

MicroCorr Dx II

MicroCorr Dx II User Manual

MicroCorr Dx II User Manual

MAN-079-0001

Issue A

Date 03/01/07

Written by SMK

Palmer Environmental Ltd
Ty Coch House
Llantarnam Park Way
Cwmbran
NP44 3AW
United Kingdom

Tel: +44 (0) 1633 489479

Fax: +44 (0) 1633 877857

Email: info@palmer.co.uk

Web: www.palmer.co.uk

Content

Contents	Page 2
Introduction	Page 3
Operational Benefits	Page 5
Principle of Correlation	Page 6
Digital Sensors	Page 7
Digital Outstation	Page 8
Basestation Features	Page 9
Outstation Features	Page 10
Battery Installation and Warning	Page 11
Basestation Battery Installation	Page 12
Outstation Battery Installation	Page 13
Outstation Deployment	Page 14
Basestation Keypad Functions	Page 15
Switching on the Basestation	Page 16
Main Menu	Page 17
Correlate	Page 18
Correlation Menu Options	Page 20
Set Up	Page 32
Test and Service	Page 34
Contact	Page 35

Introduction

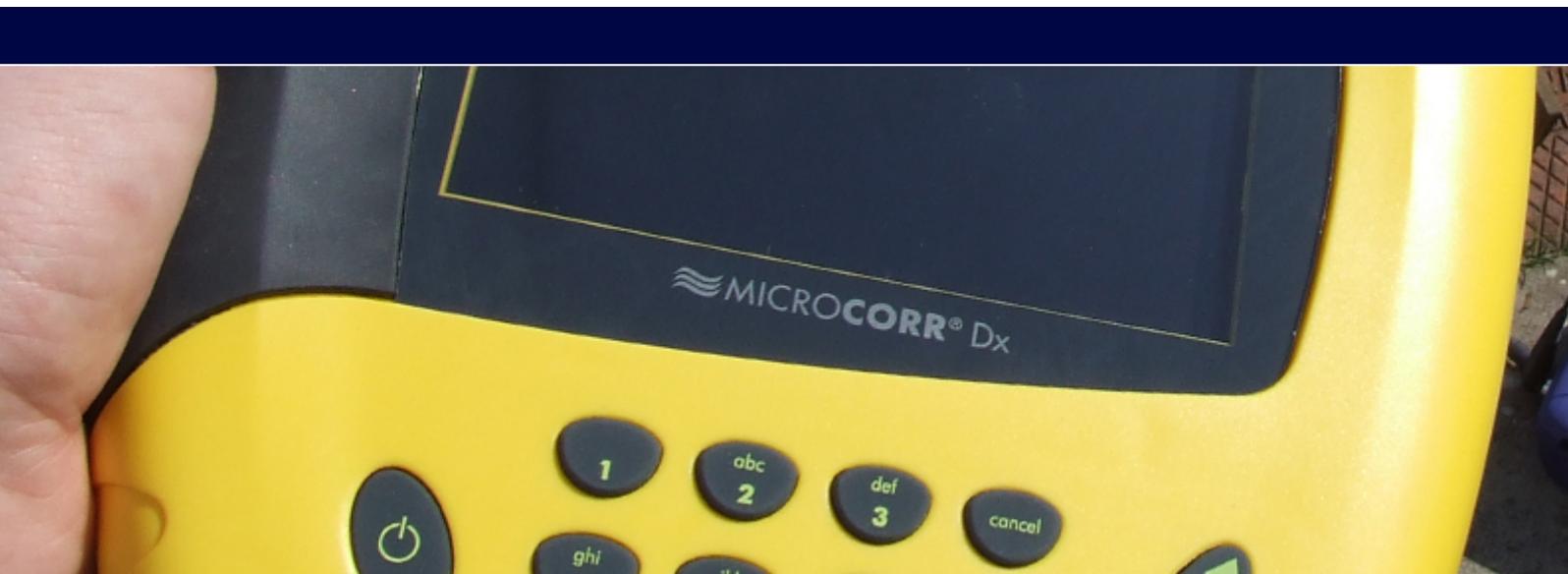
The MicroCorr® Dx II is a fully digital leak noise correlation system, available at a cost usually associated with standard analogue units.

The system uses the same proven high performance digital sensors and transmitter Outstations as the MicroCorr® Digital + (over 4,000 MicroCorr® units in use worldwide). Headphones can be connected to the MicroCorr® Dx II Basestation Unit in listening mode to hear the leak noise detected by the Outstations. A database of filter options and presets are also available within the unit to increase accuracy when being used in areas with a high level of ambient noise. Digital sensors, radio transmission and processing ensure the highest level of performance.

The standard MicroCorr® Dx II system comprises of the following:

- 1 x MicroCorr Dx II Basestation
- 2 x Outstations: 1 x Red & 1 x Blue
- 2 x Sensors with High Performance Cables
- 1 x 12V In-Car Charger
- 1 x Mains Dual Outstation Charger
- 1 x Mains Basestation Charger
- 1 x RS232 Cable for PC Communications
- 1 x Soft Carry Case
- 1 x High Quality Headphones

Optional accessories are also available including: Hard Carry Case, Dual Frequency Radios, Aviation Quality Headphones, PC Software, Vehicle Magmount Antennas, Digital Hydrophones, Leak Noise CD and Measuring Wheels.



The system builds on the proven digital technology developed by Palmer Environmental in its MicroCorr® Digital and DigiCALL systems but has been re-engineered to provide key functions in a cost effective package, retaining the highest levels of performance and quality. This enables it to achieve performance levels well in excess of previous analogue-based systems, with important benefits to the user including:

- Totally digital system, faster more accurate correlation results
- Superior leak detection performance on all pipe materials and sizes
- Quick and easy to use, especially for less experienced operators
- Automatic Parametric Filtering (APF)
- Ergonomically designed – lightweight, compact system
- Software updates via web site
- Transceiver communication enables all system functions to be controlled centrally, enabling quicker deployment
- Expert system leak detection algorithms eliminate transient, non-leak effects
- Data replay function allows immediate post-processing or off-line correlation
- Results can be transferred to a Windows PC for post processing or export

Leak detection staff require a high performance correlator in order to maximise their productivity (number of leaks found per hour) and minimise the incidence of “dry” holes, when excavation reveals no leak to be present. However, because it is used constantly in the field, the correlator must also be robustly designed and with safety in mind, the Outstations have also been designed to be highly visible over typical correlation distances and allow back-to-back portability.

The Basestation Unit and Outstations are fully injection-moulded housings, providing maximum strength and durability. They are designed to IP65 protection and the Basestation Unit incorporates an external antenna and a magmount antenna (optional extra) that may be connected for longer correlation distances if the Basestation is vehicle-based. External antennae are used with the Outstations.

All connectors are to military specification and cables are fitted with strain relief to protect against fatigue damage and help eliminate external noise interference.

