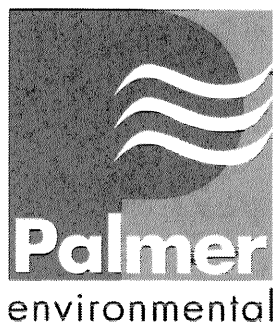


Permalog® Patroller User's Guide



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Permalog® Patroller User's Guide

Scope

This manual covers the use of the Permalog® Patroller in conjunction with Permalog® 1 and Permalog® 2 leak noise loggers.

Introduction

Permalog® leak noise loggers are deployed throughout the water distribution system to provide continuous surveying of leakage. Each Permalog® unit adapts itself automatically to its environment. If no leak is present a signal is transmitted to indicate normal background conditions (NO LEAK). However, as soon as a possible leak is detected, the Permalog® unit enters an alarm state and transmits a signal to indicate a LEAK condition.

Patroller used to survey an area

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. This module receives, analyses and "homes in" on signals to identify the location of units in LEAK mode and thereby the approximate position of the leaks. Information from the loggers is displayed on the LCD screen and held in memory. Data from loggers in LEAK mode can be downloaded to a PC or printed out directly. The Permalog® Patroller may optionally be integrated with GPS or GIS data to enhance the LEAK list with geographical or system specific information.



Safety warning

The Permalog® noise logger contains 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, tapes etc. It can also damage TV and PC monitor screens and some watches. See "Conditions of use".

Caution.

The Patroller contains a lithium backup battery. There is a danger of explosion if this battery is incorrectly replaced. It must only be replaced with the same or equivalent type recommended by the manufacturer. Used batteries must be disposed of according to the manufacturers instructions.

Warning

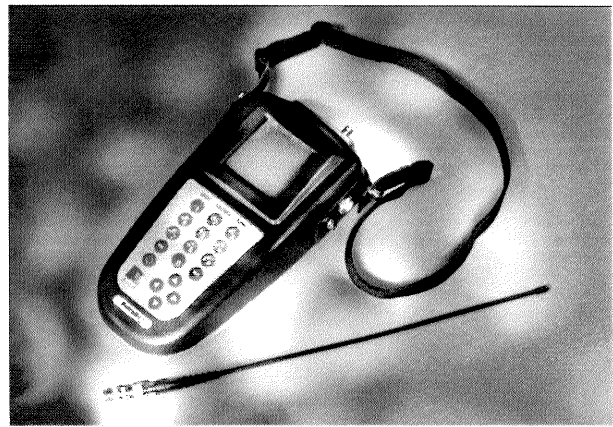
When charging from a 12v vehicle supply, if the engine is switched off, the unit must be disconnected before restarting the vehicle; otherwise permanent damage to the charge circuits may result. Once the engine is running, it safe to re-connect the Patroller.

Patroller equipment supplied

The Patroller is supplied with cables and accessories required for normal operation.



Patroller with magmount antenna with integral lead, carry strap and vehicle power supply/charge lead.



Patroller, carry strap and short antenna (used for surveying on foot).

The following equipment is supplied as standard:

- 1 Patroller unit fitted with rechargeable battery pack
- 1 12V DC power cable with vehicle lighter interface
- 1 PC download cable
- 1 Carry strap
- 1 Small antenna for portable use
- 1 Mag-mount antenna with integral co-axial lead
- 1 Mains-powered charger unit

The following equipment is not supplied as standard but may be supplied as accessories to the Patroller:-

