Triax Vibration Meter

Operating Manual

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Contents

Chapter 1

Introduction

Thank you for purchasing your Triax vibration meter from Cirrus Research plc.

Your new Vibration meter is at the forefront of design and technology and yet has been developed for seamless intuitive operation without the unnecessary complexity of traditional vibration meters.

It boasts a high-resolution large colour LCD with simple and clear visual data representation, has advanced data recording capabilities which records your data to the large internal memory at your disposal.

Equipped with a simple plug in accelerometer, carry strap and a responsive membrane keypad all housed in an elegant, balanced and practical case which has been specifically developed for this application. The case, accelerometer and cable are all designed for industrial use.

Operation of your Triax is simple and requires minimal button pressing. To start recording, simply power the instrument and start recording.

The Triax provides you with choice when it comes to analysing your data, meaning you can always choose the most effective solution for your needs.

The USB flash drive supplied with your instrument contains the latest free version of software, Triax Analysis Pro. Renowned for its simplicity and ease of use, this PC based software is a comprehensive data analysis solution.

With the Triax, combating HAVS and WBV has never been so easy, welcome to the new era in vibration level measurement.

Chapter 2

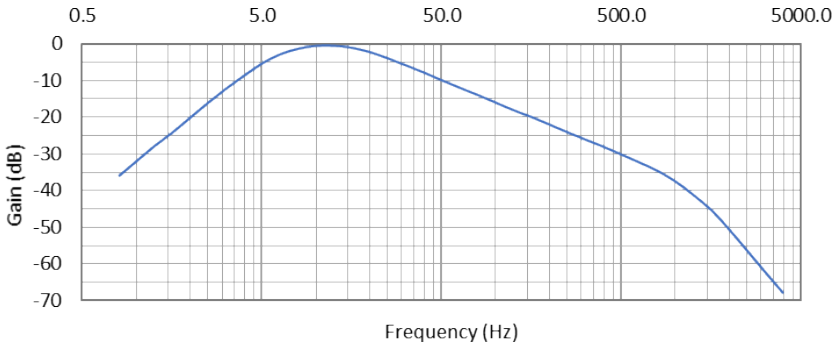
Frequency Weighting Filters

The human body's response to vibration alters depending on the vibration frequency and where the vibration is in contact with the body.

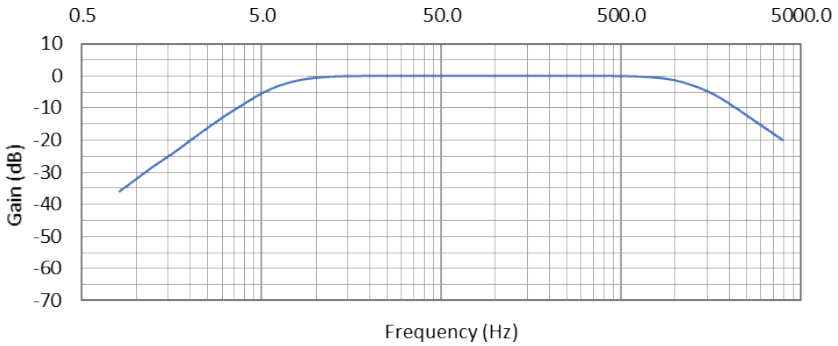
Your Triax Vibration meter has the following frequency weighting filters which are applied to the measured vibration signal using digital processing for superior accuracy.

Hand Arm Vibration (HAVS)

Wh

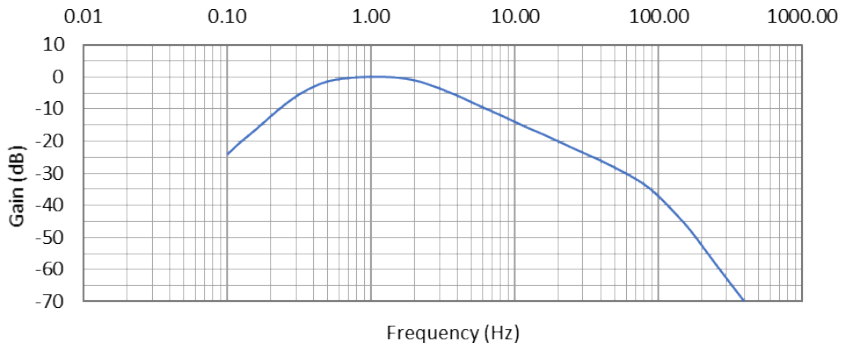


Wh Band Limited

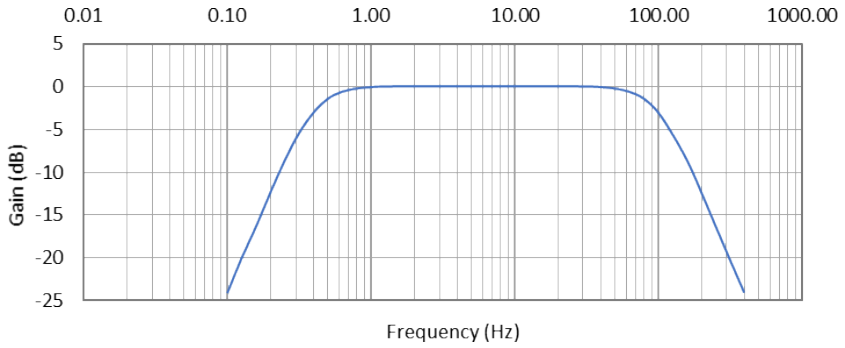


Whole Body Vibration (WBV)