Operational Benefits

With the latest technology, it's easy to see why the MicroCorr® range of correlators are at the top of their class:

- Pinpoints a higher percentage of leaks
- New technology gives significantly higher percentage of "difficult" leaks (plastic pipes, trunk mains, low pressure situations) to be detected
- Fewer "dry" holes reduces excavation costs
- Improved productivity – more leaks found per hour
- Easier to use – less training required
- Improved reliability with less downtime
- Lightweight and robust
- Easily integrates into Company-specific reporting
- New software versions available from www.palmer.co.uk
- Designed for easy portability

Fully automatic

- Immediate correlation – switch on and go (enter pipe details later)
- Automatic parametric filtering (APF)
- Self diagnosis

Easier to Use

- Graphical user interface
- Intuitive display and operation
- Quick correlation

Reliability to inspire confidence

- All functions self-calibrated automatically on power-up
- In-built power management
- In-built diagnostics
- Increased battery life – batteries rechargeable and field replaceable

Principle of Correlation

In the "classic" correlation process, two sensors are deployed on pipe fittings ("dry" connection) or connected to hydrants ("wet" connection).

The sensors are positioned either side of the suspected leak position. Noise is created by the leak as it escapes from the pipe under pressure.

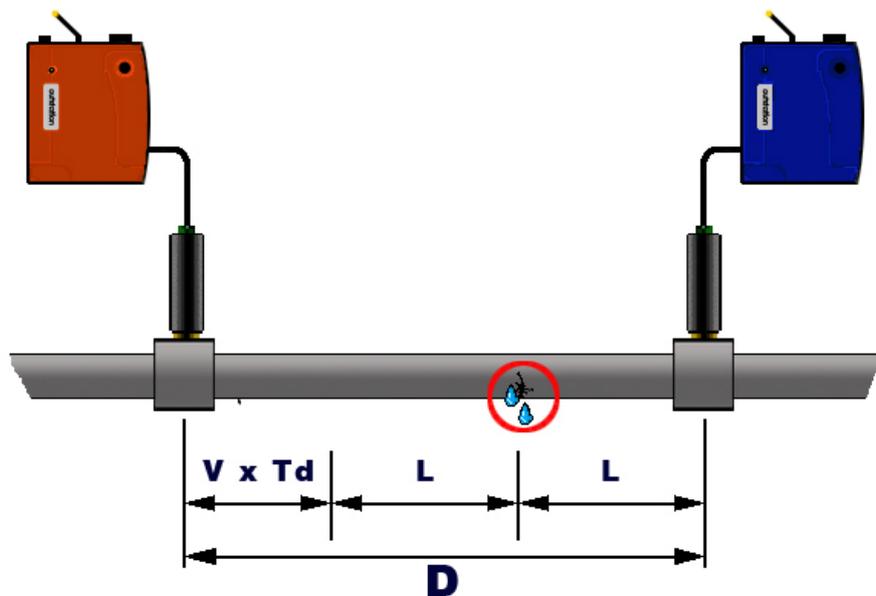
This noise is conducted in both directions away from the leak through the pipe wall (as minute vibrations) and through the water column (as a pressure wave).

The leak noise travels at a constant velocity (V), which depends on the material and diameter of the pipe, and arrives first at the sensor nearer the leak.

The arrival time at each sensor is registered. The difference (T_d) between the two arrival times, combined with knowledge of the pipe type and length, enables the leak position to be calculated by the correlator.

Depending on the environmental conditions, accuracy of leak pinpointing can be within centimetres.

Principle of correlation can be defined by: $L = \frac{1}{2} (D - (V \times T_d))$ and is shown graphically below:



Full Digital Correlation

Digital sensor

New sensor with improved sensitivity to low frequency noise (for plastic and large diameter pipes and low pressure situations) - down to 1.0Hz

Wider dynamic range than any previous sensor - can distinguish leak noises much quieter than previous sensors over much greater distances

True 16 bit $\Sigma\Delta$ ADC

Immediate digitisation of the analogue leak noise so that the calculation of the correlation can be done with no loss or interference of data.

Low noise electronics with digital protocol eliminates interference

Longer sensor cables possible

High strength magnet

Quality rubber housing for sensor protection

Military specification amphenol connection



Full Digital Correlation

Digital Outstation

New compact Digital Outstation with improved communications

Two-way communication with Interface Unit using digital transceiver technology

Virtually no data loss, interference or distortion of the transmitted signal

Single radio frequency for all Outstations

Improved dynamic range over analogue radios

High speed data transmission using transform coding techniques

No directional restrictions



MicroCorr® Dx II Basestation Features

Front view

- 1: Rubber Hand Grip
- 2: Carry Strap
- 3: Backlit Monochrome LCD Screen
- 4: Injection Moulded Housing
- 5: Tactile Rubber Keypad
- 6: Battery Compartment



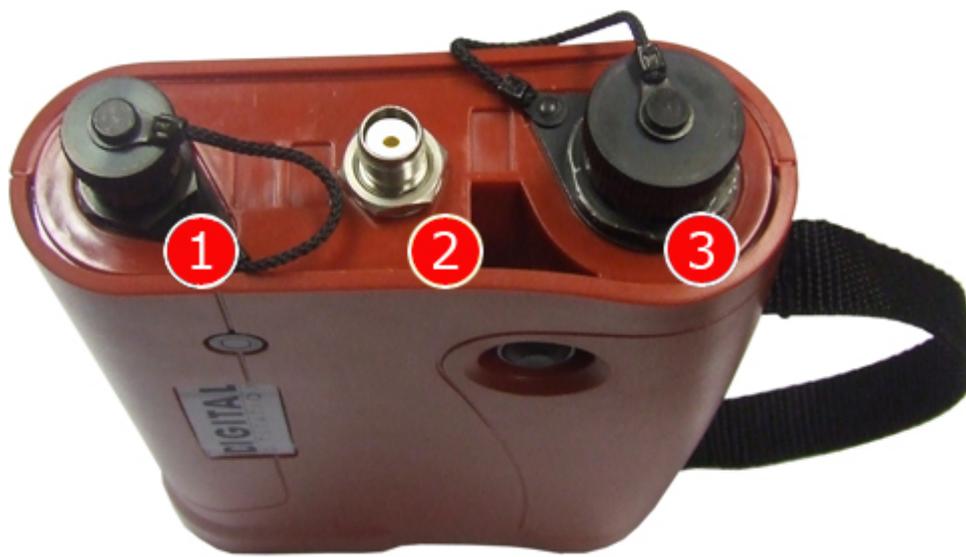
Connection details

- 1: Headphone/Charger Connection
- 2: Sensor Connection
- 3: Communications Connection (RS232)
- 4: External Antenna/Magmount Connection

MicroCorr® Dx II Outstation Features

Outstation general features

- 1: Injection Moulded Housing
- 2: LED
- 3: On/Off Switch
- 4: Carry Strap



Outstation rear view

- 1: Headphone/Charger Connection
- 2: Antenna Connection
- 3: Sensor Connection

Battery Installation

BATTERY WARNING

All three batteries supplied are rechargeable lithium ion. Do not short-circuit these batteries. Any misuse may result in explosion or fire. They must not be used in any other application or used with any other equipment. Only batteries/battery-packs supplied by Palmer Environmental must be used.

The Palmer sealed battery packs contain circuitry to prevent overcharging and over-discharging.