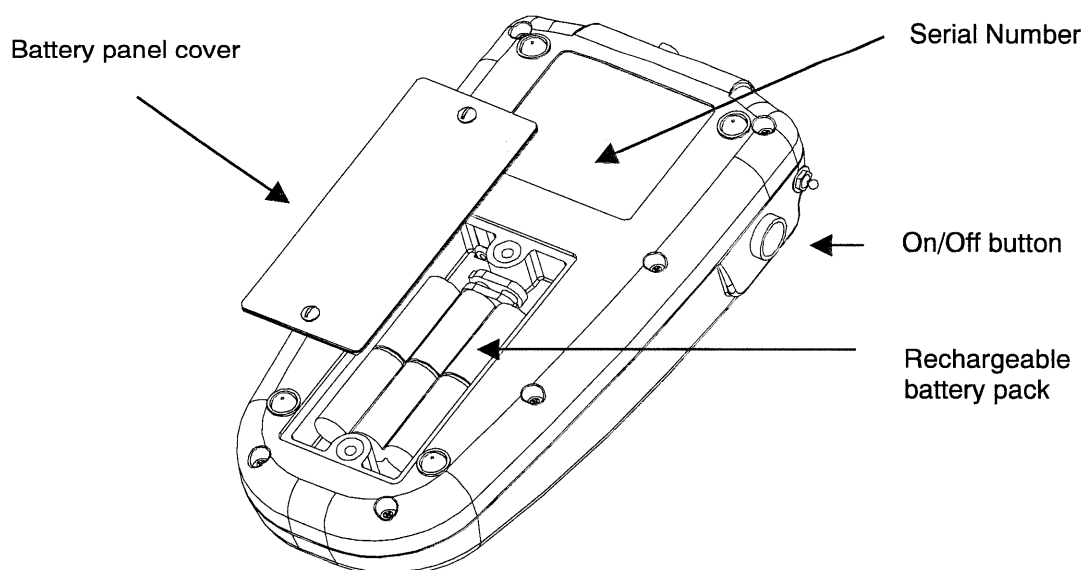
- Carry satchel
- Replacement battery set
- Portable printer with cable
- Right-angled connector for antenna
- Transit case

Battery installation

The Patroller is powered by a rechargeable battery pack located in the back of the unit. To install the battery pack, use a screwdriver to undo the two panel screws a quarter turn.

Remove the panel, insert the battery pack and clip the battery and Patroller connectors together. Ensure the leads do not become trapped when replacing the panel. Refit the panel and tighten the screws.

WARNING: DO NOT ALLOW ANY METAL OBJECT TO CONNECT THE TWO BATTERY TERMINALS ON THE CONNECTOR. This would cause a short circuit and would rapidly generate intense heat in these special batteries.



Back of Patroller unit

Checking Battery voltage

To check battery voltage, switch on the Patroller, then press ESC to access the main menu. Select Setup, then System Info to display battery voltage. Nominal battery voltage is 7.2V. When the battery voltage drops to 6.5V the Patroller will start to issue low battery warnings. When the voltage drops to 6.0V the unit will power off automatically and can not be used until the battery is recharged, or an external power supply is connected. Even when the Patroller is powered off, the data is preserved.

In the event of a battery failure, the data stored in the Patroller is maintained by a small backup battery for up to one year.

Connections and interfaces to the Patroller

The various connections and interfaces of the Patroller unit are identified on the diagram below:-



Patroller unit: connections and interfaces

Connections for in-vehicle use

Place the mag-mount antenna on the roof of the vehicle and connect the antenna lead to the connector on top of the Patroller. Connect the external power lead to the Patroller and plug into the cigar lighter socket of the vehicle.

Connections for hand-held use

Connect the short antenna to the top of the Patroller. Clip on the carry strap.

Connection to a Printer (optional)

The Patroller uses plain text printing and requires a printer that will support this. Most dot matrix, inkjet and laser printers will, but Windows Printing System (WPS) printers will not. Check the printer specifications to see that it supports printing from MS-DOS.

Connect the printer lead to the Communications port. The lead supplied is terminated with a 9 pin serial connector suitable for most printers with a serial port. For printers with a parallel port, a serial-to-parallel converter is available.

