email

E.g., tap on "Email" and IDT will fetch the data from the logger. IDT will then select your e-mail application (or allow you to choose if more than one is installed) and compose the message part of the e-mail.

The e-mail will include the logger identity (as a serial number) for the subject.
The main body of the e-mail is in plain text which is also in a c.s.v. (comma separated values) format.

Complete the e-mail by adding e-mail addresses to the "To" field, and then send.

From  example_sender@gmail.com

To  example_destination@gmail.com

1048575

~~ Channel 1 ~~
11/24/2022 5:00:00 PM,0,
11/24/2022 5:15:00 PM,0,
11/24/2022 5:30:00 PM,0,
11/24/2022 5:45:00 PM,0,
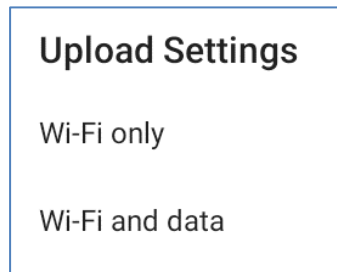
## 5.3  UPLOAD OF DATA TO DATAGATE SERVER.

Note:  In order to successfully upload data to the DataGate server, all loggers must be previously entered into the DataGate system (registered using their SMS number and linked to a dummy site; HWM usually does the initial logger registration. However, loggers within 'group 1' do not have a standard SMS number, so require some alternative way to allocate an SMS number for use as an identifier; refer to the logger user-guide for details.

After logging into the IDT app, the tablet receives a token allowing use with the server for up to 48 hours. The IDT app can be used to retrieve data from a logger and store it for upload to the DataGate server for permanent storage. If no internet connection exists, the data is temporarily stored in data files which go into an "upload queue". This pending data will upload later when an internet connection becomes available.

Note:  This method of uploading data is normally not needed for 'group 3' loggers, since they are able to upload data regularly. It can however be used when visiting site for maintenance work. The primary use is with 'group 1' loggers, as these have no facility for automatic upload of data to the server.

Options for use of various internet connections (Wi-Fi or by use of Cellular / Mobile Data) can be set within the app Settings page.
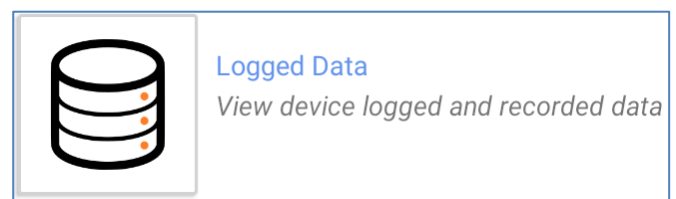
Tap on the "Data upload options" line.

## Upload Settings

Wi-Fi only

Wi-Fi and data

## Settings

Server Settings

User:

Server:

Only use certified servers

Yes

Upload Settings

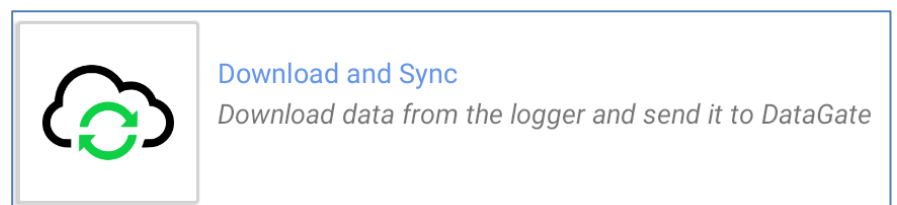Data upload options

Wi-Fi only

Select "Wi-Fi only" if you have a limited data package on your SIM card. This will defer data uploads to the server until a Wi-Fi connection is available.
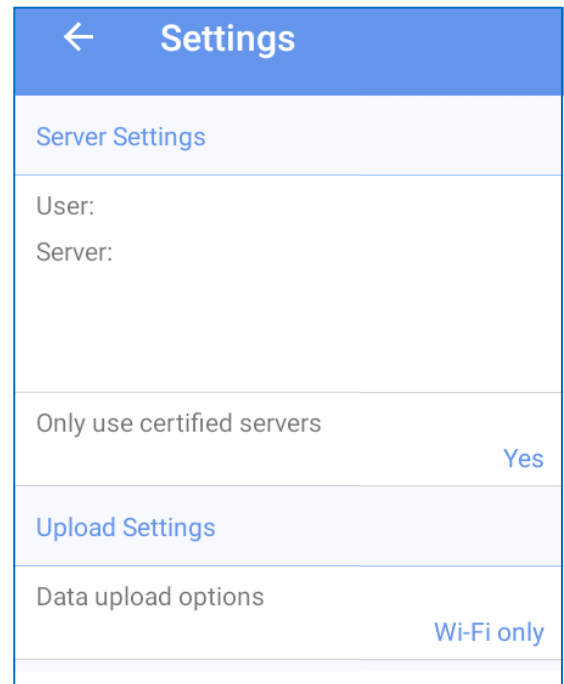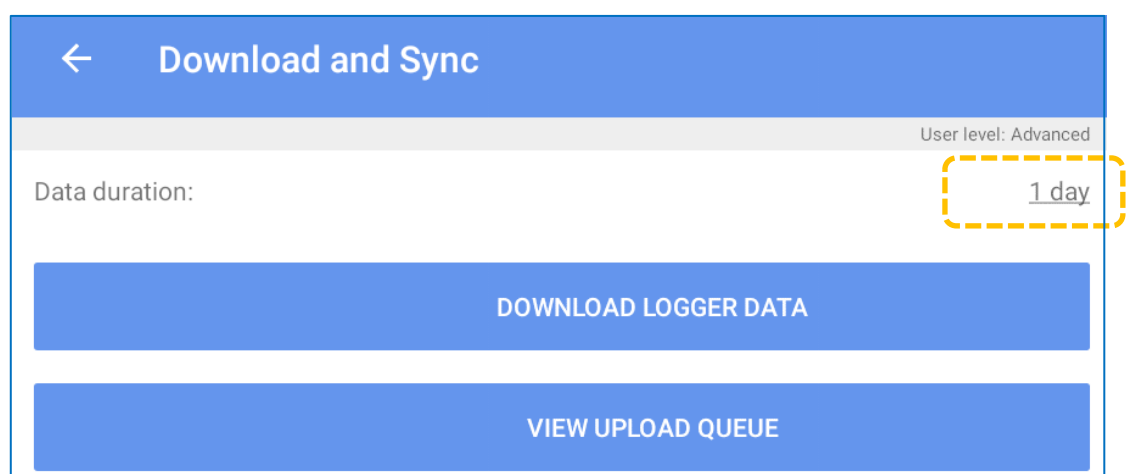
After connecting to your logger, tap on the "Logged Data" option.

Logged Data
*View device logged and recorded data*

Then tap on "Download and Sync".

Download and Sync
*Download data from the logger and send it to DataGate*

A new page will load.

## Download and Sync

User level: Advanced

Data duration:                     1 day

DOWNLOAD LOGGER DATA

VIEW UPLOAD QUEUE

Tap on the "Data duration" line and select the required time period of the data you wish to retrieve.

Then tap on the "Download Logger Data" button.

The IDT app will transfer the data from the logger device.

Note:  IDT does not keep track of what data records (normally selected by a date range) have been uploaded to DataGate. To ensure IDT has all the available datapoints, the user should select a large enough date-range to over-lap with any previously obtained data. If there are any duplications of data sent, the system will remove them before storage on the server.

To view data that is queued for upload, tap on the "View Upload Queue" line.

A list of data that has been obtained from loggers is shown along with a status indication (icon) and number of bytes left to upload.
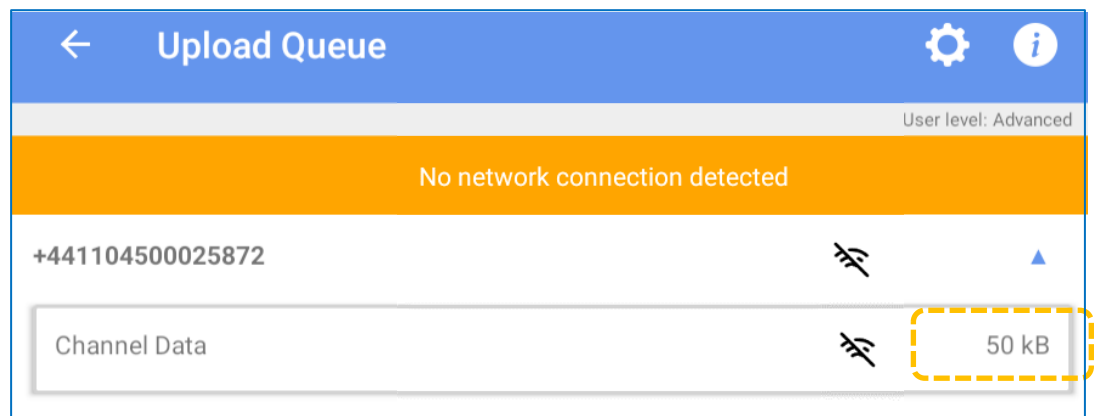


Tap the " *i* " button for a key with an explanation of the symbols.
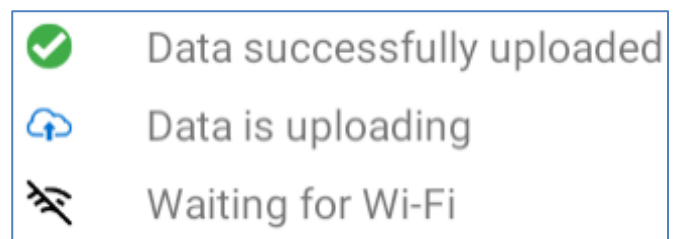


When upload is finished, all logger devices should show '0 B' (0 bytes) as being left to upload, and a green circle with a tick as the status.
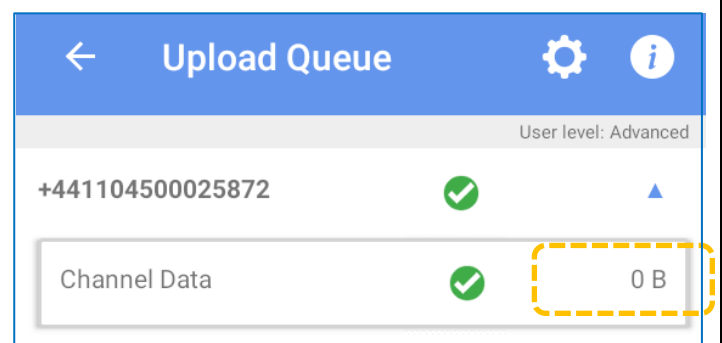


To clear the list, first check that all data items have been sent.
Then tap on the "Clear Sent Data" button.
(This does not erase any data from the logger).

