

## PermaNET+ TM

### Fixed Network Trunk Main Leak Detection

The PermaNET+ Trunk Main (TM) system combines our high performance Hydrophone 2 sensor with versatile telemetry technology to create a continuous monitoring system for sensitive pipelines.

PermaNET+ TM is fully compatible with PermaNET Web, the online data viewing and analysis platform, combining to provide map-based display, GIS interface and full audio and correlation facilities.



### Applications

Once installed, leak data is transmitted and analysed using the proven Permalog algorithm, PermaNET Web and the latest developments in AI technology. PermaNET+ TM transmits data through an integral modem with GPRS/2G, 4G, LTE-M (Cat-1) and NBIoT.

PermaNET+ TM allows leakage teams to monitor the status of each deployed logger from Google Maps compatible software using any internet enabled device. Leaks are identified immediately and once the presence of a leak has been identified, secondary measures including AI can be used to check and remove 'false positives' and correlate the leak position.

### Key Features

- **High performance Hydrophone 2:** better performance over long pipe lengths, large diameter pipes and plastic pipes.
- **Frequent logging:** establishes the noise profile and profile alarms for precise immediate leakage alarms
- **Determine leak size:** by matching daily alarms with flow data to enable leak alerts to be prioritised.
- **Telemetry:** multiple telemetry options including 4G, LTE and NBIoT.
- **Secondary validation:**
  - Aqualog - detailed noise histogram to reduce 'false positives'
  - Audio - remotely listen to the noise
  - Remote correlation to localise leak position
  - PermaNET Web, with multiple secondary analysis including historic data and AI processing.
- **Fully waterproof:** the IP68 rating has been tested at 10m depth over a 24 hour period.
- **Easy to use:** compatible with the HWM Global Deployment app and can also be programmed through PermaNET Web
- **External antennas:** support improved signal strength (contact HWM Global for more information).
- **PermaNET Web:** software supports:
  - Correlation
  - AI processing options
  - Map view
  - Aqualog
  - select GIS file formats
  - Remote configuration
  - Filtering
  - Threshold Modelling
  - Electrical Noise identification

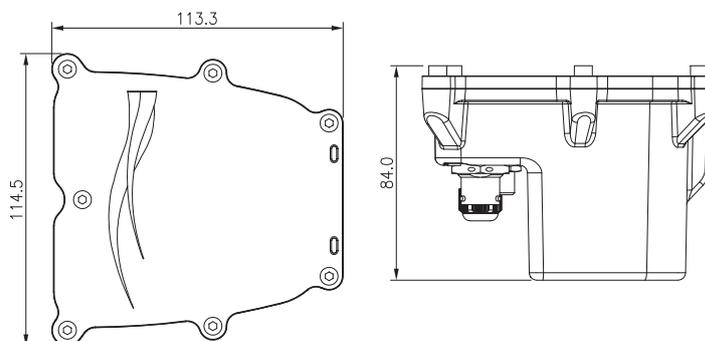


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#### Specifications

<b>Operating Temp:</b>	-20 to +60°C (-5 to +140°F).
<b>Memory:</b>	Primary recording: 1 million readings.
<b>Dimensions:</b>	Logger (without antenna): 84H x 115W x 114D (mm) - 3.3" x 4.5" x 4.5"
<b>Audio:</b>	High quality audio files for remote validation and secondary (AI) processing.
<b>Weight:</b>	Logger: 338g (0.7lb) Leak Noise Sensor: 476g (1.0lb)
<b>Construction:</b>	PC/ABS plastic enclosure. Stainless steel LNS.
<b>Ingress Protection:</b>	IP68 submersible.
<b>Antenna:</b>	Multiple external options - contact HWM Global for more information.
<b>Battery Life:</b>	Typical 5 years (depending on settings and signal condition).
<b>Internal Cellular Modem:</b>	Cellular modem supporting 2G/4G/NB-IoT/LTE-M (Cat-1) - contact HWM Global for available options and satellite based time synchronisation.
<b>Alarms:</b>	Leak/no leak. Signal received/not received.
<b>Logger ID:</b>	Readable factory set serial number in firmware.
<b>Serial:</b>	Laptop or desktop PC via USB



#### Hydrophone Spec.

<b>Operating Temp:</b>	-20 to +60°C (-5 to +140°F).
<b>Storage Temp:</b>	-40 to +60°C (-40 to +140°F).
<b>Ingress Protection:</b>	IP68.
<b>Weight:</b>	1.6kg (3.5lb).
<b>Safety:</b>	Tested to 25Bar
<b>Material:</b>	DWI regulation 31

## PermaNET Web

### Secure Data Platform

PermaNET Web is a secure, web-based portal designed to support the PermaNET product range in the remote identification of network leakage. Supporting acoustic correlation, leak detection and logger programming, PermaNET Web delivers connectivity with multiple loggers and provides the user with numerous ways to view collected data.

With recently launched new features including Threshold Modelling and Electrical Noise Identification, as well as future improvements scheduled, PermaNET Web is an ever-evolving platform to support evidence-based decision making.