Connection to a PC (optional)

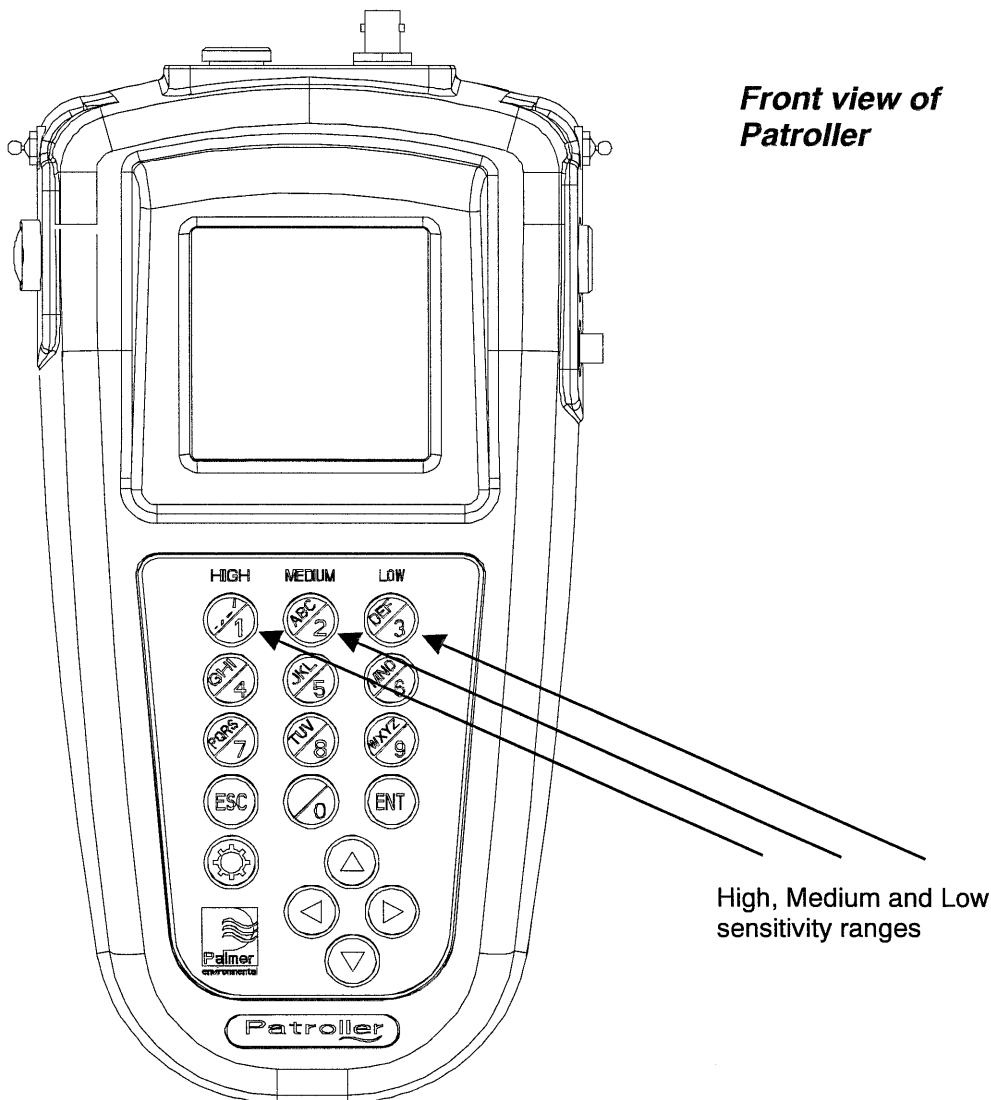
Connect the PC lead to the Patroller Communications port, and then to one of the 9-way COM ports on the PC.

Operating the Patroller

The Patroller uses on-screen menus for most of its operational functions. The key required for each function is highlighted on the display in inverse video. ESC can be used to exit a function and return to the menu above. Pressing ESC several times will always return you to the Main Menu.

Press the on-off button to switch the Patroller on. The unit will display the Palmer logo and firmware version number for 5 seconds then switch automatically to Leak Patrol mode. During the 5 second period, pressing ENT takes you directly to Leak Patrol mode and pressing any other key takes you to the Main Menu.

The backlight for the display will remain on when switched on if the Patroller is connected to a DC supply. When powered by the Patroller only, the backlight will switch off after 10 seconds to conserve power.