NOTE: If the system is going to be stored for any length of time, to ensure long life of batteries, please ensure they are at least half charged when stored.

The battery packs for the MicroCorr® Dx II Basestation and Outstations are supplied as separate items and will need to be fully charged before use.

Two different battery chargers are supplied: one for the MicroCorr® Dx II Basestation and one for both Outstations (which can be charged simultaneously).

All three batteries are identical and are interchangeable. Charging for all batteries takes up to 6 hours from flat, although an overnight charge is recommended for maximum performance.

Batteries should be removed from the units during extensive periods of storage.

Installing and charging the MicroCorr® Dx II Basestation batteries

To charge the MicroCorr® Dx II Basestation battery, the battery must first be fitted. To insert the battery pack, unscrew the three quick release screws underneath the unit (shown below), remove the cover and packing foam and connect the battery pack. Carefully place the battery pack in the battery compartment, refit the packing foam, and then replace the cover.



Connect the charge lead from the charger to the headphone/battery charge connection on the back of the MicroCorr® Dx II Basestation. Plug the charger unit into the mains supply and switch on. The MicroCorr® Dx II Basestation will turn itself on and start charging, the unit will display a battery icon to signify charging.

Installing and charging the MicroCorr® Dx II Outstation batteries

To charge the Outstation batteries they must first be installed. Unscrew the two quick release screws (shown below) and remove battery cover on the bottom of each Outstation, connect the battery to the internal connector and insert the battery. Refit the cover and attach the battery charge lead to the headphone/charge connector on the top of the Outstation. The Outstations will turn themselves on to charge.



Both Outstations may be charged simultaneously using the supplied Charger. Only batteries with the correct specification and type must be used. These are available from Palmer Environmental should replacements be required.

Outstation LED Functions

The Outstation incorporates an LED, which provides the following information:

During charge:

During a "fast" charge the LED will flash Red.

During a "slow" charge the LED will flash Yellow.

Once fully charged the LED will light up Green.

During deployment:

When the unit is on and performing normally, the LED flashes Green briefly once a second. To indicate battery status the LED will change from Green to Yellow and Red. With the LED flashing Yellow, the battery is OK. A Red flashing LED indicates the battery requires immediate charging.

If the Outstation is off and the system is not on charge, the LED is off.

Outstation Deployment

Once the batteries have been installed and charged in the MicroCorr® Dx II Basestation and the Outstations, connect the antenna, sensor cable and sensor to each Outstation.

Switch on each Outstation by pressing the On/Off button on the back, the LED will flash Orange then Green (or Yellow/Red depending on battery status) to indicate the unit is ready for use.

To turn the Outstations off, press and hold the On/Off button momentarily. The LED will light Red then go off.

To check the sensors are working correctly, connect the headphones to the Outstation and listen while running your finger over the sensor magnet. A clear crisp noise should be heard.

Deploy each sensor on a water pipe fitting either side of the suspected leak position. The sensor has a strong magnet that will enable it to remain in position on steel/iron fittings.

Always try and ensure you have a debris free contact between the sensor and the fitting for the best possible results.

Basestation Keypad Functions

MicroCorr® Dx II has an alpha-numeric keypad that includes a full stop, cancel, enter and up/down arrows. Navigation through the on-screen menus uses combinations of these keys.



On/Off Key

Press once to turn Basestation on

Press again to give the option for Standby or Switch Off



Enter Key

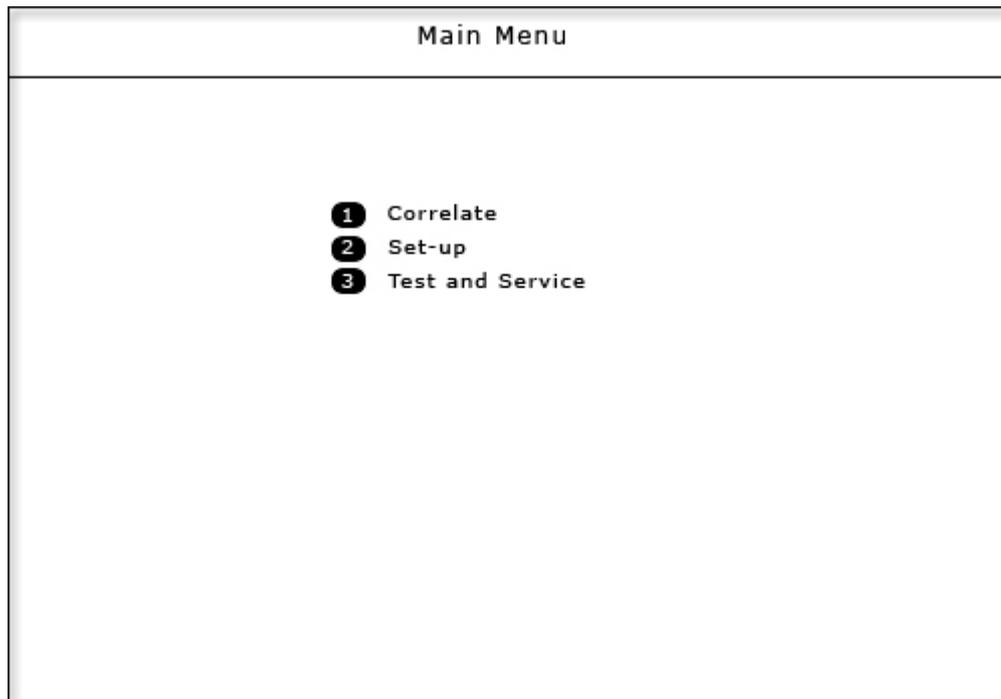
Used on multiple screens and menus to accept changes/input



Up and Down Arrow Keys

Used on multiple screens to select different features

Main Menu



The three options here are:

1) Correlate

This option will take the user back to the Correlate screen where they can perform a quick or in-depth correlation.

2) Set-up

Selecting Set-up allows the user to configure certain correlation settings such as radio power, survey modes, power saving and display options.

