

# PermaNET+ Trunk Main

## Fixed Network Leak Detection

The PermaNET+ Trunk Main (TM) system combines a high performance hydrophone 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.



### Key Features and Benefits

- **High performance hydrophones:** 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:** NBloT LTE-based cellular communication standard with fallback 2G capability
- **Secondary validation:**
  - Aqualog - detailed noise histogram to reduce 'false positives'
  - Audio - remotely listen to the noise
  - Remote correlation to localise leak position
- **Fully waterproof:** the IP68 rating has been tested at 10m depth over a 24 hour period
- **PermaNET Web:** software supports
  - Correlation
  - Map view
  - Aqualog
  - select GIS file formats
  - Remote reconfiguration
  - Filtering
- **Easy to use:** compatible with HWM Deployment app. Select features can be programmed through PermaNET Web
- **External antennas:** support improved signal strength (contact HWM for more information)

### Applications

Once installed, leak data is calculated using the proven PermaNET algorithm, and data is transmitted via low cost cellular telemetry. This removes the requirement for expensive site visits and "drive by" data retrieval.

PermaNET+ TM transmits data through an integral modem with GPRS/2G, 4G, LTE-M (Cat-1) and other NBloT cellular options available.

PermaNET+ TM allows leakage teams to monitor the status of each logger deployed from map based host software using any internet enabled device.

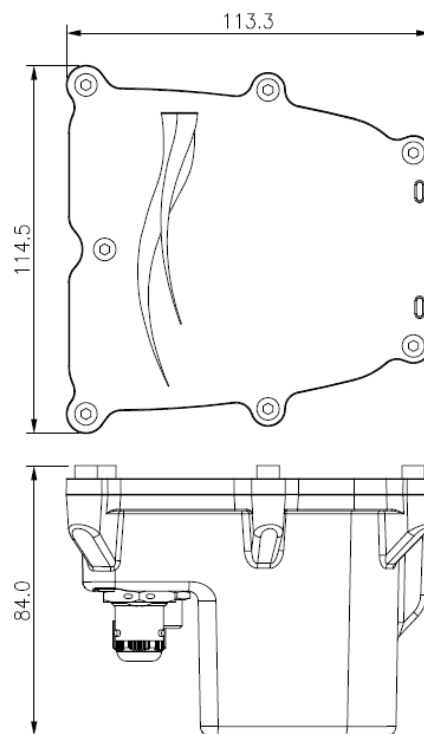
Leaks are identified immediately and once the presence of a leak has been identified, secondary measures can be used to check and remove 'false positives' and also to localise the leak position.

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### Logger Features

Operating Temperature	-20 to 60°C (-5 to 140°F)
Memory	Primary recording: 1 million readings
Dimensions	Logger: H = 84mm, W = 114.5mm, D = 113.3mm Hydrophone: H = 89.3mm, W = 50mm, D = 50mm
Weight	Logger = 338g Hydrophone = 476g
Ingress Protection	IP68 submersible
Antenna	Multiple external options - contact HWM for more information
Battery Life	Typical 5 years (depending on settings and signal condition)
Internal Cellular Modem	Cellular modem supporting 2G/3G/ NBIoT/LET-M (Cat-1) with SMS backup where available - contact HWM for more information
Alarms	Leak/no leak Signal received/not received



## PermaNET Web

### Online Data Portal

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.



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