On-Screen Menus

Main Menu

Patroller Main Menu	
1.	Leak Patrol
2.	Patrol Menu
3.	Deployment
4.	Communications
5.	Setup

This allows access to each of the Patroller's modes of operation. These are as follows:-

1. Leak Patrol

This is the normal mode of operation in the field where data received from Permalog[®] loggers is displayed on the screen. The Patrol Menu is normally accessed directly from Leak Patrol and offers a range of special functions whilst a patrol is in progress.

Leak Patrol					.)))	← Radio sensitivity range Low , Medium or High
Serial	Lv	Sp	Time			
08990980	54	6	16:24	L	}	Details of loggers indicating leak
08990127	44	22	16:27	L		
08994513	62	1	16:27	L		
08970655	46	14	16:27	L		
03984502	40	23	16:21	L		
05816442	44	21	16:26	W		
03991720	40	6	24Apr	L	}	Deployment information for highlighted logger (if entered)
					}	Scrolling cursor and LEAK/NO LEAK signals received.
Leak						
NoLk						

Leak Patrol Display

The display shows :-

- The serial number of loggers in leak mode
- The noise level in dB from the logger; **Lv**
- The noise spread in dB from the logger **Sp**
- The time or date the data was received from the logger. The time is shown for data received today. If the data was received on a previous day AND more than 12 hours ago, then the date is displayed.
- The characters on the right hand side of the display are **L** for leak and **W** for warning. Statistically, the probability of a leak being present is greater for L than for W. However, all logger results require further investigation to confirm a leak.

All patrol activities are carried out from this screen. The Patroller is fitted with two sounders. A high pitched beep indicates no-leak and a low-pitched beep indicates a leak. This information is also shown graphically on the lower part of the screen where a cursor scans across the screen over a period of 5 seconds. A vertical bar marks each leak/no-leak event received, with the height of the bar indicating the received signal strength. When full radio data is received (serial number, noise level and spread), the bar is marked with a pennant.

The main part of the screen shows a list of loggers whose full radio data have been received. One of these is highlighted with an inverting cursor and the deployment details of the highlighted logger (if entered previously) are shown in the box below. Use the up and down arrows to move the cursor and select a different logger.

The number keys each have a specific function assigned. These functions can be accessed directly by pressing the key in the Leak Patrol screen, or by first pressing ENT to show the Patrol Menu which lists these functions. The ENT key toggles between the Leak Patrol Screen and the Patrol Menu screen.

2. Patrol menu

Patrol Menu	
1.	Max Range
2.	Mid Range
3.	Min Range
4.	Logger Details
5.	Closest Loggers
6.	Patrol Setup
7.	Clear Display
8.	Restore Display
9.	Print Results
0.	Reset Logger Entry
Ent	Leak Patrol
Esc	Main Menu

1. High/Max range

Sets high sensitivity on the radio receiver to achieve maximum range, typically greater than 50 m.

2. Medium range

Sets medium sensitivity on the radio receiver for a range of typically 15 m. In an area where many loggers are in range, this can be used to limit the number of received signals.

3. Low/Minimum range

Sets low sensitivity on the radio receiver for a typical range of 5 m. This may be used to 'home-in' on one particular logger.

4. Logger Details

Press **4**, then enter a serial number and press **Ent** to view the stored results for a given logger. The default serial number is the currently highlighted logger. The display shows the level, spread and date received of the last 6 results, along with the deployment details. Press **Esc** to return to the Patrol menu.

5. Closest Loggers

To find the closest loggers to a particular logger, first select the Leak Patrol screen and check the appropriate logger is selected. Alternatively, select the Patrol menu and press **4** to enter logger details. Type in the serial number of the logger you are interested in and press **Ent** to search for it. The selected logger details are displayed. Press **Esc** to return to the Patrol Menu. **Press 5**

The screen then shows the grid reference of the selected logger by default. You may either use this grid reference or enter a different one. **Press Ent** to search for the closest loggers. The display then shows a list of loggers within 1000 m of this point. The list of loggers shows serial number, distance from the reference point (in metres), noise level and time/date last received. From this list of loggers, the up and down arrows can be used to move a highlight bar. **Press ENT** to view logger details and history for the highlighted logger. (This feature will only work if the correct grid reference has been entered for each logger). **Press Esc** to return to this list.