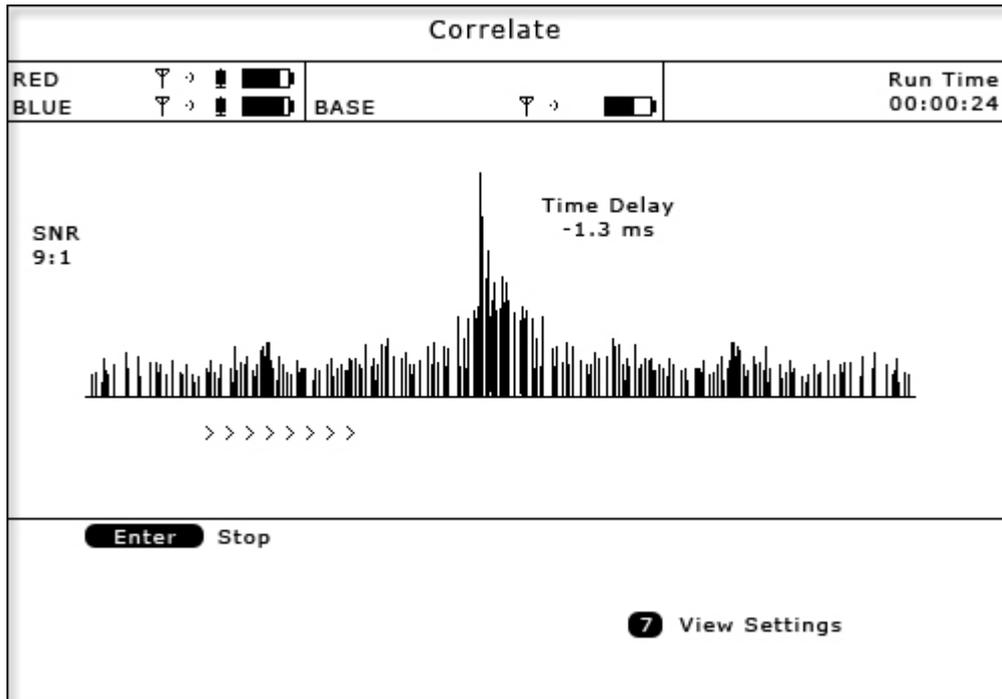
3) Test and Service

Selecting Test and Service allows the user to configure the system settings such as restoring pipe data, setting user preferences over Metric and Imperial measurements, changing system date/time, language settings. From here the user may also detail the current versions of firmware/software and perform diagnostics should a fault occur.

Correlate

From the Correlate screen, pressing the Enter Key will start the correlation. Once correlation has started, the screen will animate scrolling arrows to show that correlation is in progress.

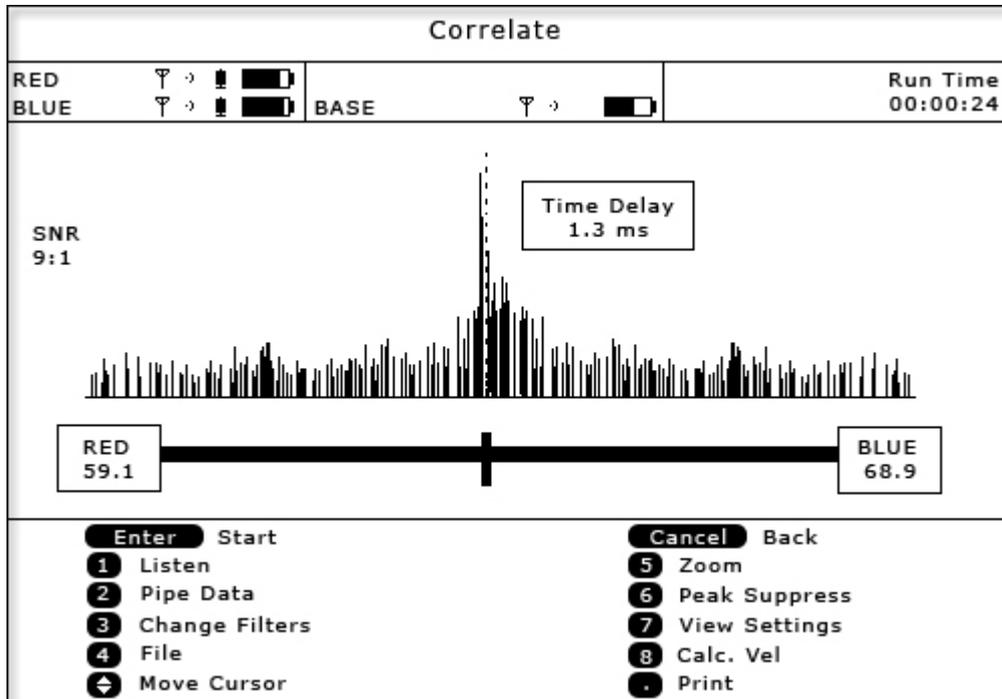
The Date and Time will be replaced with the Run Time of the correlation. Correlation can be stopped at any time by pressing the Enter Key.



For quick surveys, the user may start a correlation without having to input any pipe data as this can be entered at a later date. The system will retain the correlated information in its memory.

Once the graph displays an acceptable correlation result, press Cancel to stop the correlation. The screen will display the correlated graph and the user may use the menu options to analyse/configure the result.

Once an acceptable correlation result has been produced, upon pressing Enter the screen will display the correlation result (as shown below).



A

dashed cursor line shows the position on the largest peak (best result). The line can be moved once the correlation has been stopped by using the Up/Down Keys. Moving the line alters the correlation distance.

This screen shows the result of a correlation where the position of the leak, in this example, is 59.1 metres from the Red Outstation and 68.9 metres from the Blue Outstation.

The time delay has been calculated at 1.3 milliseconds.

The correlation shown has a SNR of 9:1. Signal to Noise Ratio (SNR) means the largest correlation peak is 9 x larger than the smallest displayed peak shown on the correlation graph. Hence the larger the SNR the more pronounced the peak will be.

Correlation Menu Options

From the results screen, the user has the following options:-

<p>Enter Start</p> <p>1 Listen</p> <p>2 Pipe Data</p> <p>3 Change Filters</p> <p>4 File</p> <p>↕ Move Cursor</p>	<p>Cancel Back</p> <p>5 Zoom</p> <p>6 Peak Suppress</p> <p>7 View Settings</p> <p>8 Calc. Vel</p> <p>. Print</p>
--	--

Pressing Enter starts the correlation again, pressing Cancel takes the user back to the main menu.

1) Listen

Attach the headphones to the Basestation prior to pressing 1. Use the Up/Down Keys to select the sensor required to listen to; Base, Red or Blue. The sound will be transmitted in blocks of approx 20 seconds. To stop listening press Enter. Please note: sound will continue to play until the 20 seconds elapse.

2) Pipe data

To accurately locate a leak position the user must enter the correct information with respect to the physical properties of the pipe. Each section must be entered to be accepted by the system. Press 5 to add a new pipe. The system will add a pipe with default settings as shown below.

Pipe Data			
RED			
Length	Material	Dia mm	Vel m/ms
0.0	Ductile Iron	100.00	1.320
BLUE			
<p>1 Length</p> <p>2 Material</p> <p>3 Diameter</p> <p>4 Manual velocity</p> <p>↕ Select</p>	<p>5 Add pipe</p> <p>6 Delete pipe</p> <p>0 Clear all</p> <p>Enter Accept data</p> <p>Cancel Cancel</p>		

Once the pipe has been added its properties must be defined.

Pipe Length

Press 1 to enter the length of the pipe, using the numeric keys enter the pipe length and press Enter to accept. This must cover the entire length of piping between sensors.

Pipe Material

Press 2 to select the material of the pipe, use the Up/Down Keys to select, press Enter to accept. To enter and store custom materials and properties press 1 (Edit Materials), then press 1 (Edit Table). Press 3 to add a custom entry. To restore to Factory Defaults see Test and Service options from the Main Menu.

