

INTERFACION PTY LTD

ACN: 614 858990

P O Box 106 R, REDAN VIC 3350. AUSTRALIA

QED OWNERS MANUAL



Proudly made in Ballarat, Victoria. Australia

Picture may vary as it is purely for illustration purposes only

QED - PI INTRODUCTION

Congratulations on your purchase of the QED Pulse Induction metal detector. The QED-PI has been engineered specifically to make your prospecting experience easier and more rewarding.

Whenever you purchase any new technology, there is no point in just looking at it, or putting it away in the wardrobe. You need to explore all the new functions and settings to maximize your understanding and the potential of the device.

If you are an experienced operator, you may find the settings to be different to anything you have previously used. Whether you are a first timer or an experienced operator, your confidence will develop as you master the QED.

Read these instructions carefully to master the QED's full potential. Be confident to alter and adjust your settings over known targets until you have a working understanding of the detector's potential and character.

This detector has an expansive range of possible settings, and as you become familiar with all the functions you will maximize your potential to find gold or relics in even the harshest ground.

Happy hunting

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START UP

As the QED is marketed in various configurations, these Steps are indicative only.

- Step 1:** Connect a suitable coil.
- Step 2:** Insert Batteries or connect Battery Pack.
- Step 3:** Turn Detector ON by pressing the ▲ BUTTON.
Turn ON the remote SPEAKER pressing the button at side of the speaker housing.
- Step 4:** Scroll through adjustment menu item numbers by pressing either ▲▼ buttons.
When on the required adjustment menu item number press ◀▶ button.
- Step 5:** INCREASE variable ▲ or DECREASE ▼
- Step 6:** To return to variable menu press ◀▶ button.
- Step 7:** To turn detector OFF, press and hold ◀▶ button and current adjustment settings will be saved.
- Step 8:** To reload **Factory Default Settings** turn the detector OFF, then PRESS and HOLD ▼ button while pressing ▲ button.

NAVIGATING THE CONTROL INTERFACE



The ▲ button Triangle image on the control box is the TURN ON BUTTON And INCREASE ADJUSTMENT button.



The ▼ button Triangle image on the control box is the DECREASE ADJUSTMENT button.



TOGGLE between menu Item Select and menu Item Adjust. Press and hold the button to TURN OFF the detector.

INPUT CONNECTIONS



Stereo Headphone 3.5 mm socket.



Power lead socket.



Note the detector is designed to run a battery voltage of 10 Volts maximum and 6 Volts minimum.

DISPLAY



The display is an all lighting conditions 3 Digit LED Backlit LCD display.

MENU OPTIONS

1:GND BAL	6:SMF
2:THS- A	7:BAT
3:THS- B	8:PITCH
4:GAIN	9:SMR
5:MODE	

CONTROL COMMANDS

TURN THE DETECTOR ON Ensure the battery power lead is connected to the power lead socket on the control box. PRESS the ▲ Button, once to turn on the detector.

CYCLE THROUGH MAIN MENU OPTIONS PRESS either the ▲ Button, or the ▼ Button to toggle through the Main menu options (1 to 8)

TOGGLE BETWEEN A MENU ITEM NUMBER OR ADJUST VARIABLE PRESSING the ◀▶ Button toggles between displaying menu item number or a variable adjustment.
A single central digit is the menu item number.
Three digits indicates variable adjust mode.

INCREASE OR DECREASE A VARIABLE (eg. GND BAL) PRESS the ▲ Button to Increase a variable number.
PRESS the ▼ Button to Decrease a variable number.

TURN THE DETECTOR OFF PRESS & HOLD the ◀▶ Button for 3 seconds.

FACTORY RESET **NOTE: The Factory Reset can only be performed with the detector switched OFF**
PRESS & HOLD the ▼ Button then PRESS the ▲ Button for 2 seconds, then release the ▲ Button.

MENU CONTROLS :: GND BAL


1: GND BAL (GROUND BALANCE)

(Setting range is 1-200 with default setting at 100)

The detector will respond to the natural mineralization of the soil and provide the operator with false signals. It is necessary to Ground Balance the detector to only register the signals generated by metal targets.

The Ground Balance procedure is as follows.

AUTO GND BAL (GROUND BALANCE)

Turn ON the detector; PRESS the  button on option menu number 1 to open the GND BAL (Ground Balance) setting.