6. **Patrol Setup**

Press 6 to go to the Patrol Setup screen. Use the left/right arrows to change the sounder options, allowing sound for both leak and no-leak, leak only, or neither (sound disabled). **Press Ent** to return.

7. **Clear Display**

This option removes the highlighted logger and those below it from the display (but not from the database) in order to keep only the most recent acquisitions.

8. **Restore display**

Undoes the effect of Clear Display and restores all loggers to the display.

9. **Print Results**

Sends the Leak Patrol results to a connected printer. There are 4 options to limit the number of loggers printed.

a. Display only – prints only those loggers in the display list.

b. Today – prints only results received today.

c. Date Range – prints only results received between the two dates specified.

d. All Loggers – prints results from all loggers in the database.

0. **Reset Logger Entry**

When a leak has been repaired and the logger switches back to no-leak mode (this happens automatically), it stops transmitting its serial number information. This option is used to inform the Patroller that a particular logger is no longer indicating leak mode. Press ESC to return to the main menu.

NOTE: When no external power supply is connected, returning to the main menu will switch off the radio receiver to conserve battery power.

3. Deployment

Deployment	
Serial	03997244
G.Ref	SK 4321 6542
Area	DMA 1625
Comment	OUTSIDE 27 PARK AVE
Ent	Accept
Esc	Cancel

This is used when deploying Permalog[®] loggers on the network. It allows the location details of each logger to be entered and stored in the internal database. It also allows logger details to be edited or deleted from the database.

Enter the logger serial number. **Press Ent.**

If the same serial number is re-entered, then a Deployment Error Screen is displayed. You can either delete the entry or confirm it.

Enter the Grid reference of this logger. The first two characters must be letters*. These are followed by numbers for the rest of the grid reference.

Press Ent.

Then enter the area details, up to 8 numbers or characters*.

Two seconds after entering a number, the cursor jumps along one digit. Alternatively you can use the left/right arrow keys.

* To enter letters instead of numbers, press the relevant keypad button twice or more as required. The numbers and letters step through in sequence and return to the start point again. For the area details the first character to appear is always a number. In the Comments section, this is reversed so that letters come up first.

The system works as shown in this example:-

Press button 2.	The number 2 appears.
Press button 2 again.	The letter A appears.
Press button 2 again.	The letter B appears.
Press button 2 again.	The letter C appears.
Press button 2 again.	The number 2 reappears.

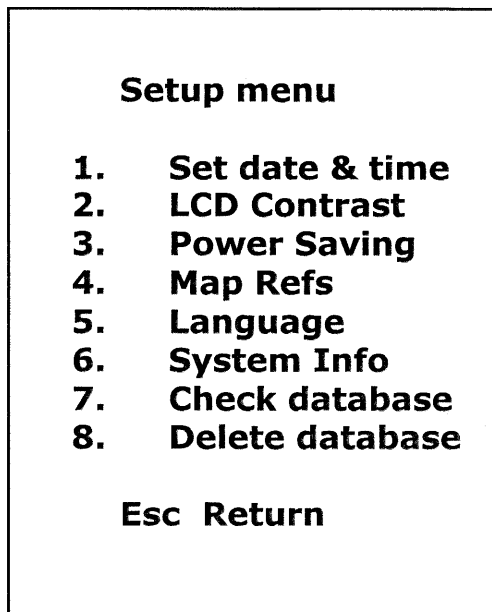
To enter a space, press 0 (zero) twice.

4. Communications

This menu enables the Patroller to download the logger database to a PC or to upload the database from a PC. The screen will show the number of packets of data transmitted and the number of retries attempted if data transmission was not completed.

5. Setup

This configures the Patroller for the area of operation.



- 1. Set date & time**
Set date and time including daylight saving time option.
- 2. LCD Contrast**
Adjust display contrast as required
- 3. Power Saving**
Adjust the time to automatically power off the display back-light when not used.
- 4. Map Refs**
Select map reference system required.
- 5. Language**
The default language is UK English.