Pipe Diameter

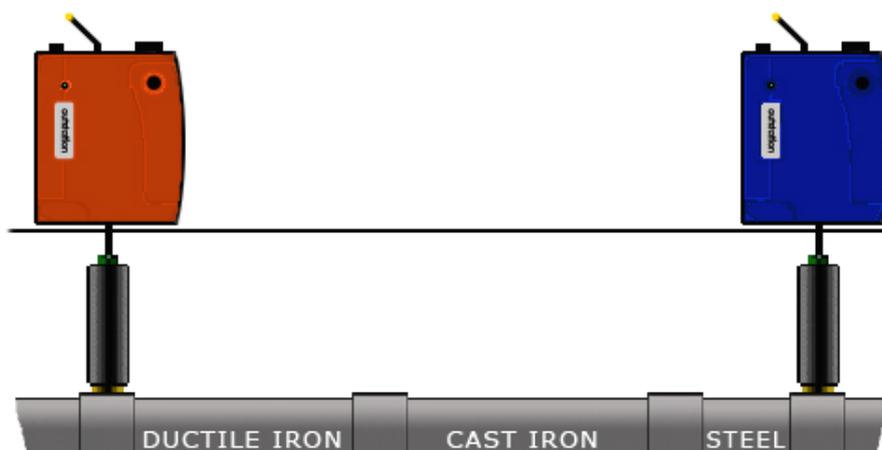
Press 3 to define the pipe diameter, using the numeric keys enter the diameter and press Enter to accept.

Velocity

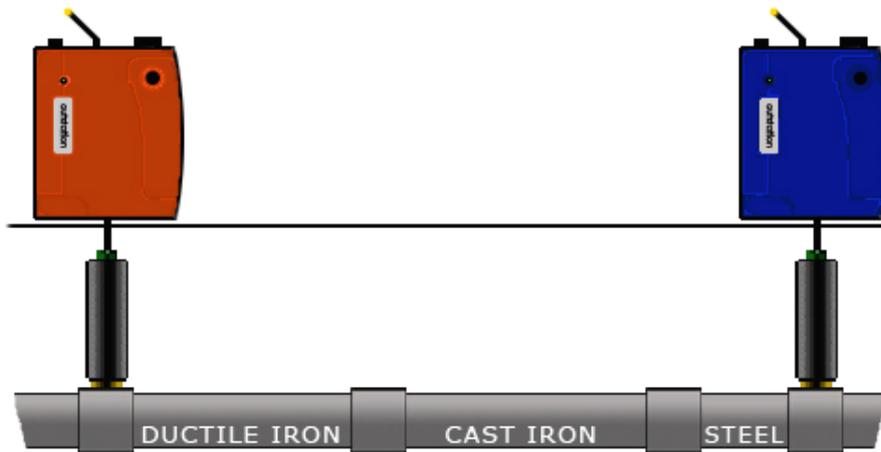
By default, the system will automatically calculate the velocity from the information given by the length, material and diameter of the pipe. If this is not deemed accurate enough for the current correlation, the user may enter their own velocity by pressing 4 and entering their own custom information.

To add a new pipe/section, press 5. This will add a new pipe/section above the current pipe with the default properties. Using the Up/Down Keys, highlight the pipe/section you need to edit then using Keys 1 – 4, define the pipes properties.

If working on mixed pipe/section materials, work from the sensor to sensor. Up to 10 mixed materials can be used in one correlation.



In the example below, from the Blue sensor the Steel pipe was entered first, the Cast iron was second and the Ductile Iron was entered last. A maximum of 6 different materials/pipes can be entered.



Once all pipes/sections have been entered, press Enter to save these details. After a short delay the Correlate screen will appear and adjust itself for the recently entered pipe/section data. It is recommended that a new correlation be conducted to get a more accurate result.

To remove a pipe/section from the Pipe Data screen, using the Up/Down Keys highlight the pipe/section you wish to delete and press Key 6 or press 0 to clear all data.

Pipe Data			
RED			
Length	Material	Dia mm	Vel m/ms
23.0	Ductile Iron	10.00	1.320
62.0	Cast Iron	80.00	1.280
9.4	Steel	80.00	1.150
BLUE			
1	Length	5	Add pipe
2	Material	6	Delete pipe
3	Diameter	0	Clear all
4	Manual velocity	Enter	Accept data
↕	Select	Cancel	Cancel

3) Change filters

If correlating with pipe data entered, the default filter settings will be used depending on the properties of the pipe. Sometimes this may not be accurate enough to filter out unwanted frequencies so the user may wish to alter the filter settings to remove certain frequencies that are influencing the current correlation.

Pressing 3 displays a pop-up box with four options:

- Quick set: Metallic
- Quick set: Non-Metallic
- Clear all
- Manual settings

By using the Up/Down Keys, highlight the required option and press Enter.

Quick set: Metallic

Removes all frequencies from 0Hz to 350Hz. So the sensors will only listen to frequencies of 350Hz and above.

Quick set: Non-Metallic

Removes all frequencies from 0Hz to 20Hz. So the sensors will only listen to frequencies of 20Hz and above.

Clear all

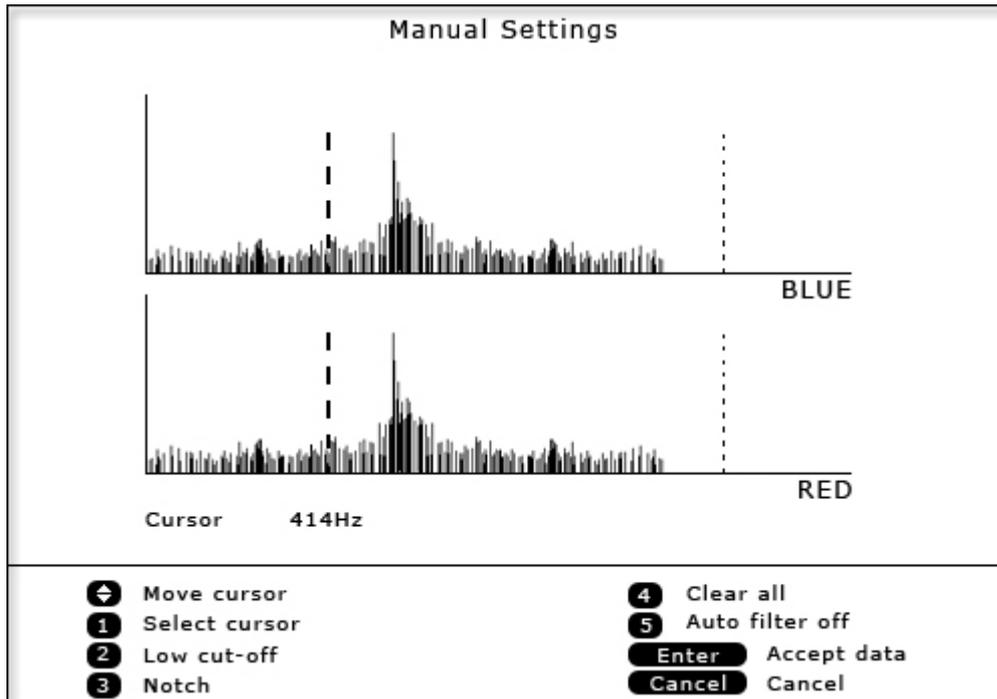
Removes any filter settings set and will listen to all frequencies.