1 Hold the coil about 15" off the ground, press and hold the AGB button while lowering the coil

2 The GB Button MUST be released when the coil is about 1" from the ground.

This first procedure is always required if the current GB setting is far different from the current ground


3 Take note of which direction (up or down) of the Ground Balance number changed


4 For minor GB adjustments press and hold the GB button and bob the coil up and down to the ground

5 If a minor precision adjustment is required use the manual GB procedure aided by procedure 3

Note: Do not hit the search coil with the ground surface as this can produce unexpected results when trying to ground balance the detector.

When the tone has faded to a minimum, the detector will be ground balanced.

If the audio on the downwards motion is a LOW tone/pitch increase the GND BAL by pressing the  Button

If the audio on the downwards motion is a HIGH tone/pitch decrease the GND BAL by pressing the  Button

UNABLE TO GND BAL

If the ground balance is too difficult to achieve or after setting the ground balance the detector becomes noisy for no apparent reason. Try a MODE setting 6 to 8 as this will help reduce the feedback from hot mineralisation pockets of ground.

Furthermore keeping the search coil 1" off the ground can help stabilize the detector at the cost of losing some sensitivity on some targets.

Higher Mode settings can reduce audio response on very small targets.

Refer Page 11 for ADVANCED GB technique

MENU CONTROLS :: THRESHOLD B - BIAS

2: THRESHOLD B

(Setting range is 1-99 with default setting at 50)


Note: BIAS can change slightly overtime depending on temperature.

When the detector is Ground Balanced the audio volume will be very low.

Lowering the BIAS will accentuate rising pitch targets (generally a small target) When prospecting for fine gold fit a small coil and adjust the BIAS accordingly to suit the coil using a known specimen target.



Raising the BIAS will accentuate falling pitch targets (usually large targets) When prospecting for larger specimens fit your selected coil and adjust the BIAS to suit your selected coil.

NAVIGATING TO BIAS


PRESS the  button on option menu number 2, to open the BIAS setting

BIAS NEUTRAL POSITION

Locating the “Neutral Position” which is determined by raising and lowering the BIAS and taking note of the numbers.

Start by raising BIAS with the  button until it the BIAS starts to get to a certain volume level e.g. 58. Then lower the BIAS with the  button until you get the same volume level e.g. 44. The example range is 58 less 44 = 14. Halve the 14, which becomes 7. Add 7 to 44 = 51.

SMALL SEARCH COILS


Once the neutral position has been located, decrease the BIAS with the  button until a slight threshold volume is created. This will boost target responses for smaller targets in the ground.

Use a test target of say 0.2g. If the 0.2g is louder and more noticeable, then BIAS has been achieved for better detection on smaller targets.

MEDIUM SEARCH COILS

Once the neutral position has been located, leave the BIAS at the neutral position to achieve a good even target response on both smaller and larger targets in the ground. Raise VOLUME (Menu Item #3) to create desired audio threshold volume.

LARGE SEARCH COILS

Once the neutral position has been located, increase the BIAS with the  button until the desired threshold volume is created. This will boost target responses for larger targets in the ground.

Use test target of approx. 0.2g. If the 0.2g is faint or undetectable, then BIAS has been achieved for better detection on larger targets.


MENU CONTROLS :: THRESHOLD A - VOLUME


3:THRESHOLD A


(Setting range is 1-90)

The VOLUME control in conjunction with the BIAS controls the detector's audio signal. Best results can be achieved by using a selected coil and MODE to suit either large or small targets, setting VOLUME low and using an appropriate BIAS to set the audio Threshold or setting BIAS to neutral and use VOLUME to create desired threshold.

ADJUSTING VOLUME

PRESS the  button on option MENU number 3 to open the VOLUME setting

Increase the VOLUME number with the  button.

Decrease the VOLUME number with the  button

MENU CONTROLS :: GAIN

4: GAIN

(Setting range is 1-10 and factory pre-set is 1)


GAIN amplifies target response, ground & mineral noises and EMI.

GAIN only marginally improves detection depth. For better depth penetration use a larger search coil.

Set GAIN as high as possible. If ground becomes noisy or impossible to detect or recognise a target in audio, check ground balance or reduce GAIN until stable .

Note: Ensure that GAIN is re-checked often, usually after a Ground Balance as mineralised ground may allow a higher GAIN setting depending on the prevailing ground conditions.

ADJUSTING GAIN

PRESS the  button on option MENU number 4 to open the GAIN setting

Increase the GAIN number with the  button.