6. **System Info**

This gives battery status information, the firmware version, the number of loggers on the database and the archive status. If the screen displays a message saying "**Archive out of date**", this means data has been received from loggers since the database was transmitted to a PC. In other words, changes have been made that have not been saved to a PC.

7. **Check database**

This option checks the database is intact and will state if it has been corrupted or not.

8. **Delete database**

This option should be used when the Patroller is about to be used in a different area and the latest version of the existing database has already been downloaded to a PC. This enables the user to make a fresh start, knowing that all logger data entered is relevant to the latest survey.

Specifications

Permalog® leak noise logger specification

Scope of supply

Logger unit with integral sensor, magnet and aerial (minimum quantity 10 units)

Dimensions

Permalog 1 193mm x 60mm diameter (without antenna)

Permalog 2 From bottom of magnet to top of logger 110mm
From bottom of magnet to top of antenna 135mm
Diameter 60mm

Antenna length

Permalog 1 70mm (standard) or 140mm (option for increased range)

Permalog 2 55mm

Weight (Permalog 1 and 2)

1kg

Power source (Permalog 1 and 2)

Internal battery - up to 10 years' operation (guaranteed 5 years)

Construction materials

(Permalog 1) Hostaform C2521 black case, Stainless steel sensor assembly

(Permalog 2) Hostaform C9021 black case, Stainless steel sensor assembly

Environmental Protection (Permalog 1 and 2)

IP68

Communications (Permalog 1 and 2)

Signal LEAK/NO LEAK

Visible LED indicator

Patroller Specification

Scope of supply

Patroller unit including 12V DC power cable with vehicle lighter socket connector, magnetic vehicle-mounted antenna and cable, short antenna, PC download cable and printer cable.

Dimensions

290mm x 150mm x 82mm

Weight

1.8kg

Construction material

ABS

Environmental protection

IP65

Standard antenna

Magnetically-attached vehicle mounting antenna with 3 metre connection cable

User interface

Membrane keypad with backlit LCD

Power source

Rechargeable/replaceable battery
12V DC vehicle battery power

Communications

Audible LEAK and NO LEAK signals
RS232 serial output to PC, printer
Antenna input
(optional) GPS receiver interface

Fuse information

Surface mount fuse part no. FUS4040 1.0 Amp, 125 V (F)

Standard accessories

12V DC power cable with vehicle lighter interface
PC download cable
Carry strap
Small antenna for portable use

Optional accessories

Carry satchel
Mains-powered charger unit
Replacement battery set
Portable printer

Conditions of Use of Permalog® System

1. Deployment of Permalog® units should be carried out in accordance with Palmer Environmental document PDI(E) Issue 1. 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 5-year warranty and customers are warned that damage to the sensor in particular is unlikely to be economic to repair.
2. During handling and transportation of Permalog® units from place to place, 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 Permalog®'s internal clock, which will lead to an increased possibility of false alarms. Particular care must be taken to avoid packing Permalog® 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.
3. Due to the strength of the magnet used with Permalog®, large quantities of Permalog® units should not be carried by staff with heart pacemakers.
4. The magnet keeper fitted to Permalog loggers should be left attached to the magnet until the unit is ready to be placed in its logging position. If the unit is to be moved for any reason the keeper should be refitted to the magnet. **All Permalog units should be transported with the keeper attached to the magnet.**

Permalog Deployment Instructions

1. Ensure that both the screw thread on the aerial and the screw hole on top of the Permalog are clean.
2. Screw the aerial into the top of the Permalog firmly by hand. Ensure that the rubber washer is fitted to make a watertight seal (Fig 1).
3. Reset the Permalog by passing a magnet close to, and across, the communications window. (Fig 2). Look into the communications window to see a faint red LED flash every 5 seconds. If the LED does not flash, then pass the magnet across the window again and look into the window to verify.

Resetting the Permalog 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 - it cannot be switched off even if a magnet is passed over it many times. Once reset, it will operate continuously for the life of the batteries. The guaranteed battery life is 5 years. Any medium strength magnet will reset the Permalog; for convenience, the magnet on another Permalog may be used (Fig 2).