# 6 TROUBLESHOOTING

The app, the logger, the user and sometimes the server interact with each other. Any issues in use of the app should consider all four parts of the system.

(Refer also to section 8, which describes a few of the differences of operation of IDT under various use circumstances).

## 6.1 PUTTING THE EQUIPMENT INTO SHIPPING MODE (DE-ACTIVATING)

Before putting any HWM equipment into long term storage, moving an installed unit, or shipping for repair, it should be put into "Shipping mode" using IDT.
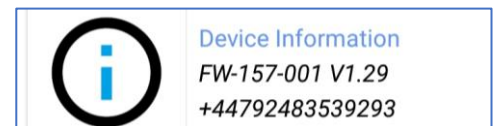
Note:   Be sure to upload any unsent data before this operation.

'Group 3' loggers:

To put the equipment into shipping mode:

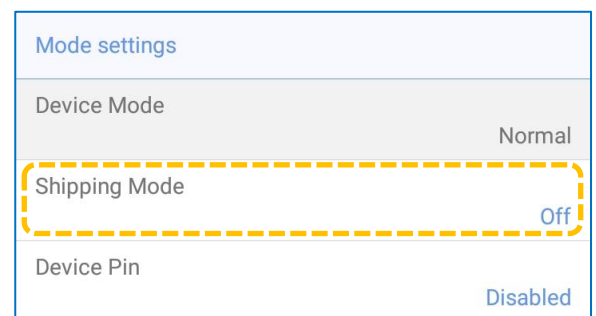From the main options page, tap on the "Configure Device" selection.
Then select the "Device Information" option.

Move the display to show the Mode Settings panel.

The "shipping mode" setting will be shown as "off" since the logger is in use.

Tap on the shipping mode line.

Read and accept the warning (by tapping on "Continue").

IDT will update the device.

The device will go into shipping mode and drop the communications link.
(IDT will therefore begin scanning for devices).

'Group 1' loggers:

The equivalent to shipping mode is a recording state of 'stopped'. Refer to section 3.1.4 for how to do this.

## 6.2 THE USER CANNOT LOG IN USING THE APP

- Ensure the correct server URL exists (Test connection).
- Ensure the correct username and password are being used.
- Ensure the user is correctly set-up on DataGate.

(Refer to your system administrator for assistance if required).


## 6.3 THE IDT APP DOES NOT LIST THE LOGGER

- The logger communications link is not activated.
  – Activate the logger communication link again (see section 1.6).
- The phone may be out of the communication link range of the logger.
  - Bring them closer together.
- The logger battery may be depleted, or the logger may be defective.

When used with DataGate:

- The logger is not correctly registered on DataGate.
- The user is not logged into the app, or the initial synchronisation is incomplete.
- The user does not have the appropriate DataGate permissions.
- Try selecting "show unprotected devices". If the logger then appears listed in red, it is functioning correctly in "unprotected mode".
- Try re-starting the phone and the app.
  – Confirm the app Bluetooth connection is working correctly by trying with another logger.


## 6.4 THE DATA FROM THE LOGGER DOES NOT APPEAR ON THE SERVER.

- Ensure the logger uses the correct data destination URL and port-number for your server.
- Check the logger antenna is attached and in an OK condition.
- Make a Call Test and confirm OK.
- Ensure your server is correctly configured to receive and present the data from the logger.


## 6.5 TRANSFER OF LOGGER SETTINGS FOR ASSISTANCE / LOAD VIRTUAL LOGGER

If requested by HWM-water, the logger configuration settings can be saved to a file and forwarded to HWM-water for assistance.

Connect to the logger and from the main screen navigate to the Device Information screen.

Tap on the Share icon.

| | |
|---|---|
| **Share** | |
| Copy to clipboard | |
| Email | |

Select a method for sharing the information (a logger configuration file + recent event log messages).
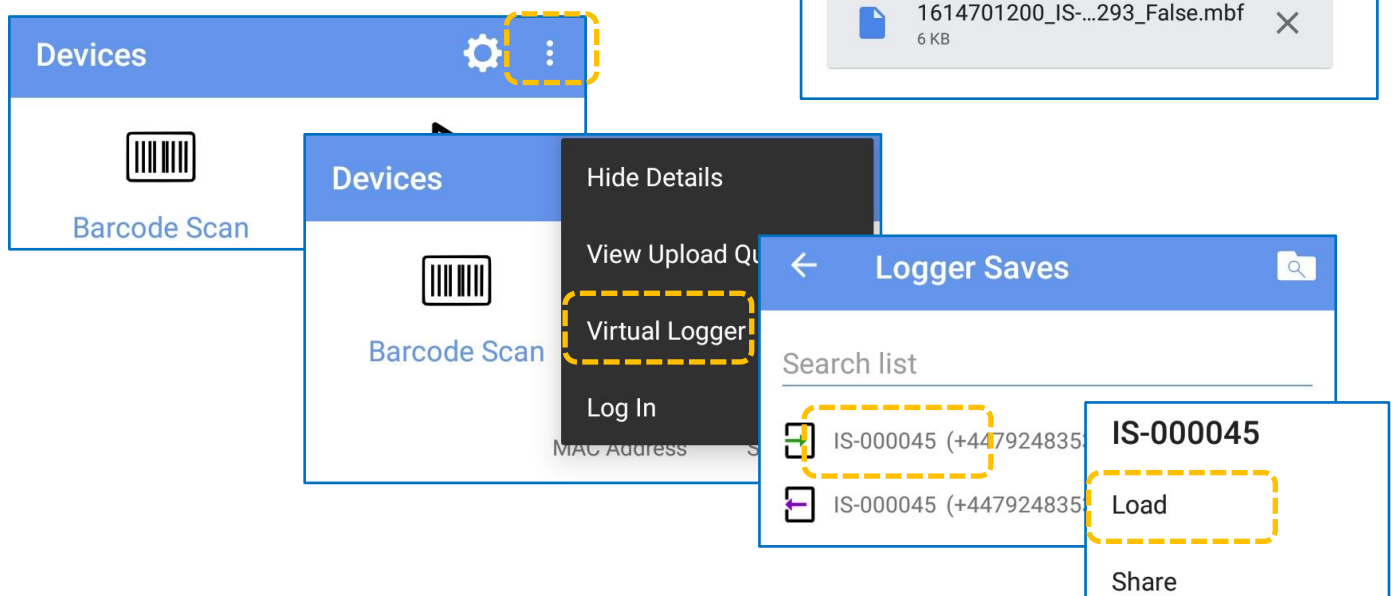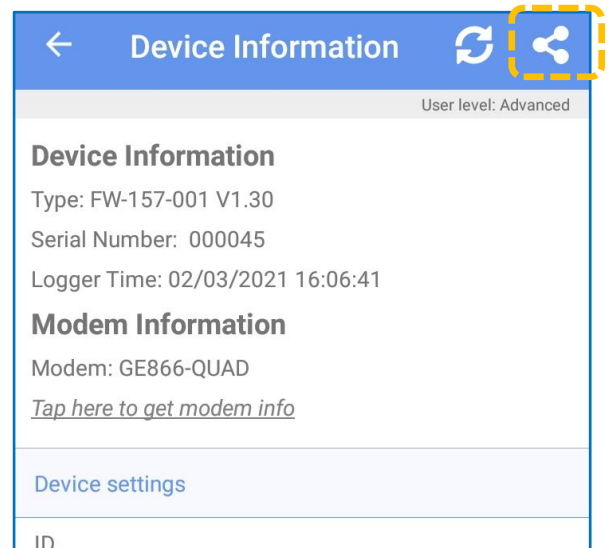
Typically, this will be via e-mail.

Select an e-mail program when the phone prompts you.

**Device Information**

← **Device Information**

User level: Advanced

**Device Information**
Type: FW-157-001 V1.30
Serial Number: 000045
Logger Time: 02/03/2021 16:06:41

**Modem Information**
Modem: GE866-QUAD
*Tap here to get modem info*

Device settings

ID

IS-000045

~~ Device Information ~~
Type: FW-157-001 V1.30
Serial Number: 000045
Logger Time: 02/03/2021 16:06:41

⋮

204, S: 0
UTC: 1614689036, Type: 3, Cid: 2, Err: 2,
S: 0

The contents of the e-mail are automatically generated. You will simply need to complete the destination e-mail address.

1614701200_IS-…293_False.mbf
6 KB ×

The logger details and a copy of its configuration file can now be sent for examination and debug.

**Devices** ⚙ ⋮

|||||IIII|
Barcode Scan

**Devices**

|||||IIII|
Barcode Scan

MAC Address

Hide Details

View Upload Qu

Virtual Logger

Log In

← **Logger Saves** 🔍

Search list

IS-000045 (+4479248353

IS-000045 (+4479248353

**IS-000045**

Load

Share
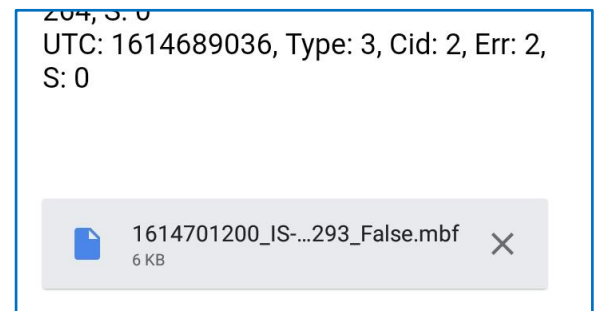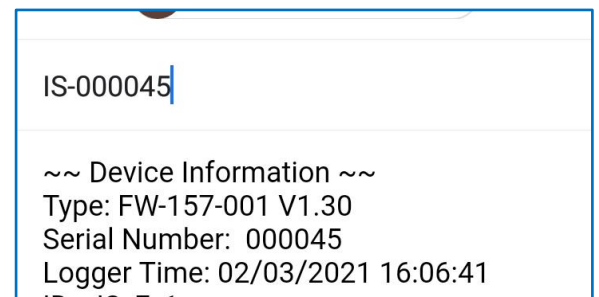
All setting details will be available for inspection once the email recipient loads the configuration details as a "virtual device" (click as shown above, from left to right).