Decrease the GAIN number with the  button

MENU CONTROLS :: MODE

5: MODE


(Setting range is 1-15)

The MODE function matches the search coil to the detector's receive circuitry. If the mode is increased the sample delay time is also increased which decreases detection distance on tiny targets but also improves ground handling ability. Some search coils may need a higher or lower mode number to run better in certain grounds, with good target response.

ADJUSTING MODE

In order for MODE to work correctly the detector first needs to be Ground Balanced. See Page 6 on how to ground balance.

Note: BIAS and other settings should be set after MODE has been configured.

PRESS the  button on option MENU number 5 to open the MODE setting

Increase the MODE setting with the  button.

Decrease the MODE numbers use the  button.

MODE 1 has the shortest sample delay and provides the best performance in less mineralized ground with a small coil on small targets.

Note: Some coils may require increased MODE if adjusting the DELAY cannot achieve GROUND BALANCE.

MODE 15 is best used in extremely mineralized ground to help reduce ground feedback noises at the cost of losing some smaller targets.

NOTE :

Use the lowest MODE number that the ground will allow

If the ground is very hot or changeable don't hesitate to increase MODE to 15

Note higher MODE numbers are more susceptible to EMI.

MENU CONTROLS :: SMF

6: SMF


(Static Magnetic Fields)

(Setting range is 1-100 with default setting of 50)


As a search coil is swung through the Earth's magnetic field

(Static Magnetic Field) an undesirable signal is generated in the search coil particularly when detecting vertically up the sides of banks or cuttings. The factory pre-set setting is 50 is used to minimize this signal. Further, if as a result of the ageing of electronic components the SMF cancellation can be adjusted. To adjust SMF use a large coil and swing the coil vertically as when detecting vertical creek banks. Adjust SMF up or down to minimize any signal fluctuation.

ADJUSTING SMF

PRESS the  button on option MENU number 6 to open the SMF setting.

Increase the SMF number with the  button.

Decrease the SMF number with the  button

MENU CONTROLS :: BATTERY

7: BATTERY

Displays the battery range from ~5.98 - 9.99 Volts

The detector is designed to run on a battery voltage of **10 Volts maximum** and 6 Volts minimum.

To protect rechargeable batteries, the detector will automatically turn off when the battery voltage is below 6 Volts.

Note: If the detector shuts off due to low battery then current settings will NOT be automatically saved.

Further, the REMOTE SPEAKER needs to be turned ON / OFF independently. The speaker contains 3/AAA batteries that can be replaced after carefully separating the speaker body and speaker base.

MENU CONTROLS :: PITCH

8: PITCH

(Setting range 1-50 with default setting of 25)

To alter the Audio Pitch to the Operator's preference

INCREASE the **PITCH** number with the ▲ button.

DECREASE the **PITCH** number with the ▼ button.

This usually only need to be done when the Operator is happy with the setting.

Take note of the desired number as "Factory Defaults" will reset the value to 25.

MENU CONTROLS :: SMR

9 : SMR

The default value is 107 Adjusting SMR can be used to null out 50Hz mains EMI that is off frequency.

It may also be used to null out other rhythmic EMI sources.

ADVANCED GROUND BALANCE TECHNIQUE

When detecting extremely variable ground there is a method to prevent wasting time digging "ground noises." While swinging the coil take note of the response to determine either rising or falling pitch.

If the **pitch rises**, toggle the GB DOWN 4 counts (or UP 4 counts if the **pitch falls**) then swing over the patch again. If the signal has diminished or has disappeared then don't bother digging, it's a ground noise. Restore GB to previous value and continue detecting.

FERRITE EMI SUPPRESSORS



Included in the base package are 2x ferrite EMI suppressors as required by Australian Law. One ferrite EMI suppressor needs to be fitted to the search coil plug inserting into the detectors control box for each coil intended to be used with the detector.

SEARCH COIL TYPES

The QED detector can use most MONO Search Coils and will perform poorly if a DD Search coils is used.

CHANGING BATTERIES

The Batteries are to be fitted directly into the Battery compartment at the rear of the main box

Note: Both batteries should be fitted with Pos + to the top of the compartment as per pictorial

Remove the batteries and charge with the supplied charger.