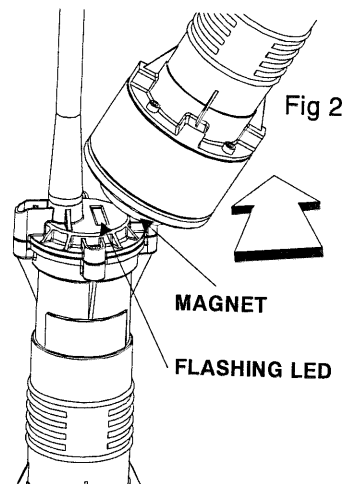
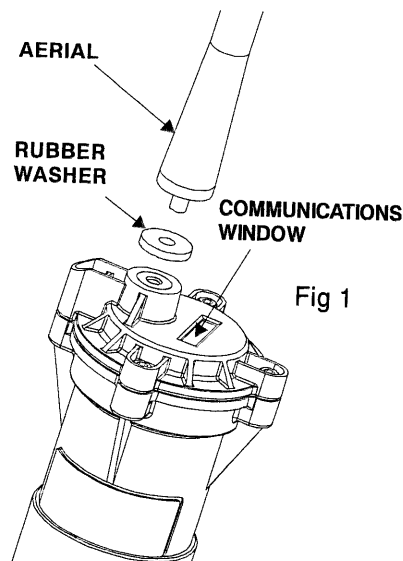
Do not attempt to remove the magnet from the bottom of any Permalog - it is locitted on and should not be removed.

4. Attach the Permalog to a metal pipe fitting using the magnet on the base. Always ensure that the contact point is free from dirt so that the magnet makes a good contact.

5. The Permalog must remain in an upright/vertical position when installed. The aerial is flexible and may be bent out of the way to refit a manhole cover.

Only aerials supplied by Palmer Environmental may be used. Permalog units have no user serviceable parts. If any unit does not appear to function correctly then it must be returned to Palmer Environmental or an authorised Palmer representative.

Permalog is a permanently installed leak noise monitoring unit. It transmits a short 1mW radio signal at 173MHz every 5 seconds.



Permalog units have no user serviceable parts. The enclosure protects the user from electrical shock 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 representative. Caution: Permalog units contain batteries. There is a danger of explosion if they are incorrectly replaced. They must only be replaced with the same or equivalent type recommended by the manufacturer. Used batteries must be disposed of according to the manufacturers instructions.

Redeployment

- Ensure you have sufficient keepers for the magnets and pieces of card to put between the keepers and the logger magnets. Removing keepers from logger magnets takes some effort. Always insert a piece of thin card between the keeper and the magnet to make this job easier.
- On retrieval, always grasp the main body of the logger. Do not pull loggers by the aerials.
- Ensure the magnet from one logger is kept more than 3 inches (8cms) away from the window of the nearest logger. If any magnet is held too close to the logger window, the logger will continually reset causing an incorrect internal clock setting.
- An option during transport is to magnetically attach the loggers to a large piece of metal. This will act as a keeper and prevent the loggers from moving.

Permalog 2 Deployment Instructions

1. Ensure that both the screw thread on the aerial and the lower recessed screw hole in the Permalog are clean, then screw the aerial into the lower screw hole firmly by hand. Ensure that the rubber washer is fitted to make a watertight seal (Fig 1). Remove the magnet keeper and store for later use.

2. Reset the Permalog by passing a magnet close to, and across, the communications window. (Fig 2). Look into the communications window to see a faint red LED flash every 5 seconds. If the LED does not flash, then pass the magnet across the window again and look into the window to verify.

Resetting the Permalog 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 - it cannot be switched off even if a magnet is passed over it many times. Once reset, it will operate continuously for the life of the batteries. The guaranteed battery life is 5 years. Any medium strength magnet will reset the Permalog; for convenience, the magnet on another Permalog may be used (Fig 2).

Do not attempt to remove the magnet from the bottom of any Permalog - it is loctited on and should not be removed.

3. Attach the Permalog to a metal pipe-fitting using the magnet on the base. Always ensure that the contact point is free from dirt so that the magnet makes a good contact. If an eye-hook (optional accessory) is used, this must be screwed into the top of the logger.

