

# Permalog<sup>®</sup> PLUS

## Permalog Plus User Manual

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## Introduction

Permalog® Plus is the very latest in a highly successful line of permanent and semi-permanent leak noise loggers. This logger can be used as both a traditional leak noise logger, and as a "drive by" logger.

Permalog® Plus leak noise loggers are deployed throughout the water distribution network to provide continuous surveying of leakage. Each Permalog® Plus unit adapts itself automatically to its environment. If no leak is present a signal is transmitted to indicate normal background conditions, however, as soon as a possible leak is detected, the Permalog® Plus unit enters an alarm state and transmits a signal to indicate a leak condition. The logger also incorporates an LED to display the leak status visually.

Following a rise in unaccounted for water, or at standard intervals, a leakage patrol is carried out in the area using the Permalog® Patroller module. Leak status information from the loggers is displayed on the PDA screen of the Patroller module and stored in the memory.

With no cables or hard installation, Permalog® Plus is simply fitted to a metal fixture within the chamber (usually a hydrant or valve) and left alone. Logging times, Patrol times and Transmission times are fully customisable ensuring the operator gets the most benefit from the system and can configure it to their advantage. With integrated Bluetooth technology, the Permalog® Plus logger offers easy management through the PDA and Patroller Interface Unit. Permalog® Plus can be fully configured without having to be removed from the chamber.



## **Benefits of Use**

### **Operational Benefits**

- 100% of distribution system permanently monitored.
- Finds more leaks more quickly than traditional methods.
- Responds rapidly to new mains bursts, improving service to customers.
- Automates and de-skills leak surveying, eliminating human error and finding leaks that would otherwise be missed.
- Eliminates "stop tap bashing" (surveying using listening sticks).
- Operates independently of the size, structure or integrity of the area being monitored.
- Completely non-invasive method with no detrimental effects on supply to customers (preferred alternative to step testing).
- Improves overall detection efficiency and motivation by enabling skilled staff to concentrate on finding "known" leaks and avoid wasting time in no-leak areas.
- Operates continuously for up to 5 years (dependant on configuration), enabling a low leakage level to be maintained easily.
- Bluetooth and RF technology allow wireless configuration on site.
- Logging can be fully customised to fit customers requirements.

### **Economic Benefits**

- Survey costs cut by >90% with elimination of surveying using listening sticks
- Dramatic productivity gain - one person can survey several DMA's (District Metered Areas) per day.
- Record low leakage levels attainable and easily maintained.
- Low installation cost and no maintenance costs enable rapid payback, with increasing profits per year.
- No night work required for leak surveying.
- Negligible incremental cost of additional surveys.
- Highly attractive return on capital employed.
- Lower leakage level reduces cost of water into supply.
- Demonstrates high technology benefits to regulator, customers, shareholders and international clients.

With over 50,000 units deployed world wide, its easy to see why the Permalog range is one of the most highly respected Leak Noise Loggers in the industry. Palmer Environmental, your gateway to the latest technology, solutions and services.

### **Important Notes**

Deployment of Permalog® Plus units should be carried out in accordance with local regulations. Mishandling the logger could result in damage to the antenna (if incorrectly used to lower or raise the logger) or the sensor (connecting the logger to, or removing it from, the fitting). Such damage is not covered by Palmer Environmental's warranty and customers are warned that damage to the sensor in particular is unlikely to be economic to repair.

During handling and transportation of Permalog® Plus units from site to site, care must be taken not to bring the communications window into the magnetic field of a medium or strong strength magnet. Continuous exposure to a magnetic field can result in variation in the logger's internal clock, which will lead to an increased possibility of false alarms. Particular care must be taken to avoid packing Permalog® Plus units head to tail. Remedial work by Palmer Environmental required to correct loggers that have been affected in this way is not covered by warranty and will be charged.

Always grasp the main body of the logger or use the optional lifting hook when placing or retrieving the logger from the pipe fitting. Do not pull the logger by its aerial as this can cause damage. Permalog® Plus units have no user serviceable parts. The enclosure protects the user from electrical shocks and other hazards. Servicing must be referred to competent personnel. If any unit does not appear to function correctly then it must be returned to Palmer Environmental or an authorised Palmer Environmental representative.

#### **IMPORTANT SAFETY NOTE:**

The Permalog® Plus logger uses a high strength magnet and should not be carried by anyone with a heart pacemaker. This magnet can permanently corrupt magnetic storage media such as floppy discs, hard discs and tapes etc... It can also damage TV and PC monitor screens and some watches.

### **Permalog® Plus Features**

The Permalog® Plus logger is a fully sealed non-user serviceable unit. A hermetic seal protects the internal battery, radio module and electronics from particle or fluid ingress and is mechanically strong enough to withstand extreme environmental conditions such as ground frost, flooding, heat and humidity.