## 6.6 " ... BLOCK THE LOGGER FROM CALLING IN" WARNING (LOGGER OVER-COMMIT)

The logger schedules its repetitive measurement tasks and also evaluates how much time is available for other tasks such as calling into the server. Whilst programming settings into the logger, it is possible for the user to over-commit the logger resources. If some potential issue is found where the logger is likely to be over-committed and unable to fit all tasks into its schedule, it warns the user via an IDT warning message.

If IDT issues a warning during setup of the logger, similar to those shown opposite, it indicates that the logger may have insufficient time to call into the server.

> Warning: high log and sample periods can block the logger from calling in

> Warning: high log period can block the logger from calling in

> Warning: high sample period can block the logger from calling in

The logger manages its expected power use during operation (so as to not cause an over-demand of the supply current beyond what is available). Some measurements are from sensors that use very little power and are only required to be powered for very short intervals. Other sensors may require more power or may need to be powered for several tens of seconds before a measurement can be obtained. Each measurement therefore has a power and time budget for the logger to consider when scheduling tasks, as does the operation of making a call-in to the server. The logger may manage power-use by sequencing certain measurement tasks to occur one after another rather than being done simultaneously.

The user should therefore consider a worst-case scenario in which only one sensor can be powered at any given time. Each sensor may need to be activated sequentially. Certain sensors may require a pre-power period and / or additional time for a measurement to be made and then communicated to the logger). The user should also add approximately one minute for the call-in time.

Sensor interfaces that should especially be taken into consideration are:
- 4-20mA (active)  ; Pre-power time
- SDI-12              ; Pre-power time ; Measurement time varies.
- RS485              ; Pre-power time ; Measurement time varies.
- SonicSens3        ; Measurement time is approx. 10s.

The user should minimise the period of use and number of samples obtained from sensors using the above interfaces. This helps the logger to schedule tasks. It also helps towards minimising over-all power consumption from the logger battery.

If IDT generates a warning message, the sensor pre-power timings, sample period, log period and logging mode should be re-visited and adjusted. Try:

- Use a "spot" logging mode (which samples only at the log rate) where possible ; Other logging modes require more samples to obtain datapoints.
- A log period of 5 minutes or longer is recommended.

# 7  PART2: ----- TRIGGER-ACTIONS AND SENSOR INTERFACES -----

Note:  Certain sensors have their own User Guide regarding installation and configuration using IDT. Follow the additional guidance where available.

## 7.1  DATA VIEWING PORTALS

- Data from the logger can generally be viewed using webpages provided by HWM DataView website.
- Where other HWM data viewing portals (websites) exist for certain sensors, they are identified within each sensor description.
- Your utility company may also employ its own data viewing tool.
- To view data on any portal, the data must be delivered to the server.

## 7.2  TRIGGER-ACTION FEATURES (USING 'GROUP 3' LOGGERS)

### 7.2.1  Support of multiple triggers from same sensor

Loggers can support programming of multiple trigger conditions related to the same sensor.

This can be programmed within IDT by tapping the "+" line to add additional triggers.

e.g. Refer to the diagram opposite, which shows two triggers set up for different angles of a Spillsens sensor.
Here these are both set to generate an alarm, but alternative actions may be selected.
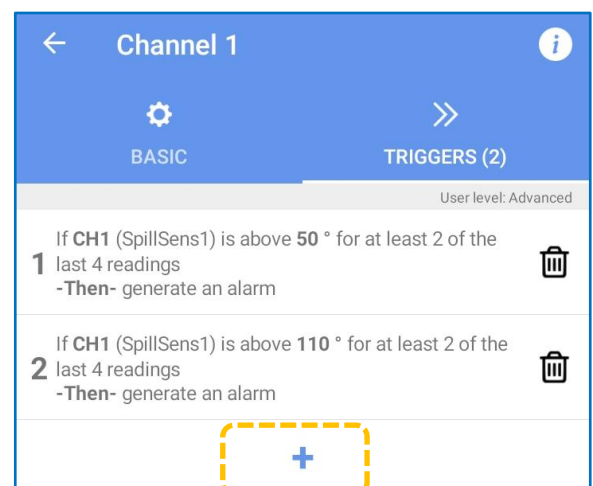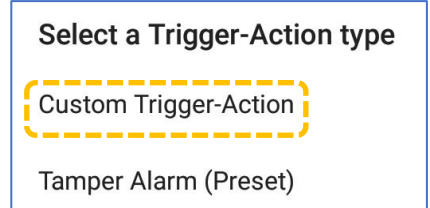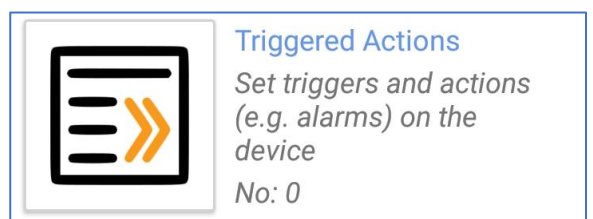


### 7.2.2  Support of multiple conditions for a single trigger

IDT supports setup of multiple-condition triggers, if supported by the logger.

From the main screen, select the Triggered Actions line.



Tap on the "+" symbol to create a new trigger action. And then select "Custom Trigger-Action".

Tap on "Add Trigger" to allow two or more conditions that are to be considered as part of the over-all trigger result.

Select each condition.

The conditions may be connected into either an "AND" gate or an "Inclusive OR" gate; only one selection is allowed per trigger-action (although additional Trigger-Actions can be set up to cover other combinations if required).

(Tap on the "-Or-" line to change the logic gate used).

Add trigger requirements.

Tap the back-arrow to show a summary:

> If **CH1** (Status1_0) is above **0** for at least 1 of the last 1 readings
> **1** -Or- if **CH2** (Status2_0) is above **0** for at least 1 of the last 1 readings
> **-Then-** generate an alarm

When finished, tap on the 'save' button.

### 7.2.3 Support of multiple actions from a single trigger

IDT can support the programming of multiple actions conditions related to the same trigger, if supported by the logger.

This can be programmed within IDT by tapping the "Add Action" line to add the first and any required additional actions.

e.g.   Refer to the diagram opposite, which shows three different actions set up for a single trigger condition.

Available options will depend on the model number of your logger and the options supported / enabled.

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## 7.3 FLOW SENSOR INPUT (USING 'GROUP 1' LOGGERS)

To set up a Flow sensor input on this group of loggers, refer to section 3.4.1. Flow inputs have no other function on this logger group; skip to section 7.7.

## 7.4 STATUS INPUT (FROM A FLOW / PULSE INTERFACE)

(This section applies to 'group 3' loggers only).

The interface known to IDT as "Pulse" may (where fitted) be labelled "Bi-Directional FLOW" or "Uni-Directional Flow" or similar. It may also be unlabelled except via inspection of the model-number of the logger (refer to the logger manual).

Note:   "Pulse input" can be considered as the *general-purpose* name for the interface. It can be known by additional (more specific) names when the function has been set within the logger setup.
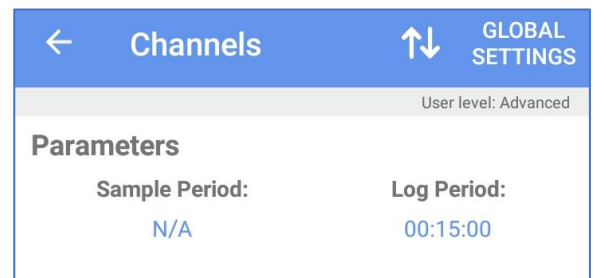A pair of pins (i.e., 2 pulse inputs) is normally presented on a single connector. Each pin may be assigned a different use, or their use combined as a pair.

The interface is versatile and can be used for a variety of purposes. One such use is as a **Status Input**. A status input requires just one pin.
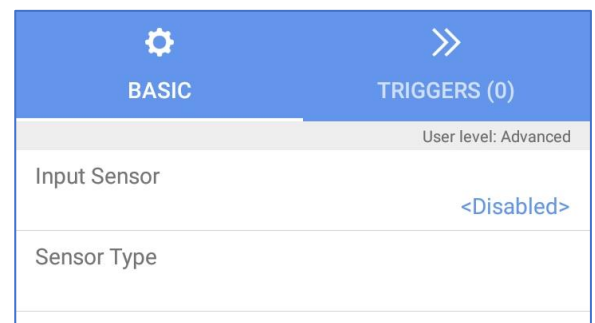
To set up a new Status Input channel:

Go to the Channels screen.

| ← | **Channels** | ↑↓ | GLOBAL SETTINGS |
|---|---|---|---|
| | | User level: Advanced | |

**Parameters**

| Sample Period: | Log Period: |
|---|---|
| N/A | 00:15:00 |

Tap the " + " line to add a new channel.          ┃ **+** ┃

| ⚙ | ≫ |
|---|---|
| **BASIC** | **TRIGGERS (0)** |
| | User level: Advanced |

Tap the "Input Sensor" line.
(Currently, it shows "<Disabled>"; it is unconfigured).

| Input Sensor | |
|---|---|
| | <Disabled> |
| Sensor Type | |

Select the required "Pulse (n)" type interface from the list of interfaces.

e.g., Tap on "Pulse 2".