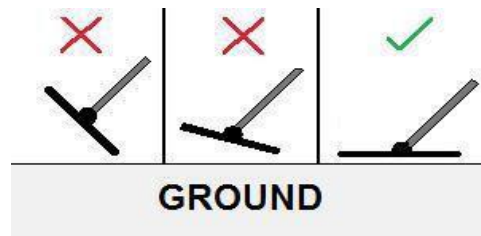
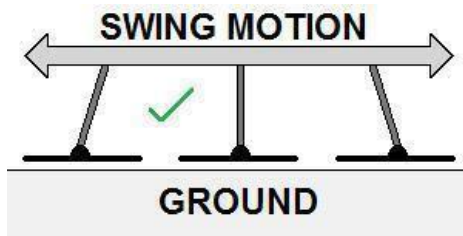
Never leave charging batteries unattended.

Additional Batteries to increase run time can be plugged directly into the socket above the Battery compartment.

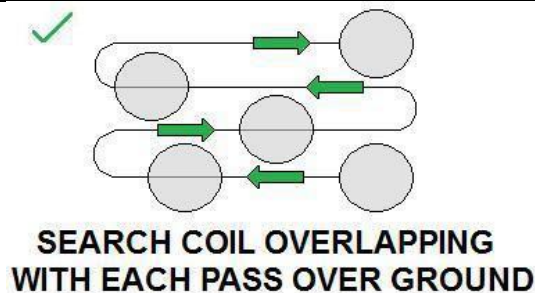
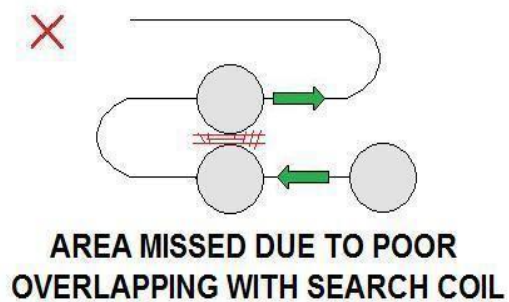
HOW TO SEARCH THE GROUND

First Turn the detector ON and follow the GND BAL (Ground Balancing) procedure to get the quietest response from the areas ground conditions. Adjust any other settings to your preference.

Keep the search coil parallel and as close to the grounds surface as possible, raising the search coil too far from the grounds surface will reduce depth and can eliminate target sensitivity.



Sweep the search coil in a slow pattern as illustrated below (with the green tick) will maintain a more parallel relationship between the ground surface and the search coil; furthermore ensure the Searchcoil flows with the ground structure and make sure the search coil overlaps some of the swing area from the previous sweep over that ground.



Note: If swinging a small search coil past a distance wider than each of your bodies left and right arms can result in a missed area due to poor overlapping, broader footsteps can also have the same result.

TECHNICAL SPECIFICATIONS

A single channel Pulse Induction metal detector using a differential integrator as the null summation / averaging means to null the ground and static magnetic fields.

The method is based on the published papers or lapsed patents of the early pioneers Eric Foster, Chapman and Howells and more recently the lapsed patent of Dr. George Paltoglou and Australian Innovation Patent AU2010101019.

The front end blocking circuitry is US Patent Pending by Dave Emery and is used under license.

Average current consumption 450mA, voltage limits 6v min to 10v max.

Audio PWM VCO & VCA.

Digitisation method Bipolar Integrating (200uS) ADC

Display, 3 digit LED Backlit Transflective LCD

MANUFACTURER'S WARRANTY

If within one year (12 months) from the original date of purchase, if the QED detector PCB fails due to a genuine fault, INTERFACION Pty Ltd will repair or replace parts at its option.

Manufacturer's Warranty Claim:

- Simply return the control box to the Dealer where you purchased it.
- The unit must be accompanied by a detailed explanation of the symptoms of the failure.
- You must provide proof of date-of-purchase before the unit can be serviced.

Note: Manufacturer Warranty is transferable, which covers one year from the original purchase date, regardless of the owner. Software updates are cost-free to units within the warranty period.

Manufacturer's Warranty excludes:

Any accessory items such as batteries, search coils, straps, cords, shafts, nuts / bolts, external speaker and arm rest, or third-party accessories, shipping/handling costs are not covered by the Manufacturer's Warranty.

Manufacturer's Warranty is voided if damage has been caused by over-voltage batteries or batteries incorrectly fitted with reversed polarity, any accident, misuse, neglect, abuse, alterations, modifications, unauthorized service, or prolonged exposure to heat, corrosive compounds, water, including salt water.

Note: All transport costs will be the customer's responsibility. Manufacturer's Warranty does not cover postal, courier charges or any transport cost to and from customers, service centres or dealers.

This manual may be updated over time.