The main features of the Permalog® Plus are listed below: -

1. **Antenna**
2. **Leak Status LED**
3. **Lifting Hook Insert**
4. **IP68 Rated Housing**
5. **Stainless Steel Accelerometer**



## **Deployment**

Ensure the screw thread for the antenna is clean before hand tightening the antenna to the Permalog® Plus logger. If optional lifting hooks have been purchased, please ensure these are fitted tightly.

Start/reset\* the Permalog® Plus logger by passing a magnet close to and across the communication LED. Successful start/reset operation is confirmed by observing the LED flash in sequence (Red, Green) after swiping.

\*Resetting the logger erases the internal memory. Should the logger be moved from one location to another, it must be reset to remove historical data. This is the only way to reset the unit. Once reset it will operate continuously for the life of the batteries. Logging times, patrol times and transmission timing can be fully configured and turned off using the Patroller II\*\*.

\*\*Please see the Patroller II User Manual for more information.

Any medium strength magnet can be used to swipe the logger, for convenience, the magnet on another Permalog® Plus logger may be used.

Attach the Permalog® Plus logger to a metal pipe fitting using the magnet on the base. Always ensure the contact point is free from dirt so that the magnet makes a good contact. We recommend the use of a wire brush to clean the pipe/valve/hydrant fitting prior to attaching the logger.

For best performance, it is recommended that the Permalog® Plus logger is deployed in a vertical/upright position as this gives the most effective radio range.

### **Redeployment Notes:**

When removing from fitting, please grasp the main body of the logger or use the optional lifting hooks. Removal of the logger by grasping the antenna can cause permanent damage and is not covered by warranty.

It is recommended the data be read from the logger and stored on the Patroller prior to resetting the logger for redeployment.

Store unused loggers in the original packaging. This ensures the loggers are kept apart enough as to not continuously reset them causing internal clock errors.

## User Interface

Permalog® Plus loggers are designed with a battery life span of up to 5\* years. To achieve this the logger will spend most of its operating life in a sleep state. While in this state, all components in the logger are switched off except for the transceiver modem which is polled periodically to check for a presence of a Patroller unit.

\*Dependant on configuration

The logger is woken from sleep state either by a Patroller unit being detected in range or the predetermined time to record a sample is reached (default is 2am). When a Patroller unit is detected the unit wakes up and sends its serial number, level & spread, and leak status and then responds to any commands sent by the Patroller. If the recording time is reached then the logger wakes to record noise levels found on the water pipe it is magnetically coupled to. Analyzing these noise levels will cause the logger to switch to one of 3 states:

### **No Leak Mode:**

The logger is in this state when no leak has been detected. If the logger is in Warning mode and there is a no leak result with the second recording, the logger will change to this mode.

This state is indicated by the LED flashing green and transmitting an "N" through the RF communications to the Patroller unit to signify no leak.

### **Warning Mode:**

If a leak is detected from the first recording then the logger will change to this mode. During this mode the logger will perform a second recording an hour later to determine whether to change to leak or no leak mode.

### **Leak Mode:**

If the logger is in Warning mode and a leak is detected with the second recording then the logger will change to leak mode.

This state is indicated by the LED flashing Red and the logger transmitting an "L" through the RF communications to the Patroller unit to signify a leak.

### User Interface (Continued)

The LED is primarily used to signify whether the logger is in leak or no leak mode. Other features indicated by the LED are:

 **1s**  **Low Battery Warning:**

Red LED flashes every second.

        **Logger Reset/Woken:**

A short sequence of red and green flashes.

**No Illumination:**

Logger is asleep or battery failure.

### **Patroller Communication**

Inside each logger is a transceiver module. In normal operation the logger will pole the transceiver looking for a Patroller unit. When a unit is detected the logger will send its unique ID (serial number), level & spread values and leak status to verify to the Patroller that the logger is awake and ready to receive commands.

With the Patroller communicating with the individual logger, any historical data stored on the logger can be downloaded for analysis and the logger configuration can be changed if needed.

To save power, a patrol window can be configured in the logger. This means that the logger will only look for a patroller in a certain time period (e.g. between 8am—8pm). If communication is required outside this time period then a reset is required to wake the logger.

## Technical Specification

### Logger Dimensions:

**Width:** 50mm  
**Height:** 122mm  
**Height (with antenna):** 196mm

### Weight:

**Without Lifting Hook:** 619 g  
**With Lifting Hook:** 633 g

### Environmental Protection:

IP68  
Water Proof to 4m

### Operating Temperature Range:

-30°C - +60°C

### Construction Materials:

**Main Housing:** Polybutylene Terephthalate  
**Sensor Assembly:** Stainless Steel

### Battery Life:

Up to 5 years (dependant on configuration)

### Approvals:

**European:** CE and R&TTE  
**USA:** FCC  
WEEE and ROHS Compliant

## **Contact**

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### **Note**

Palmer Environmental reserves the right to change products, services or specifications without notice.