**Input Sensor**

Pressure1

Pulse 01
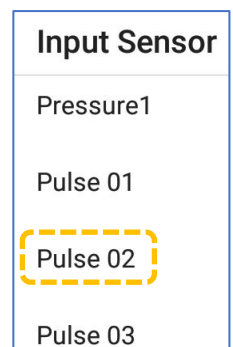
Pulse 02

Pulse 03

For this particular interface, multiple software driver options exist, and hence a new setting line is displayed, "Pulse Mode".

| | | |
|---|---|---|
| ⚙ | ⚙° | » |
| BASIC | ADVANCED | TRIGGERS (0) |

User level: Advanced

Input Sensor
Pulse 02

Pulse Mode
Uni-directional

Sensor Type

Tap on the Pulse mode setting and select from the available options.

For this example, a Status sensor is required.
Therefore select "Status".

This selection commits the relevant pin of the interface connector for a specific use). For this selection, the software driver will use the input as for sensors that give a simple status indication (typically signalled by a switch being open or closed).

**Pulse Mode**

Uni-directional

Status

Ensure the "Sensor Type" also reads "Status".

(Select if not already selected).

**Sensor Type**

Status

| | | |
|---|---|---|
| ⚙ | ⚙° | » |
| BASIC | ADVANCED | TRIGGERS (0) |

User level: Advanced

Input Sensor
Pulse 02

Pulse Mode
Status

Sensor Type
Status

The selections made (so far) are shown in the channel configuration screen.

Additional settings are required, depending on what is to be measured and logged from the input …

### 7.4.1   Use as a logic-level data stream

Complete the settings as shown to use the sensor as a digital status input.
(i.e., The input status can be either "1" or "0".
Or, more precisely, either "Open" or "Closed").

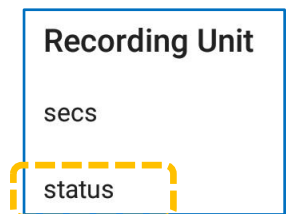Note:   The IDT app sometimes shows:
        "Open"    as "O".
        "Closed"   as "X".

Pulse 02

Pulse Mode
Status

Sensor Type
Status

Units/Pulse:
1

Recording Unit
status

Logging Mode
Spot State

The recording unit must be set to "status".

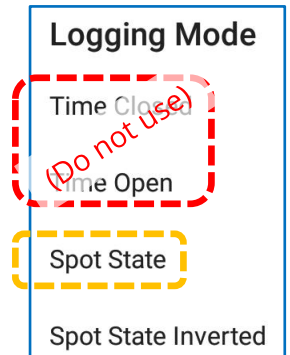This ensures the Pulse input is logged as a digital status
(a value of either 0 or 1).

**Recording Unit**

secs

status

Select a logging mode of "Spot State" to record (log) the regular input status.

If you wish to change (invert) the logic of the status input, the "Spot state inverted" option may be chosen.
(e.g., This may be required for a switch which has a "normally closed" rather than a "normally open" condition).
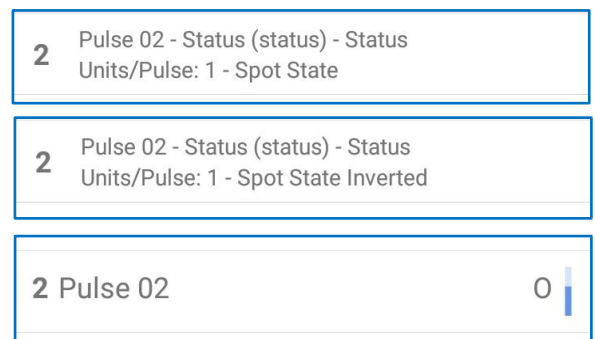
**Logging Mode**

Time Closed

(Do not use)

Time Open

Spot State

Spot State Inverted

The summary status is shown opposite for
a channel set up to the log normal state input.

| 2 | Pulse 02 - Status (status) - Status Units/Pulse: 1 - Spot State |

The summary status is shown opposite for
a channel set up to the log inverted state input.

| 2 | Pulse 02 - Status (status) - Status Units/Pulse: 1 - Spot State Inverted |

Both of the above give the same result for a
hardware test; it reports the raw input state
(before any inversion is applied).

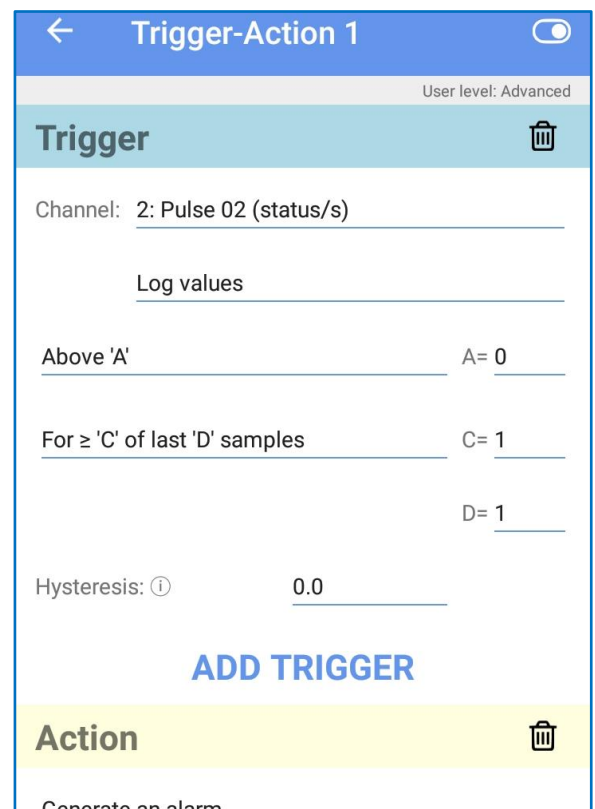**2** Pulse 02                                    0

Triggers and actions can be set using the regular
setup process, where triggers can be set to match
specific conditions from recently logged
datapoints.
(The datapoints can be either the regular or
inverted status input, depending on the channel
settings).

e.g. The settings shown opposite will trigger
immediately (on a log boundary) if the input
switches from 0 to 1.

The user should consider any threshold values
carefully to ensure the logger can be triggered.

e.g. In the example, setting A to "1" will not permit
the logger to trigger since the required data
value would be out of range; the data range
for a status type data stream cannot exceed
 "1", so cannot be "Above 1".

← **Trigger-Action 1**

User level: Advanced

**Trigger**                                    🗑

Channel:  2: Pulse 02 (status/s)

Log values

Above 'A'                              A= 0

For ≥ 'C' of last 'D' samples         C= 1

                                      D= 1

Hysteresis: ⓘ            0.0

**ADD TRIGGER**

**Action**                                    🗑

Generate an alarm

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### 7.4.2   Use as a Time-On data stream

The logger can measure how long a status input remains in a specific state within each log period. The results can be recorded (as datapoints) using a unit of time, namely seconds.

| Pulse Mode | |
|---|---|
| | Status |
| Sensor Type | |
| | Status |
| Units/Pulse: | |
| | 1 |
| Recording Unit | |
| | secs |
| Logging Mode | |
| | Spot State |

To accomplish this, select a recording unit of "secs".

**Recording Unit**

secs

status

Set the Logging mode to be "Spot State" to consider the regular input status.

If you wish to change (invert) the logic of the status input, the "Spot state inverted" option may be chosen.
(e.g., This may be required for a switch which has a "normally closed" rather than a "normally open" condition).

**Logging Mode**

Time Closed

(Do not use)

Time Open

Spot State

Spot State Inverted

This changes the logger trigger options to consider the input status as a function of time; the number of seconds the input is at a logic level of "1" between each datapoint being produced.
The time counter resets to 0 seconds whenever a datapoint has been created.

The summary status is shown opposite for a channel set up to the log normal state input.

**2**   Pulse 02 - Status (secs) - Status
Units/Pulse: 1 - Spot State

The summary status is shown opposite for a channel set up to the log inverted state input.

**2**   Pulse 02 - Status (secs) - Status
Units/Pulse: 1 - Spot State Inverted

Both of the above give the same result for a hardware test; it reports only the raw input state (before any inversion is applied).

**2** Pulse 02                                    0

Note: The *time-on result* is not shown.

Triggers and actions can be set using the regular setup process, where triggers can be set to match specific conditions from recently logged datapoints.

(The datapoints can be either the regular or inverted status input, depending on the channel settings).

 e.g. The settings shown opposite will trigger immediately (on a log boundary) if the status input is closed for a total time of between 15 to 45 seconds during the last log period.

The user should consider any threshold values carefully to ensure the logger can be triggered.

e.g. In the example, say the log period is set to be 5 minutes. (300 seconds).
Setting A above "300" will not permit the logger to trigger since the data value would be out of range; the data range for this channel data stream cannot exceed "300" (seconds) due to the log period set.

### 7.4.3   Use as a Time-On (%) data stream

The logger can measure what % of the time a status input is in a specific state within each log period. The results can be recorded (as a series of datapoints).

To accomplish this, select a recording unit of "status".

Set the Logging mode to be "Time Closed".
(This should be considered as "% of time closed").

A "Time Open" option may alternatively be chosen if required.
(e.g., This may be required for a switch which has a "normally closed" rather than a "normally open" condition).

The logger calculates the proportion of time (relative to a log period) that the Status pin is in the chosen condition. The datapoints will be in the range of 0 to 10000.
So, if "Time Closed" is chosen, then a value of "0" would indicate permanently open, whilst a value of "10000" would indicate permanently closed.

**Logging Mode**

Time Closed

Time Open

Spot State

(Do not use)

Spot State Inverted

The summary status is shown opposite for a channel set up to the log % of Time Closed.

| 2 | Pulse 02 - Status (status) - Status Units/Pulse: 1 - Time Closed |

The summary status is shown opposite for a channel set up to the log % of Time Open.

| 2 | Pulse 02 - Status (status) - Status Units/Pulse: 1 - Time Open |

Both of the above give the same result for a hardware test; it reports the raw input state (before any inversion is applied).

| 2 Pulse 02 | 0 |

Note: The *% time-on result* is not shown.