Manual Settings

Allows the user to view the frequencies and set their own preference.

The Manual Settings screen displays the frequencies heard at the two sensors in use. The bottom axis of each graph displays the frequency starting from the left side at 0Hz.

Two cursor lines are displayed on each graph and can be moved by using the Up/Down Keys respectively. The longer dashed cursor line is the current line selected to move. The position of the currently selected cursor line is displayed under the bottom graph, in the following example 414Hz.



The menu options at the bottom of the Manual Settings screen are as follows:

Select cursor (1)

This toggles between the two cursor lines. Only the longer dashed cursor line can be moved, the cursors cannot cross each other.

Low cut-off (2)

When the left cursor line has been selected, the low cut-off option is displayed. Using the Up/Down Keys, move the cursor to the required position and press Key 2. This will remove all frequencies to the left of that position. In this example, the left cursor (low cut-off) has been moved to 414Hz so all frequencies from 0Hz to 414Hz will be ignored. The filtered out area will go grey

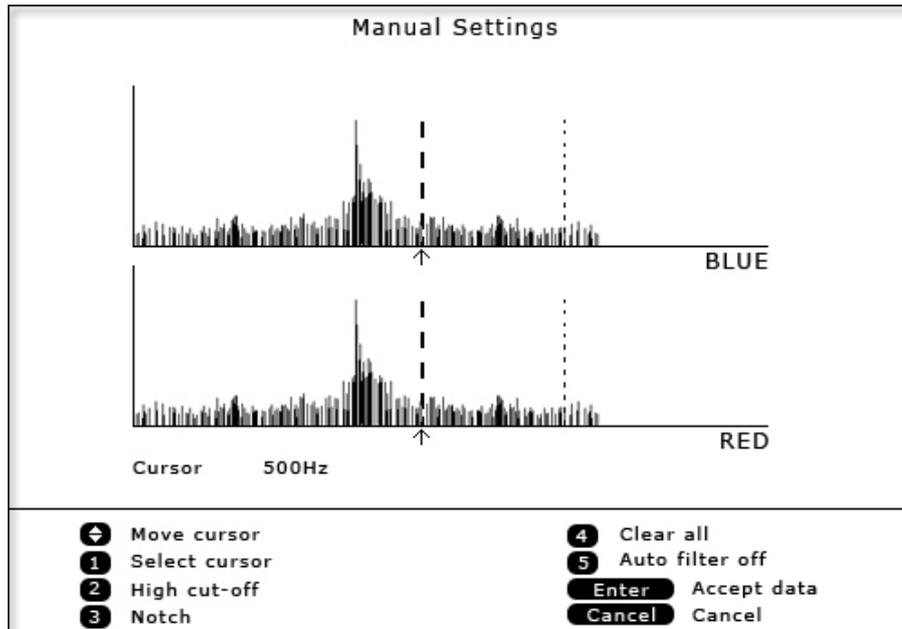
High cut-off (2)

When the right cursor line has been selected, the high cut-off option is displayed. Move the right cursor to the required position and press Key 2. This will ignore any frequencies to the right of the cursor. In this example, the cursor was moved to 648Hz and the high cut-off selected so all frequencies will be ignored from 648Hz upwards. The filtered out area will go grey.

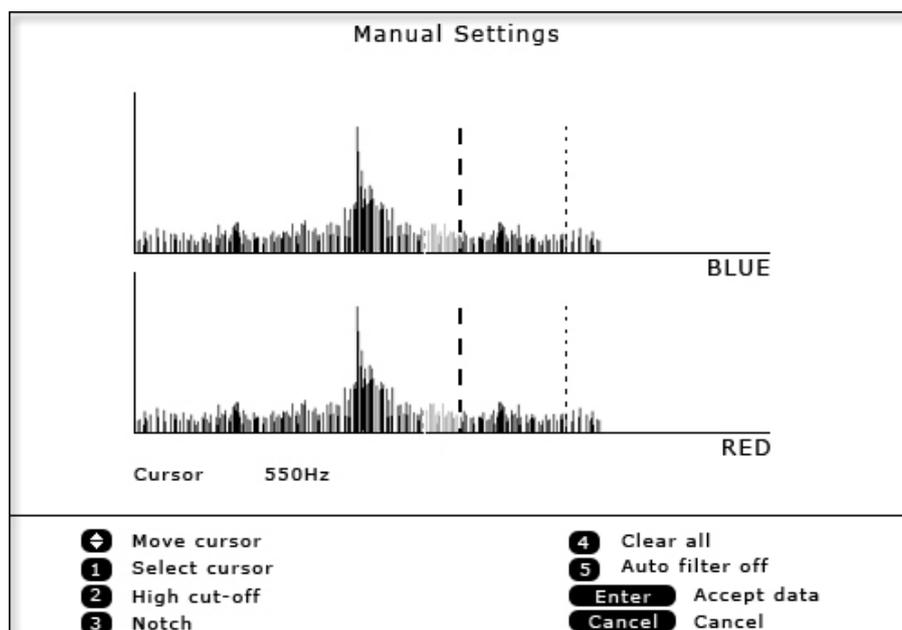
By pressing Enter to accept the changes, the system will now only process frequencies between the low and high cut-off points.

Notch filter (3)

This option allows a segment (notch) of frequencies to be filtered out. Move the cursor to the left side of the frequency range you want to remove and press Key 3 (in the example below we have placed this at 500Hz). A small arrow appears below the bottom axis to mark the lower end of the notch.



Now using the Up/Down Keys, move the same cursor to the right side of the frequency range you want to remove and press key 3 again (in this example we have placed this at 550Hz). The notch area will go grey.



In the example, we have filtered out frequencies between 500Hz and 550Hz. The current correlation will now ignore all frequencies between 500Hz and 550Hz but will use all other frequencies.

Press Enter to accept the filter changes and apply them to the current correlation.

Clear all (4)

This clears all filter settings currently set.

Auto filter off (5)

This will toggle between Auto filter off and Auto filter on.

4) File

This enables the user to save the current correlation for post processing at a later date. The user may also load a previously saved correlation file/result from the memory. The unit can store approximately 30 files in total. To help the user, they may enter a file name, title, date/time and several comments for each saved correlation.

File Management		
Name	Date	Time
Prince Street	26-01-2006	14:05
South Road	25-01-2006	11:27
88% of disk space available		
1 Save 2 Load 3 Delete	4 Properties Select Cancel Back	

From the Correlate screen, press Key 4. A new screen will appear where details on the correlation can be entered and saved for easy access. Using the keypad in a similar fashion to that of a mobile phone, enter a file name, title and any comments. Pressing Enter will save the correlated data along with the details just entered.

