

## PermaNet TM GPS

### Acoustic, Multi-Parameter Trunk Main Leak Detection with GPS Time Sync

PermaNet TM GPS is an acoustic monitoring system for trunk mains, plastic and sensitive pipelines where noise transmission and fittings are limited, such as plastic and trunk mains. It uses GPS Time Synchronisation to produce accurate correlations over long distances.

Based around the high performance Hydrophone 2, the system can be supplied with a single channel logger for acoustic detection only, or with Multilog 2 to add pressure and flow capability. The hydrophone includes a connection for a pressure sensor, and flow can be monitored if a meter is present.

This provides combined inputs to detect leaks and other network factors such as pressure transients. Fast logging and profile alarms allow telemetry notification on change of state for all parameters including acoustic profiles which can also be continuously monitored in 'trunk main' mode. Multilog 2 includes an external battery box connector to support extended life in fast logging modes.

Acoustic files are transmitted for correlation, audio monitoring and AI or machine learning.



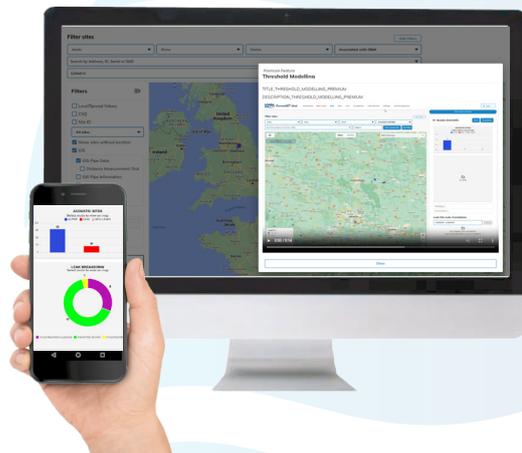
### Applications

No expensive mains or solar power infrastructure is required, meaning that PermaNet TM GPS has the flexibility for fixed or portable, short or long-term deployments. PermaNet TM GPS is ideal for low-cost continuous or temporary monitoring of transfer or plastic mains.

All parameters can be viewed in PermaNet Web or DataView for continuous monitoring.

### Key Features

- **Hydrophone 2:** high performance hydrophone for best results on large and non-metallic pipes.
- **GPS Time Synchronisation:** accurate correlation even over long runs and in rural locations.
- **Multi-parameter options:** flow and pressure capability, including fast logging (transient).
- **Easy to deploy:** battery powered, no requirement for solar or mains infrastructure.
- **Telemetry:** latest NBIoT/LTE-M/4G or 2G telemetry
- **PermaNet Web:** software supports:
  - Correlation
  - Remote configuration
  - Map view
  - Filtering
  - Aqualog
  - Threshold Modelling
  - select GIS file formats
  - Electrical Noise identification
- **DataView:** supports multi-parameter and continuous logging display and alarm management.
- **Fast Burst Detection:** profile alarms on noise level (pressure and flow) to quickly identify leaks.
- **External battery packs:** to support fast logging or accelerated dial-in regimes.
- **Easy to use:** compatible with HWM Global Deployment App. Select features can be programmed remotely.



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### Input Options

- Noise:** HWM Global Hydrophone 2 or LNS Accelerometer.
- Flow:** One bi-directional pulse for Flow.  
Two single-directional pulse inputs for Flow logging.  
Up to 64 pulses per second.
- Analogue (pressure):** Internal Pressure Transducer. External pressure.  
4-20mA (optional).  
0-20 bar / 0-200 meters head / 0-300psig, 0.1% repeatability / please note that the logger is calibrated to 10 bar as standard.  
(20 bar calibration must be specified at time of order if required).  
(0-10 bar / 0-100 meters head / 0-150 psig option also available).

### Leak Detection

- Leak Identification:** HWM Global noise level and spread algorithm, or Trunk Main mode: continuous sampling with alarm on threshold or profile breach.
- Sound File:** Automatically recorded on alarm or manual request.  
Remote audio 'listening'.  
Remote correlation.
- Correlation:** Full feature correlation with GPS Time Synchronisation

### Hydrophone Spec.

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



### Specifications

- Frequency:** Variable logger sample rate from 1s to 24hrs (this may affect battery life and communication costs).
- Operating Temp:** -20 to +60°C (-5 to +140°F).
- Ingress Protection:** IP68 submersible.
- Power:** Typical 5 year life (depending on settings and signal condition). External power connection for battery box and DC input.
- Memory:** Primary recording: 1 million readings (non-volatile memory).
- Fast Logging (secondary channel):** Secondary, fast channel supports sampling up to 100 Hz and record average, minimum, maximum, standard deviation or time interval between pulses (for data smoothing).
- Alarms:** Multiple alarm options including Rate of Change, Profile, Minimum Night Flow and Threshold. 16 alarms per logger. Can be programmed to auto dial up to 8 telephone numbers on alarm. Over 16 alarms per logger depending on channel configuration.
- Internal Cellular Modem:** Cellular modem supporting 2G/4G/NB-IoT/LTE-M (Cat-M1).
- Accelerated Dial-in:** Dial-in rate is increased if alarm situation is triggered. Logger can accelerate dial-in at alarm level for multiple applications - including SonicSens 3, Flow, Pressure and other alarmed sensors.