Triggers and actions can be set using the regular setup process, where triggers can be set to match specific conditions from recently logged datapoints.
(The datapoints can be based on either the proportion of Time Open or proportion of Time Closed, depending on the channel settings).

e.g. The settings shown opposite will trigger immediately (on a log boundary) if the status input is closed for a proportion of less than 75% of the time during the last log period.

The user should consider any threshold values carefully to ensure the logger can be triggered.

e.g. In the example trigger shown:
Setting A as "0" (or lower) will not permit the logger to trigger since the channel datapoint value would always exceed this; the data range for this channel data stream is always "0" (or above).

← **Trigger-Action 1**

User level: Advanced

**Trigger**

Channel: 2: Pulse 02 (status/s)

Log values

Below 'A'                          A= 75

For ≥ 'C' of last 'D' samples      C= 1

                                   D= 1

Hysteresis: ⓘ        0.0

**ADD TRIGGER**

**Action**

Generate an alarm

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Setting A as "101" (or higher) will not permit the logger to clear from being triggered since the data value would always be below this; the data range for this channel data stream is always "100" (or below).

## 7.5 STATUS OUTPUTS

(This Sub-section applies to 'group 3' loggers only).

"Status Output" is a digital output signal supported by some logger models.

Where more than one channel is available, they will be available as separate output signals on the connector or cable.

IDT provides support for the setup of the logger for the following use of an output signal:

- Pulse replication of a digital flow meter (i.e., one which generates meter pulse outputs) (see section 7.6.2).
- General-purpose output signal that can be switched as the action part of a trigger-action logger setting (see section 7.5.1).

### 7.5.1 Use of Status output as part of a trigger-action

A Status Output can be used to control the activity of equipment external to the logger.

An example of use would be for the logger to monitor the water level of a channel and if it goes above a certain level (possibly indicating some spillage of wastewater into a river due to drains being overloaded), the output can be used to activate some water quality measuring equipment.

The trigger is set using data from an appropriate sensor. The action is set to drive the status output signal for a set time (e.g., see opposite).



## 7.6 FLOW INPUT (FROM A FLOW / PULSE INTERFACE)

(This Sub-section applies to 'group 3' loggers only).

The interface known to IDT as "Pulse" may (where fitted) be labelled "Bi-Directional FLOW" or "Uni-Directional Flow" or similar. It may also be unlabelled except via inspection of the model-number of the logger (refer to the logger manual).

Note:  "Pulse input" can be considered as the *general-purpose* name for the interface. It can be known by additional (more specific) names when the function has been set within the logger setup.
A pair of pins (i.e., 2 pulse inputs) is normally presented on a single connector. Each pin may be assigned a different use, or their use combined as a pair.

The interface is versatile and can be used for a variety of purposes. One such use is as a **Flow Input**. The interface supports a family of different types of Flow measurements, depending on the logger setup.

The interface is best considered as a pair of pulse input pins, since many Flow interface configurations require the use of two pins; others require just one pin. The two separate pins of a pulse input pair, however, are not necessarily equal in functionality. One of the pulse inputs (usually the odd numbered one, Pulse1, Pulse3 ... etc) should be assigned a use first.

During setup of the odd-numbered pulse input, the logger determines how many pins are required to implement the chosen functionality. The even-numbed pulse input may be automatically seized by the logger for interfaces that require the two pins to be used together.

The interfaces that can be supported by **a single pulse input** (1 pin) are:

- Uni-directional Flow:
  Each open → closed transition of the input (from a meter) signals the flow of a set volume of a fluid. The rate of meter pulse arrival indicates the rate of fluid flow through the meter.
  The meter signalling gives no direction indication and is commonly used for uni-directional metering. For instance, uni-directional flow can indicate the consumption of a commodity (e.g., Water, Gas, or other fluids).

The interfaces that can be supported by **a pair of pulse inputs** (2 pins) are:

- Bi-directional Flow:
  Various systems of signalling can be used to indicate the flow of a set volume of a fluid and to specify the direction of flow (Forward or Reverse). The rate of meter pulse arrival (by various types of signalling) indicates the rate of fluid flow through the meter.
  The meter signalling includes direction information and is therefore used for situations that require 2-directional flow of fluid to be metered.

Note: Update of the logger firmware to the latest version is recommended.

If the user chooses to continue to operate a logger with firmware earlier than v3.0.0, then refer to the earlier version of this user guide (i.e., MAN-2000-0001-A) for a description of setup of the flow interface and its operation. The setup method and selection choices are different, and the descriptions here do not apply.

Note: On some logger models, Status Inputs may share the same input electronics. However, only one purpose can be assigned to a pin at any time.

Setup of a Flow interface can be summarised as follows:

- Select the relevant Pulse interface for use.
  (For bi-directional meters this will require the setup of a specific pulse input of a pulse-input pair. For uni-directional meters, any input can be selected from the pulse input pair).
- Set the mode of the input (uni-directional or bi-directional).
- For bi-directional only:
  - Set the Pin Configuration / signalling.
  - Set the method of storing Flow results.
- Continue setting the channel in a manner similar to most other channels.
- Check that the sampling rate is suitable for the meter signals; adjust if needed.
  Unlike most other channels, a Flow (meter pulse detection) channel requires very frequent sampling of the input pins, so have an additional setting for timing.

Flow was introduced during an example earlier in the user-guide (see section 3.4.2). Here we will consider the channel setup in more detail…

### 7.6.1 Flow input selection

To set up a new Flow (meter pulse input) channel:

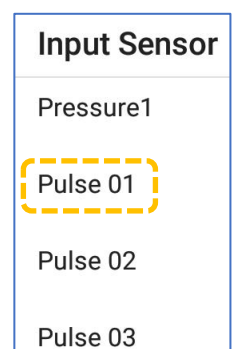Go to the Channels screen.

Tap the " + " line to add a new channel.
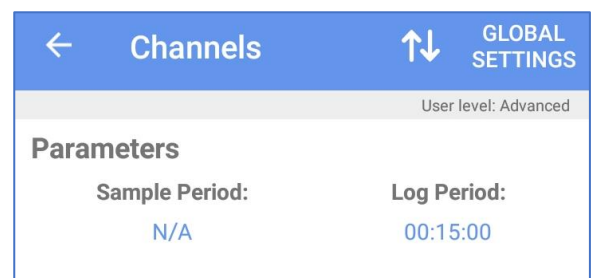


Tap the "Input Sensor" line.
(Currently, it shows "<Disabled>"; it is unconfigured).
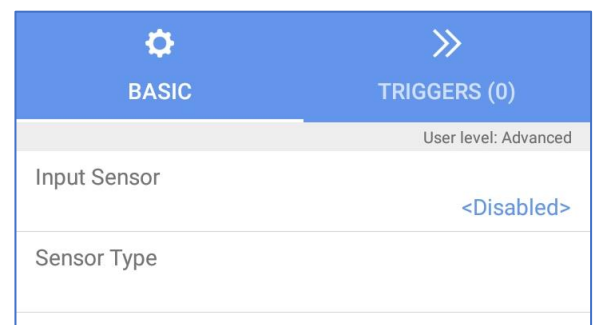


Select the required "Pulse (nn)" type interface from the list of interfaces.

If you are required to make an interface for a bi-directional meter, use an odd Pulse (nn) input (Pulse 01. Pulse 03, … etc)

e.g., Tap on "pulse 01".

The selection is shown on the screen.

The "Pulse-Mode" setting may have defaulted to some value, which can be changed if required.

(An "Advanced" tab also now appears).

| ⚙ BASIC | ⚙ ADVANCED | » TRIGGERS (0) |
|---|---|---|
| | | User level: Advanced |
| Input Sensor | | Pulse 01 |
| Pulse Mode | | Uni-directional |
| Sensor Type | | |

Next tap on the "Pulse Mode" line.

The shown options will vary according to whether an odd or even Pulse input is being set up.

Tap on the selection required.
e.g. For a uni-directional flow meter type interface, select "Uni-directional".

**Pulse Mode**

Uni-directional

Bi-directional

Status

Pulse nn. (for odd nn)

**Pulse Mode**

Uni-directional

Status

Pulse nn, (for even nn)

**For a Pulse Mode of "Uni-directional" …**

Tap on "Sensor Type" select the physical substance or characteristic which is being measured.

The selection here will determine the list of units of measure which are available to choose from later (i.e., the available recording units).

**Recording Unit**

l

m³

gal

ML

**Sensor Type**

Count

Electricity

Flow

Flow (US)

Gas

Continue setup by choosing a recording unit, etc; follow the guidance in section 3.4.2 (as required).

**For a Pulse Mode of "Bi-directional" …**

Further setting stages appear…

Tap on "Pin Configuration".

| Pulse Mode | | Bi-directional |
|---|---|---|
| Pin Configuration | | Pulses - direction |
| Storage Type | | Net (fwd - rev) |
| Sensor Type | | |

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Select from the listed options.
(e.g., "Pulses – direction").
This sets the signalling protocol for the interface, and so must be set to match the meter that is being connected to the logger.

- Pulses – direction (Pulses & Direction signals)
    - The even pin (Pulse 02, Pulse 04, etc) acts as a direction indicator.
    - The odd pin (Pulse 01, Pulse 03, etc) acts as a meter pulse to indicate a volume of the commodity has passed through the meter.
    - Note:  The logger supports "net flow" for this type of interface signalling. The logger can alternatively split the flow information into 2 separate datapoint streams (forward flow and reverse flow).

- Fwd pulses – rev pulses (Forward Pulses & Reverse Pulses)
    - The even pin (Pulse 02, Pulse 04, etc) acts as a meter pulse to indicate a volume of the commodity has passed through the meter in the Reverse direction.
    - The odd pin (Pulse 01, Pulse 03, etc) acts as a meter pulse to indicate a volume of the commodity has passed through the meter in the Forward direction.
    - Note:  The logger supports "net flow" for this type of interface signalling. If 2 separate datapoint streams (forward flow and reverse flow) are required, use 2 Uni-directional channels instead; the split into forwards and reverse flow directions is already done at the meter.