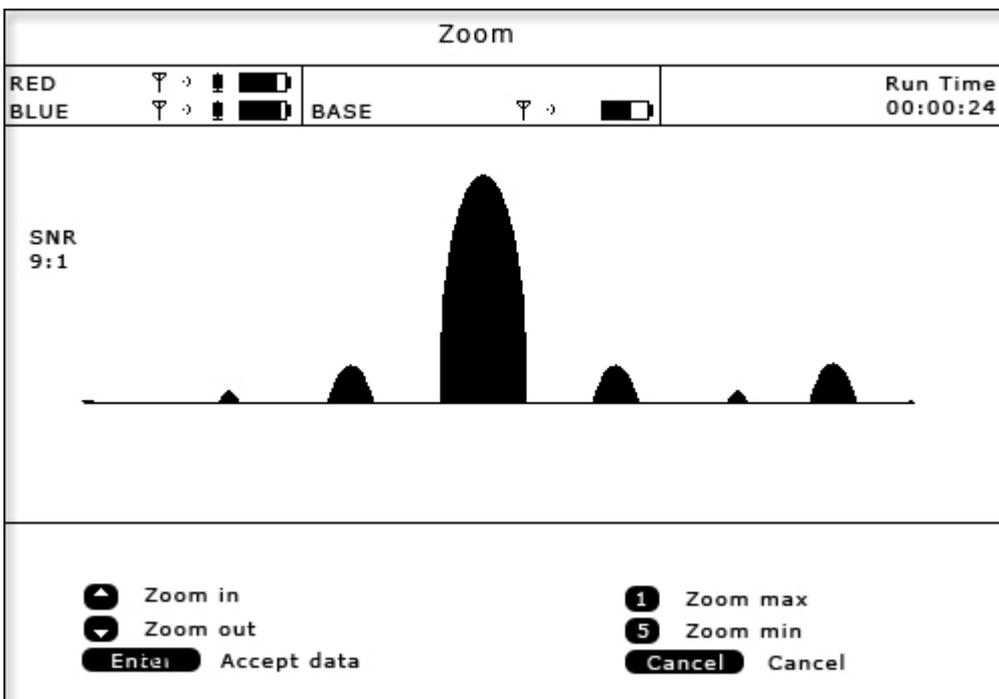
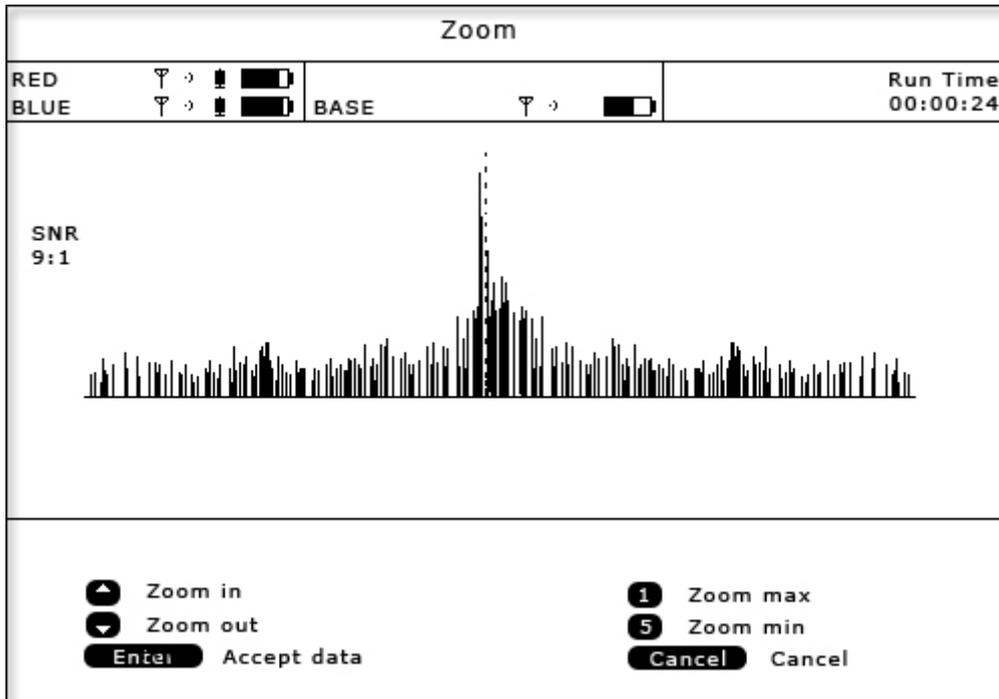
To load a saved correlation, using the Up/Down Keys, select the file you wish to view and press Key 2. The saved correlated data will be displayed along with the file name and date/time stamp.

The saved correlation will be displayed on the Correlate screen. From a loaded file, the system can undertake post correlation. Correlating functions such as pipe data, filters and peak suppression can be changed on the loaded data without having to return to site to re-correlate. Using new information could correlate a different result.

To delete a saved file, using the Up/Down Keys, select the file you wish to delete and press Key 3. To view the properties of a saved file, highlight the required file and press Key 4. From here you can view the file name, date/time, title and any comments that have been saved with that file.

5) Zoom

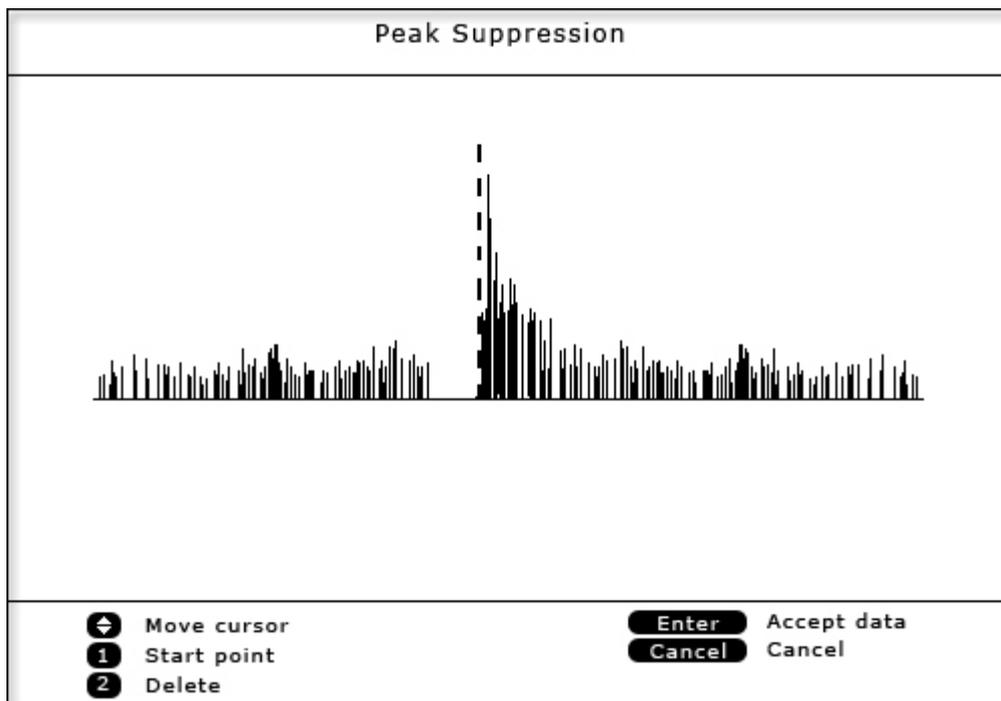
Allows the user to see a more enhanced view of the leak centred around the dashed cursor line. Using the Up/Down Keys allows the user to zoom in/out stage by stage. To quickly zoom in/out use the zoom max and zoom min options by pressing 1 or 5 respectively.