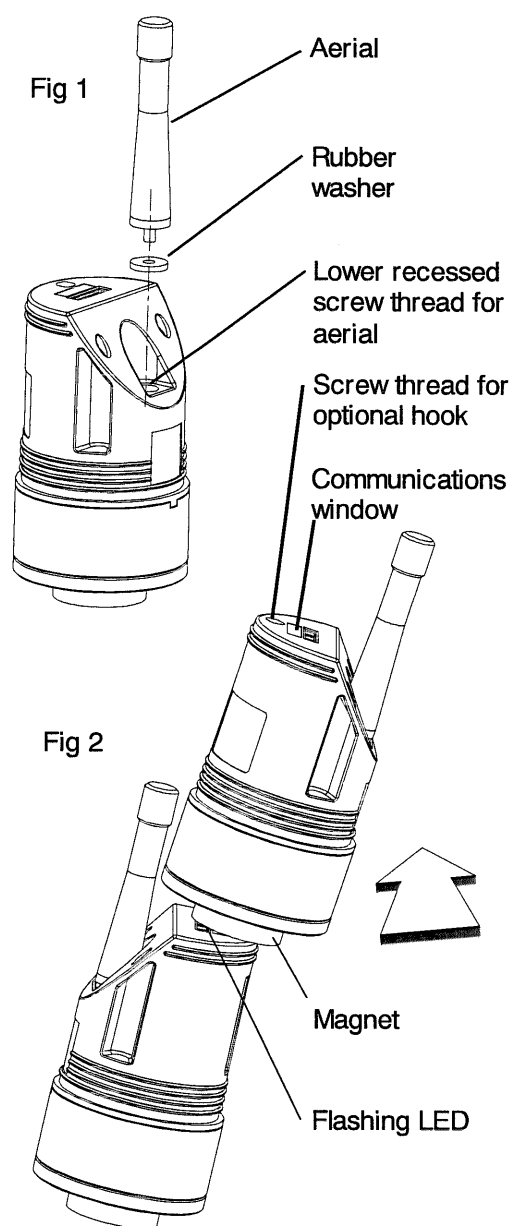
4. For best performance, it is recommended that the Permalog unit is deployed in a vertical/upright position. Only use aerials supplied by Palmer Environmental. A right angle connector is available to position the aerial vertically.

Permalog units have no user serviceable parts. The enclosure protects the user from electrical shock 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 representative.

Caution: Permalog units contain batteries. There is a danger of explosion if they are incorrectly replaced. They must only be replaced with the same or equivalent type recommended by the manufacturer. Used batteries must be disposed of according to the manufacturers instructions.

Redeployment

- Ensure you have sufficient keepers for the magnets. Removing keepers from logger magnets takes some effort. Always insert a piece of thin card between the keeper and the magnet to make this job easier.
- On retrieval, always grasp the main body of the logger. **Do not pull loggers by the aerials.**
- Ensure the magnet from one logger is kept more than 3 inches (8cms) away from the window of the nearest logger. If any magnet is held too close to the logger window, the logger will continually reset causing an incorrect internal clock setting.
- An option during transport is to magnetically attach the loggers to a large piece of metal. This will act as a keeper and prevent the loggers from moving.



Warranty

Permalog® loggers are warrantied 5 years.

Permalog® Patrollers are warrantied 1 year.

All equipment is warrantied by Palmer Environmental Ltd to be free from defects in materials and workmanship for a period of one year (unless otherwise stated) from the date of shipment to the original customer. This warranty is only valid if the equipment has been installed and used in the correct manner as described in this manual.

Repair or replacement (at Palmer Environmental's option) will be made without charge provided the above conditions have been met.

If any problems occur, notify Palmer Environmental Ltd or its authorised representative giving full details of the problem, and the model and serial number of the equipment. You will receive technical advice and/or shipping instructions depending upon the nature of the problem.

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PERMALOG
FCC ID:MJCPERMALOG

This device complies with Part 15 of the FCC rules
operation is subject to the following two conditions

1) This device may not cause harmful interference

2) This device must accept any interference received
including interference that may cause undesired operation