- Quadrature
    - The signalling is encoded in grey-scale binary.
    - Sequence 00 → 01 → 11 → 10 → 00 ; Each transition indicates forward flow through the meter.
    - Sequence 00 → 10 → 11 → 01 → 00 ; Each transition indicates reverse flow through the meter.
    - Note:  The logger supports only "net flow" for this type of interface signalling.

When the Pin Configuration is set to "Pulses – Direction":

Tap on "Storage Type".

Then select from the listed options.
(e.g., "Net (fwd – rev)" ).

This sets the method used to produce and store channel datapoints.

- Net (fwd – rev)
  - The logger keeps track of a forward and reverse consumption (flow pulses) using counters.
  - A single set of Flow Rate datapoints is added to the logger recording memory and is assigned to the channel number being set up.
  - The logger uses a Net Flow calculation to produce the datapoints. (Value recorded = Forward pulse count – Reverse pulse count … for new pulses obtained between each log period).

- Independent (fwd , rev)
  - The logger keeps track of a forward and reverse consumption (flow pulses) using counters.
  - Two sets of Flow Rate datapoints are added to the logger recording memory, one indicating the consumption in the forward direction and the other consumption in the reverse direction. … for new pulses obtained between each log period.
  - The Forward set of datapoints is assigned to the (odd) channel number being set up.
  - The Reverse set of datapoints is assigned to the (even) channel number immediately above the channel being set up. (It will be shaded grey when shown in IDT; There is no direct edit availability).

Tap on "Sensor Type" select the physical substance or characteristic which is being measured.

The selection here will determine the list of units of measure which are available to choose from later (i.e., the available recording units).

Continue setup by choosing a recording unit, etc; follow the guidance in section 3.4.2 (as required).

| Recording Unit | Sensor Type |
| --- | --- |
| l | Count |
| m³ | Electricity |
| gal | Flow |
| ML | ⋮ |
| CuFt | Rainfall |
|  | Time |
|  | Water |

Typical Channel summary and Hardware Tests are shown below for the various options:

Formats: Flow value, unit, pulse count, pin state or
                              pulse count, pin state or
        Flow value, unit, pulse count, pin state, pin direction or
        Flow value, unit, pulse count, pin state, pin state.

Key: O = Open
       X = Closed
       << = Reverse Direction
       >> = Forward Direction.

| Pulse Mode | Uni-directional |
|---|---|

| 1 | Pulse 01 - Flow (l) - Uni-directional<br>Units/Pulse: 10 - Spot |
|---|---|

| 1 Pulse 01 | 0.00 l /s, 0 , O |
|---|---|

---

| Pulse Mode | Bi-directional |
|---|---|
| Pin Configuration | Fwd pulses - rev pulses |

| 1 | Pulse 01 - Flow (l) - Bi-directional<br>Units/Pulse: 10 - Spot |
|---|---|

| 1 Pulse 01 | 0.00 l /s, 0 , O |
|---|---|
|  | 0 , O |

---

| Pulse Mode | Bi-directional |
|---|---|
| Pin Configuration | Pulses - direction |
| Storage Type | Net (fwd - rev) |

| 1 | Pulse 01 - Flow (l) - Bi-directional<br>Units/Pulse: 10 - Spot |
|---|---|

| 1 Pulse 01 | 0.00 l /s, 0 , O , >> |
|---|---|

---

| Pulse Mode | Bi-directional |
|---|---|
| Pin Configuration | Pulses - direction |
| Storage Type | Independent (fwd, rev) |

| 1 | Pulse 01 - Flow (l) - Bi-directional (fwd)<br>Units/Pulse: 10 - Spot |
|---|---|
| 2 | Pulse 02 - Flow (l) - Bi-directional (rev)<br>Units/Pulse: 10 - Spot |

| 1 Pulse 01 | 0.00 l /s, 0 , O |
|---|---|
| 2 Pulse 02 | 0.00 l /s, 0 , O |

---

| Pulse Mode | Bi-directional |
|---|---|
| Pin Configuration | Quadrature |

| 1 | Pulse 01 - Flow (l) - Bi-directional<br>Units/Pulse: 10 - Spot |
|---|---|

| 1 Pulse 01 | 0.00 l /s, 0 , O , O |
|---|---|

**Pulse speed / Timing**

Consideration should be given to the pulse speed of the meter in order to ensure the logger is set to sample the interface signal level quick enough to catch the pulses.

Refer to section 3.3 for details of how to check or adjust this timing parameter (see opposite).

Ensure the logger can capture pulses that are generated at the *maximum* expected meter output rate.

For convenience, the same control is accessible within the "Advanced" tab of the setup of a Flow (pulse) interface.
Note that the setting will be applied to all Flow (pulse) channels.

### 7.6.2  Pulse Replication output

Utility companies sometimes install several items of equipment that each require access to the meter output signals. One solution to this is for equipment to replicate the meter pulse signals that are input to them. The items of equipment can then be serially interconnected so that the pulse information is transferred from one unit to another.

It is possible to re-purpose a Status Output from certain loggers to replicate the meter pulse signals.

Select the logger channel that uses the meter signals.

In the channel configuration screen, select the Advanced tab.

If pulse replication is required check / adjust the setting for the "Replicate Channel – Output on: …". Setting to "Yes" will activate the pulse replication.

The line lists the status outputs that are being used for the pulse replication. (One is required for a Uni-directional meter. Two are required for a Bi-directional meter).

Note:  Not all loggers have this feature available.
Pulse replication may not be available for all pulse input channels. Check logger user-guide for any restrictions of pulse replication.

### 7.6.3   Tamper alarm sensor

Utility companies sometimes have items of equipment installed that are used for billing purposes (e.g., a gas meter). The logger may be used for automated meter reading purposes and must therefore remain connected to the utility meter at all times.

Utility companies can apply mechanical seals to bear witness to any attempt to tamper with the equipment. However, some loggers also have a facility of providing detection of a customer tamper attempt. Here, the inter-connecting cable between logger and meter is monitored electronically for any disconnection attempt (if the meter is compatible).

For loggers that support this facility, it is possible to use (re-purpose) a Flow (Pulse) Input to implement the tamper-detection. The pulse (tamper) input detects an electrical path (loop) is present when it is attached to the meter. If the cable is unplugged from the meter, the path no longer exists, and a tamper alarm can be indicated to the server.

Note:   A single cable should include the meter pulse signals and the tamper detection signal, with both sharing the same connectors.
For loggers that are supplied with 2 pulse inputs per connector, the consequence is that the tamper detection feature is only available using a uni-directional flow channel (and is used at the expense of disabling the availability of the second flow channel within the interface).

To set up a sensor for Tamper alarm, first setup the Flow channel for use (see section 7.6.1) then follow the following steps:

From the main page, find the Triggered Actions control and tap on it.

From the main page, find the Triggered Actions control and tap on it.
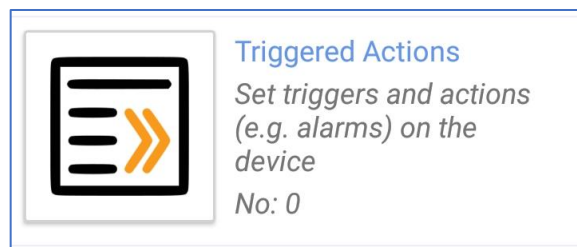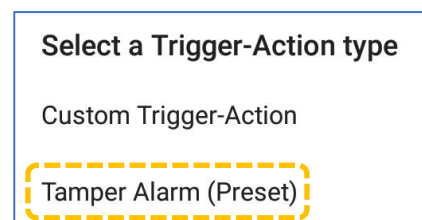
Tap on the "+" line to add a new Trigger-action combination.
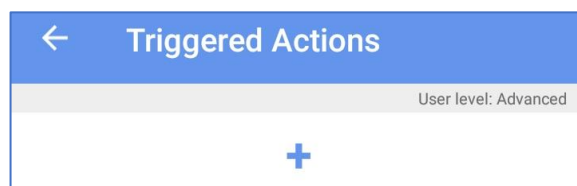
IDT has a facility to use a *Tamper-Alarm pre-set* to simplify its setup. Tap on this line.

(Pre-sets can sometimes implement settings that the user may not have direct access to).

Next select the Pulse input pin that is to be used as the Tamper detection signal.

e.g., To protect a uni-directional Flow input set up using the Pulse 01 input, Pulse 02 should be chosen if it shares the same connector.

**Select a hardware configuration**

Pulse 02

Pulse 03

Pulse 04

IDT will make several changes to logger settings to implement a tamper detection and the appropriate alarm.

(The illustrations opposite and below are for information only... The tamper detection has been implemented using the Pulse 02 input signal, monitoring time open, and triggering immediately when first seen.
It requires a compatible cable where Pulse 01 / Pulse 02 share the same connector; Pulse 02 input protects against removal of Pulse 01, which is the meter pulse input).

← **Triggered Actions**

User level: Advanced

**1** If **CH16** (Pulse 02) is above **0/s** for at least 1 of the last 20 readings
-**Then**- generate an alarm 🗑

← **Trigger-Action 1** ⬤

User level: Advanced

**Trigger** 🗑

Channel: 16: Pulse 02 (status/s)

Sample values

Above 'A'                              A= 0

For ≥ 'C' of last 'D' samples          C= 1

                                       D= 20

Hysteresis: ⓘ          0.0

**ADD TRIGGER**

**Action** 🗑

Generate an alarm

Report alarm immediately   On activating

⋮

← **Channels**    ↑↓   GLOBAL SETTINGS

User level: Advanced

**Parameters**

Sample Period:          Log Period:
00:01:00                00:15:00

**Logged Channels**

**1** Pulse 01 - Flow (l) - Uni-directional
Units/Pulse: 1 - Spot

**Trigger Channels**

**16** Pulse 02 - Status (status) - Status
Units/Pulse: 1 - Time Open    ≫ x1

Note: Channel 16 is being used by the logger here. IDT chooses this "end channel number" to keep it separate from any channels that are in use for regular data-logging.

Send 'alarm cleared' message   ⬤
Report as tamper alarm         ⬤

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### 7.6.4   Tamper alarm (message option)

It should be noted that the tamper detect facility described in section 7.6.3 is distinct from the ability to send a "report as tamper alarm" message, although they are intended to be used together.