6) Peak suppress

Allows the user to suppress a section of the time delay range from the current correlation. This may be used to remove known leaks or demand usage that may be hiding unknown leaks.

Moved the dashed cursor line to the start point of the data to be removed and press Key 1 to select a start point. A small arrow will appear below the graph to mark the lower side of the suppression.

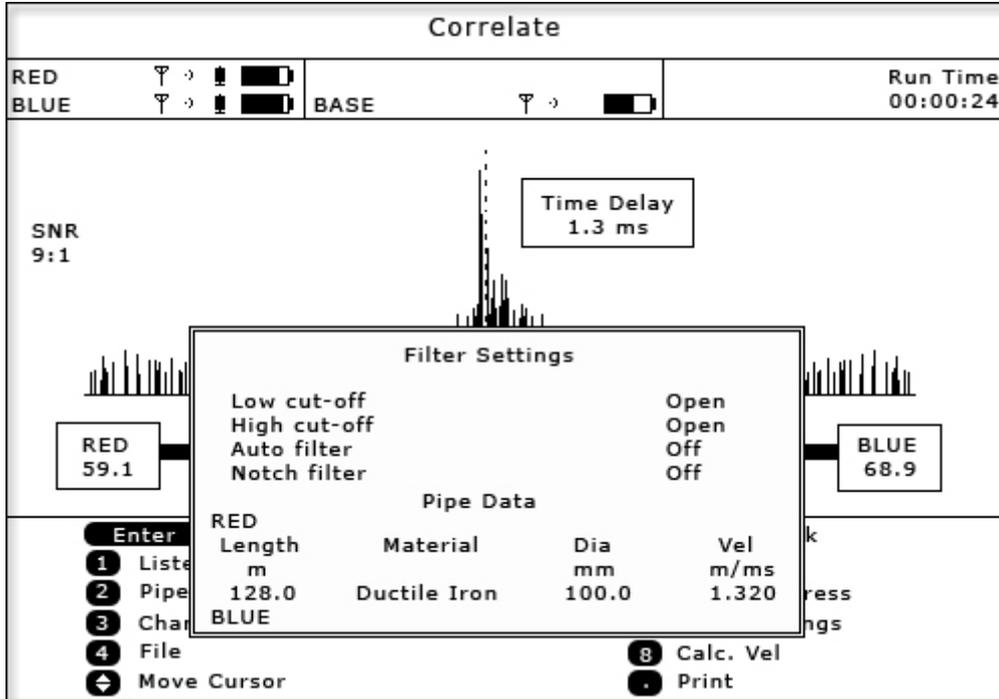


Now move the cursor line along the data to select a stop point and press Key 1 again, the section is now removed. Press Enter to apply the changes to the current correlation.

To restore the graph data press Key 2 to delete the suppressed data.

7) View settings

Displays the current pipe length, material, diameter and velocity and the filter settings for the current correlation. Press any key to close the pop-up window.



8) Calc. Vel

After stopping correlating the option to calculate velocity appears. A velocity check gives a more accurate velocity of the pipe to be correlated instead of using the pre-determined velocity values.

To calculate velocity a leak must be present, either real or induced. The leak can either be between the sensors (known as "in-bracket") or outside the sensors (known as "out of bracket"). Unlike correlation, where the more central the leak is positioned between the sensors, the more accurate the result will be, a velocity check requires the leak to be positioned closer to one of the sensors to create a larger time delay.

The procedure for a velocity check is to position your sensors as described above. Induce a leak or if possible use an existing real leak. Correlate as normal, ensuring to enter the pipes properties. After a good correlation peak, stop correlation and press Key 8.

If the leak is "in-bracket" (between sensors) enter the distance from the leak to the Red sensor. This needs to be the actual measured distance to the known leak and not the previously correlated measurement.

Once the distance to the Red sensor has been entered, press the Enter Key. The new velocity is calculated and on pressing Enter again, applied to the correlation.

If the leak is "out of bracket" (outside sensors), the distance will automatically be calculated by the unit and the velocity displayed. The new velocity is calculated and on pressing Enter, applied to the correlation.

To cancel the calculated velocity check, press the Cancel Key.

Set Up

This screen allows the user to configure the current correlation settings.

Set-up		
1	Correlate on start-up	Yes
2	Default filters	Clear
3	Survey mode range	0.8s
4	Correlation sensors	Red-Blue
5	Radio mode	Low Power
6	Power saving	
7	Display set-up	
<div style="display: flex; justify-content: space-between; margin-top: 10px;"> Enter Accept Data Cancel Cancel </div>		

1) Correlate on start-up

Toggles between Yes and No. If set to Yes, the system will go straight to the Correlate screen after turning on. If set to No, the system will default straight to the Main Menu after turning on.

2) Default filters

Toggles between Clear and Retain. If set to Clear, in survey mode, the filters will clear each time a new correlation is processed. If set to Retain, in survey mode, the filters will retain a set filter setting (set by the user) for every correlation processed.

3) Survey mode range

Toggles between 0.8, 2.5 and 4.2 seconds. Each of these values provides the time delay range over which the correlator will correlate, where the times in seconds shows twice the range. For example, over longer distances the 4.0 second range should be used to give +2 seconds to -2 seconds. If entering pipe data, the survey mode range automatically defaults to the appropriate setting.

4) Correlation sensors

Toggles between the pairs of sensors to be used. Red-Blue, Red-Base, Blue-Base.

5) Radio mode

Toggles between High and Low power. Low power can be used over shorter distances and High power over longer distances or areas where a signal can be interrupted by the environment. The correlator will always default to Low power when turning on.

6) Power saving

Allows the user to configure the power settings on the system.

Press 1 to toggle the system power off between Never, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55 and 60 minutes. Press 2 to toggle the Backlight settings.

7) Display set-up

Allows the user to change the contrast of the display screen. Press 1 to decrease the contrast and press 2 to increase.

Test and Service

This screen allows the user to configure certain parameters and settings for the system.

1) Restore default pipe data

Resets the pipe data to the default settings.

2) Units are metric

Toggles between Metric and Imperial measurement units.

3) Time is in milliseconds

Toggles between milliseconds and seconds.

4) Language

Select the required language by using the arrow keys.

5) Set clock

Allows the user to select the time and date format and adjust the system date and time.

6) Debug messages are off

Toggles between On and off. This should normally be set to Off and is only used during fault diagnosis.

7) Information

Connect sensors to Outstations and turn on prior to selecting this option. This displays the current firmware and software versions currently installed on both the Outstations and Basestation.

8) Diagnostics

Displays critical information for fault diagnosis on the Basestation and Outstations.

Contact

Palmer Environmental Ltd

Ty Coch House

Llantarnam Park Way

Cwmbran

Gwent

NP44 3AW

United Kingdom

Tel: +44 (0) 1633 489479

Fax: +44 (0) 1633 877857

General Enquires: information@palmer.co.uk

Technical support: support@palmer.co.uk

Web: <http://www.palmer.co.uk>

Note

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