The "Report as tamper alarm" option *includes an additional message* when sending the alarm to the server. It (if the server software supports) allows regular alarm conditions to be prioritised and handled differently to customer tamper attempts.
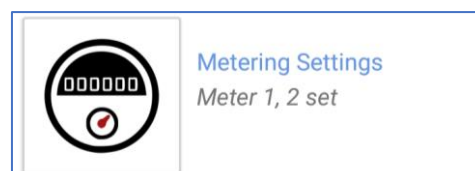


### 7.6.5   Meter Reading(s)

Digital Flow Interface channels are often used to track the usage of a commodity (e.g., of gas or electricity) supplied by a utility company. The commodity passes through an on-site meter, which can indicate consumption (use) by providing meter pulses. An initial meter reading has to be taken and entered into the logger to enable this feature. When the logger calls into the server with the flow measurements datapoints it can also include a calculated current meter reading.

From the main screen, locate the Metering settings control. (This includes a summary of all meters being monitored by the logger, as space allows, depending on how many meter interfaces are currently in use).



Tap on the "Metering Settings" line.

Read the main meter, noting its format.



Tap on the "Initial reading …" line for the Pulse interface connected to the meter.
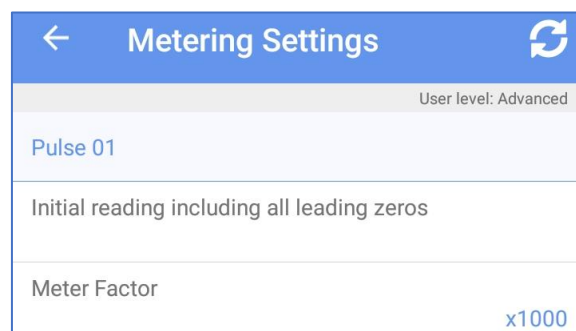


Next enter the meter reading.
(Include any leading zeros, the decimal point, and any other displayed digits).
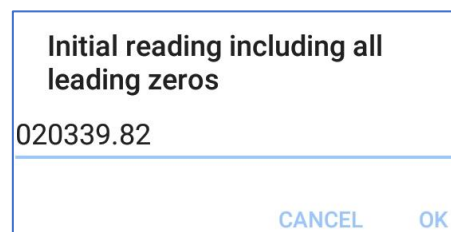
The screen will update to show the meter reading that was entered.



It also shows the time the initial meter reading was obtained.

The "Current Value" will show the *calculated* current meter value. This is not live but updated upon entering the "Metering Settings" screen.

Calculate and enter a meter factor.

$$\text{Meter factor} \; = \; \frac{\text{Unit of volume measurement used on the Meter for each digit.}}{\text{Unit of volume measurement used on the Flow channel.}}$$

Tap the back-arrow and the entered reading for Meter 1 is now shown. (This is not a live value).



You can confirm logger is set up correctly by doing the following:

Wait for the display of the real meter to change by a few digits.
Note the meter reading and tap on the "Meter Settings" control.
Confirm the logger's "Current value" reading matches the meter reading (noted earlier).

If the reading is not correct, re-check:
The cables go to the correct meter.
The meter factor is correct.
The channel settings (units/pulse and recording unit) are correct.
… and then repeat the test.



Where more than one Pulse channel is used for metering purposes, the meter reading entry page will show a section for each one. Make the settings (as above) for each meter in the relevant section. Then confirm the operation of each metering (calculated current value) is operating as expected, using the method described earlier.
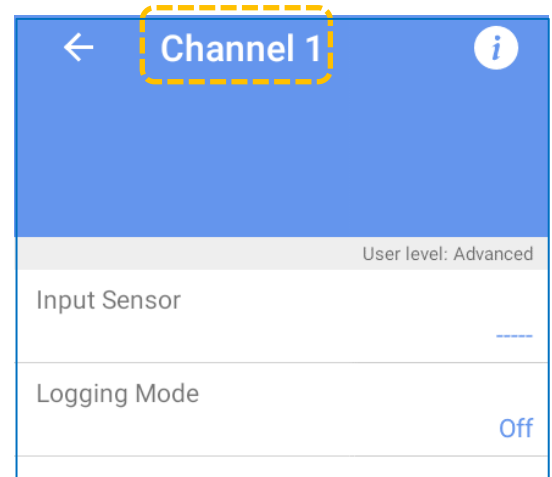
## 7.7 Pressure Sensor input (Using 'Group 1' Loggers)

### 7.7.1 Setup

From the "Channels" page, tap on the " **+** " symbol to add the channel.

A channel number is allocated for the outgoing data stream, and a page is loaded with the current settings.

Initially there is no Input Sensor selected.
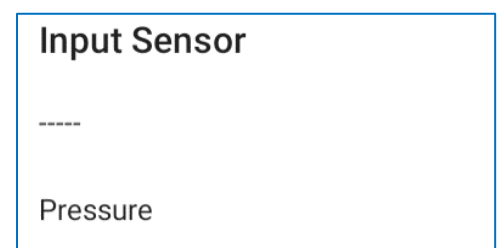(Shown here as "-----", the channel is disabled).

To select an electrical interface for an input sensor, tap on the "Input Sensor" line.
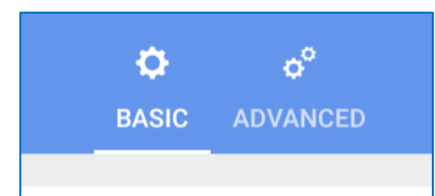
A pop-up box is shown on the screen for the user to select which input to use for this channel.
(Here, the logger offers either to disable the input, or to use a "Pressure" sensor input).

Tap on the Pressure line to make the selection.

Continue channel set-up using the "Basic" tab.
However, certain sensors require additional settings or controls, which may cause other tabs to appear on the page, such as the "Advanced" tab (shown opposite); check for these.
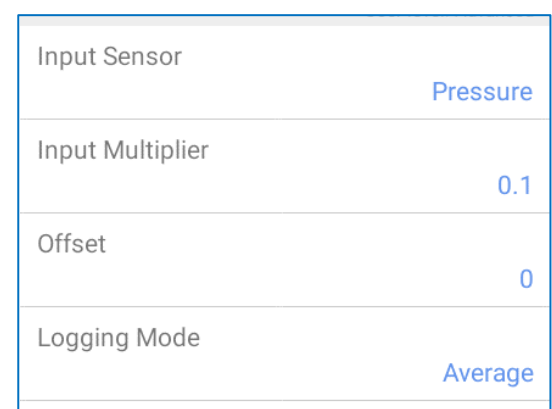
The input sensor of "Pressure" has now been selected.

Check the other fields before accepting the change.

The input multiplier field should be set to give your required unit of measure. (Refer to the logger user-guide for further information).
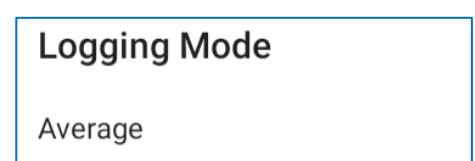
The offset for a pressure channel is usually "0".

The Logging mode lists all available modes of operation on the channel for obtaining the datapoints.

Here, an "average" value of the sensor reading is the only available option.

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Once the content of all the fields is correct, tap on the "accept" button to commit the changes to the logger.

IDT will take a few seconds to modify the program settings within the logger. It will then re-start the logger, so that the logger is making a new recording (because the operation of the channels has been changed).

Tap the left arrow to return to the Channels screen, and check that the channel is now present and has correct settings.



Note: Before using a pressure channel, be sure to re-zero the sensor. Refer to section 7.7.2.
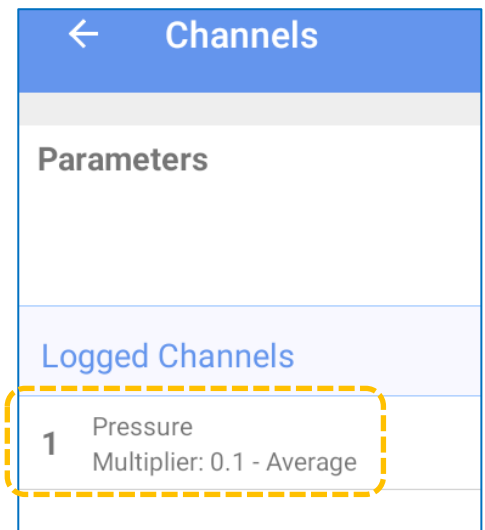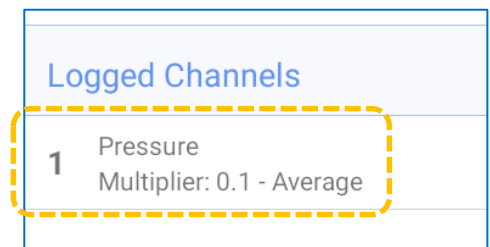
### 7.7.2   Re-zeroing a pressure channel

IDT allows the user to re-zero the pressure channel to local atmospheric pressure prior to being used.
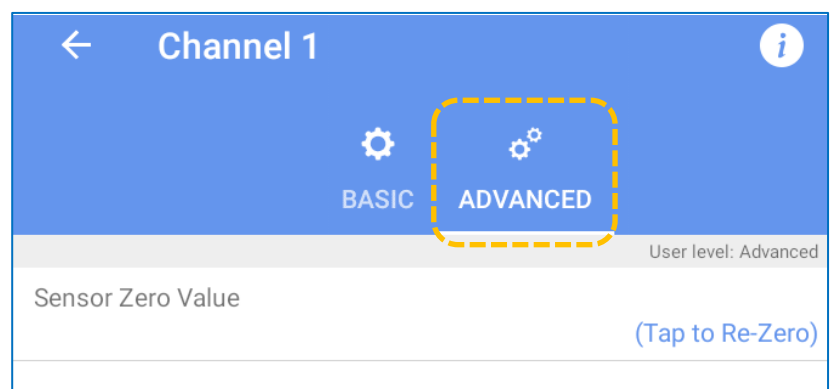
Note: Before proceeding, ensure that the pressure sensor has been removed from the measurement point and exposed to the local atmosphere.

From the Channels page, tap on the Pressure channel that is to be re-zeroed.



Select the "Advanced" tab on the setup page of the channel.

When ready, tap on the "Sensor Zero Value" line.



Then tap on the "Start" button.

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The screen will start making periodic measurements and will indicate a numeric (raw data) result.

Wait for the readings to stabilise.

Zero 24522
Zero 24521
Zero 24521
Zero 24519
Zero 24520
Zero 24520
Zero 24522

Then tap on the Store button.

(This saves the last result as the pressure calibration 'zero' reference).

**STORE**

## 7.8  4-20mA INPUT (USING 'GROUP 1' LOGGERS)

From the "Channels" page, tap on the " **+** " symbol. (The symbol is blue if a channel can be added, but grey if no further channels are available).

A channel number is allocated for the data stream, and a page is loaded with the current settings.

Initially there is no Input Sensor selected.
(Shown here as "-----", the channel is disabled).

To select an electrical interface for an input sensor, tap on the "Input Sensor" line.

← **Channel 1** ⓘ

User level: Advanced

Input Sensor
-----

Logging Mode
Off

A pop-up box is shown on the screen for the user to select which input to use for this channel.
(Here, the logger offers either to disable the input, or to use a "4-20mA" sensor input).

Tap on the 4-20mA line to make the selection.

**Input Sensor**

-----

4-20mA

The input sensor of "4-20mA" has now been selected.

Check the other fields before accepting the change. They should usually be set as shown in the diagram opposite.

Tap on any line to edit it. Then tap on OK to confirm the change.

Input Sensor
4-20mA

Input Multiplier
10

Offset
0

Logging Mode
Average

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The Logging mode lists all available modes of operation on the channel for obtaining the datapoints.

Here, an "average" value of the pressure reading is the only available option.

**Logging Mode**

Average

Once the content of all the fields is correct, the "accept" button to commit the changes to the logger. IDT will take a few seconds to modify the program settings within the logger. It will then re-start the logger, so the logger is making a new recording (because the operation of the channels has been changed).

Tap the left arrow to return to the Channels screen, and check that the channel is now present and has correct settings.

← **Channels**

Parameters

Logged Channels

1    4-20mA
     Multiplier: 10 - Average
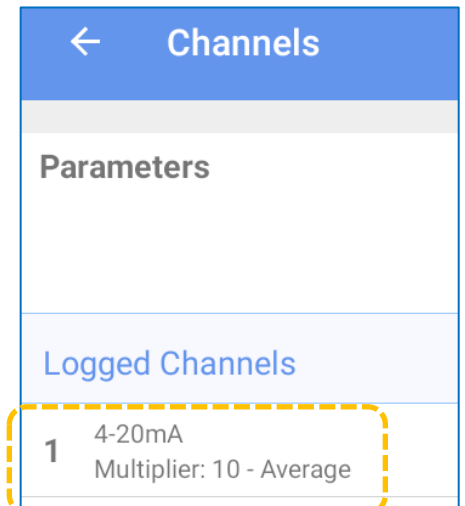
## 7.9 DIGITAL SENSOR INTERFACE

The Digital Sensor interface is available on some logger models. It is an interface that is required for the attachment of certain sensors supplied by HWM.

Currently supported sensors include:

- SpillSens.

### 7.9.1 Use with a SpillSens sensor

SpillSens is a digital float angle sensor.

SpillSens is often used with the following data viewing portals:

- SpillGuard.

SpillSens requires a specialised method of setup, especially when used with the SpillGuard data viewing portal. Refer to the SpillSens User-guide for more details.

## 7.10 SPILLSENS INTERFACE

A Digital Sensor interface type that has been set up by the factory for use with a SpillSens sensor is sometimes factory labelled as "SpillSens" instead of "Digital Sensor".

(Refer to section 7.9 for further details).

## 7.11 LEAK-NOISE SENSOR

- A leak-noise sensor listens for leaks in water pipe networks.
- It is often used with the following viewing portals:
  PermaNETWeb.
- This is a complex sensor and requires a specialised method of setup.
- Refer to your logger User-guide for information if this sensor is supported and for more details.

## 7.12 SONICSENS3 SENSOR

- SonicSens3 is a sensor which measures distances with ultra-sound.
- It is often used with the following viewing portals:
  DataView
- This is a complex sensor and requires a specialised method of setup.
- Refer to your logger User-guide for information if this sensor is supported.
- Refer to the SonicSens3 User-guide for more details.

# 8 IDT - OPERATION DIFFERENCES

The IDT app adapts the content of its screen options based on many factors:

- IDT User level.
- Use of IDT with or without login to the server.
- Type of logger (logger family).
- Interfaces available for use (unconfigured and configured).
- Sensor attached or missing (applies to certain sensors only).
- Previously entered setting choices.
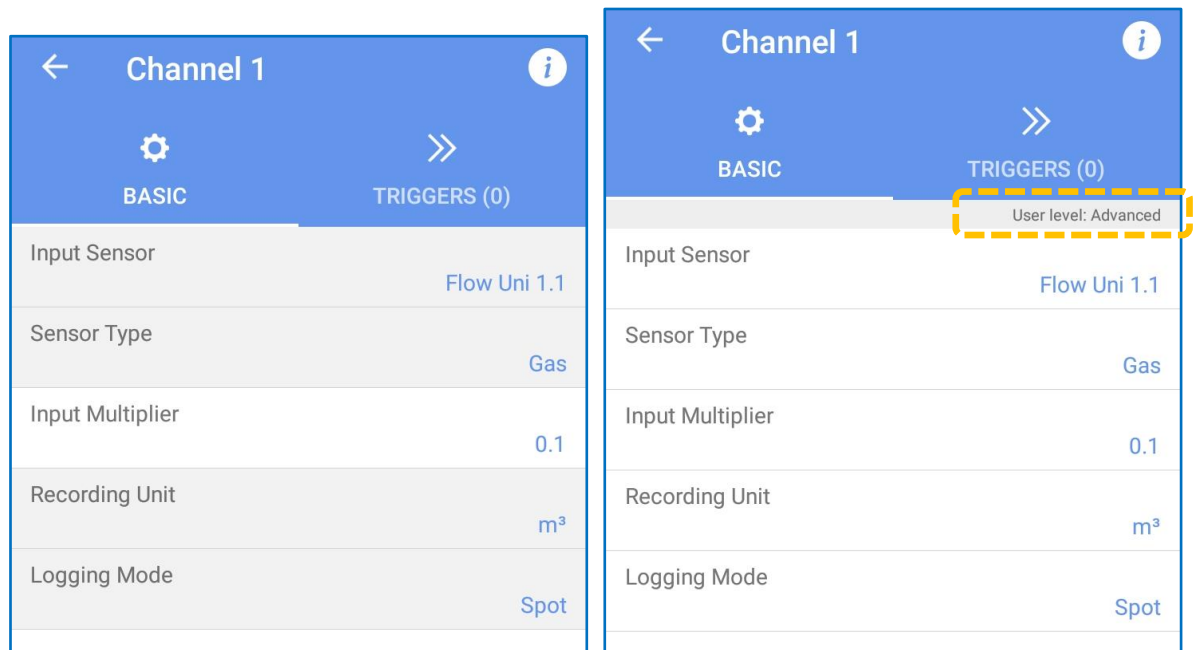- Device security settings.

This section describes how this may sometimes affect the operation of IDT.
The description is not exhaustive but indicate typical issues which may arise due to circumstance of IDT use.

## 8.1 RESTRICTIONS OF IDT BASIC MODE

When operating IDT in BASIC mode, some features are restricted.

e.g. The ability to modify channel settings is restricted in BASIC mode (greyed-out), but available in Advanced mode. (See below for an example).

## 8.2  USE OF IDT WITH DATAGATE VS WITHOUT DATAGATE

Certain menus adapt to whether IDT is being used with or without the DataGate server.

Since DataGate is a player in the security of logger settings, the options to update allowed devices and see unprotected devices is removed when IDT is not used with DataGate.

Similarly, IDT will make no attempt to queue data for upload since it has nowhere to send the data from the phone device.
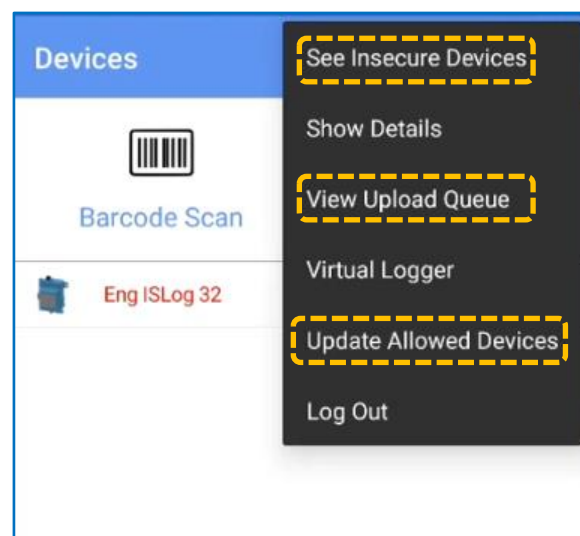
The main screen does not show the "Deploy Device" option.
It is not possible to deploy the device using the same credentials as was used to log the IDT app into DataGate; you have not provided credentials as you have not logged in.
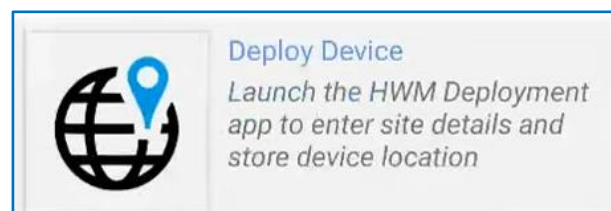
## 8.3  USE OF IDT WITH A VIRTUAL LOGGER

When IDT is used for inspecting the settings of a virtual logger (loaded from a logger settings file) it is read-only access. (See section 6.5)

IDT is not connected to any real device and has no facility to update either a real device or the settings file.

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