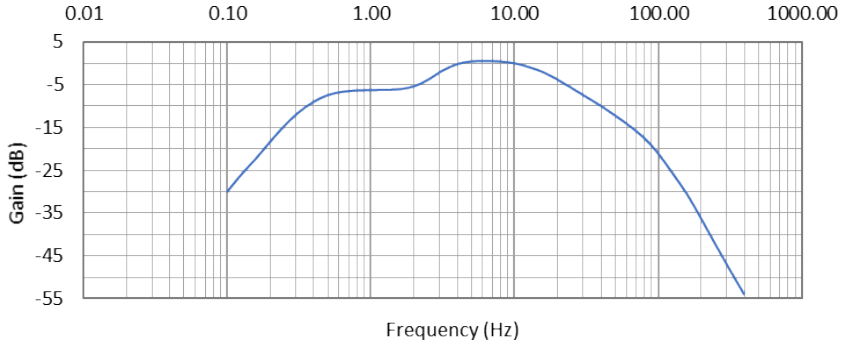
Wd



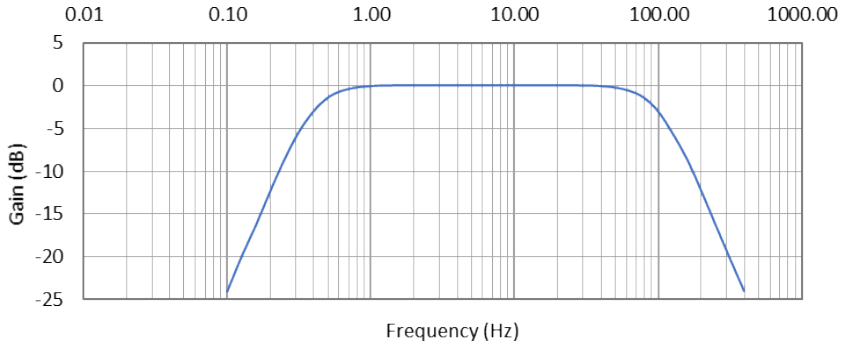
Wd Band Limited



Wk



Wk Band Limited



Chapter 3

Accelerometer Details

Accelerometers by the very nature of their manufacture are precision components that are easily damaged through incorrect use. Great care must be taken when using the instrument to ensure the longevity of the Accelerometer.

Attaching & Removing the Accelerometer

Align the orientation keys between the accelerometer cable and instrument socket, which are easily identified with a Red marking and then gently push the accelerometer cable into the instruments socket.

To unlatch and remove the accelerometer cable gently pull the on the knurled part of the stem and pull the accelerometer from the instrument.

Do not twist the connector, doing so will likely damage internal wiring which would not be covered under warranty.

Removal of the accelerometer can be achieved with the instrument powered on or off.

To prevent damage occurring to your Triax Vibration Meter or your transducer assembly, never attempt to twist the connection point.

Accelerometer Types

The accelerometers for use with the Triax produce a Voltage Output proportional to the signal being measured.

The table below shows the output voltage and specifications for the accelerometer where g is the acceleration due to gravity on the Earth's surface and is defined as 9.80665 ms-2.

Acceleration is measured in metres per second per second (m/s/s) which can be written as either of the following: -

- **ms-2**
- **m/s2**

Hand Arm

CVB202 : 1mV/g +/-500g , 1Hz to 5kHz

	m/s^2	g	ft/s^2
Low	0.20 – 2000	0.02 – 200	0.656 – 6560
High	1.00 – 10000	0.1 – 1000	3.28 – 32800

Whole Body

CVB203: [980.66mV/g] , 0.1Hz to 100Hz , 0.01m/s^2 to 5m/s^2 PEAK

	m/s^2	g	ft/s^2
Single Range	0.01 – 35	0.001 – 3.5	0.0328 – 115

Certifiable Calibration

The calibration process includes the transducer and vibration level meter. Any change in this measurement chain will require a new calibration certificate.

Cirrus Research plc offers a complete calibration service.

It is recommended that your vibration meter instrumentation is calibrated annually to ensure your measuring equipment is completely accurate and fully compliant.

Chapter 4

Vibration Level – General Advice

To ensure measurements are as accurate and as repeatable as possible always ensure that your cable is tightened securely to your accelerometer and that the accelerometer is mounted as securely and as flush as possible to the vibration source. The trailing cable of the accelerometer should also be attached to the vibration source without creating a potential hazard for the operator or other people.

Where possible always mount the accelerometer as near to the center of where the operator holds and grips the vibration source. In reality this is not always possible and the best compromise must be achieved.

Measurement durations are dependent on the vibration source, and a minimum period of 30 seconds for Hand Arm Vibration is recommended. Measurement periods of 3 to 15 minutes are often used for Whole Body vibration. These increased durations will undoubtedly increase the accuracy and repeatability of your measured results.

Hand Arm Vibration Transducer Mounting

The supplied mounting block can be attached to the Hand Arm accelerometer using the supplied screw and tightened using a Hex Key. The mounting block can then be mounted to the vibration source using hose clamps or plastic ties. If plastic ties are used it is recommended that they are tightened using a tie tensioning tool. Attaching devices such as clamps and the accelerometer to hand held devices may alter the mass of the vibration source and will inevitably slightly alter the vibration emitted from the device, it is therefore recommended to keep the mass of hose clips or clamps to a minimum.

Other mounting possibilities to mount the accelerometer to the vibration source are tapping a stud into the vibration source and attaching the accelerometer to the stud.

Alternatively, the stud may be adhered to the device rather than tapped with an adhesive that dries rigid.

Vibration Direction

For Hand Arm vibration, the three axes being measured can be measured in any orientation; however, it is recommended that the suggested axes indicated in the figure below are used. If this is not possible, then choosing other axes orientation is permissible as axes can be swapped from the Channel Setup menu. This will not affect your measured data.

In all cases it is strongly recommended to make notes on the axes used relative to the vibration source. This information will be required if vibration control is to be implemented on the vibration source.

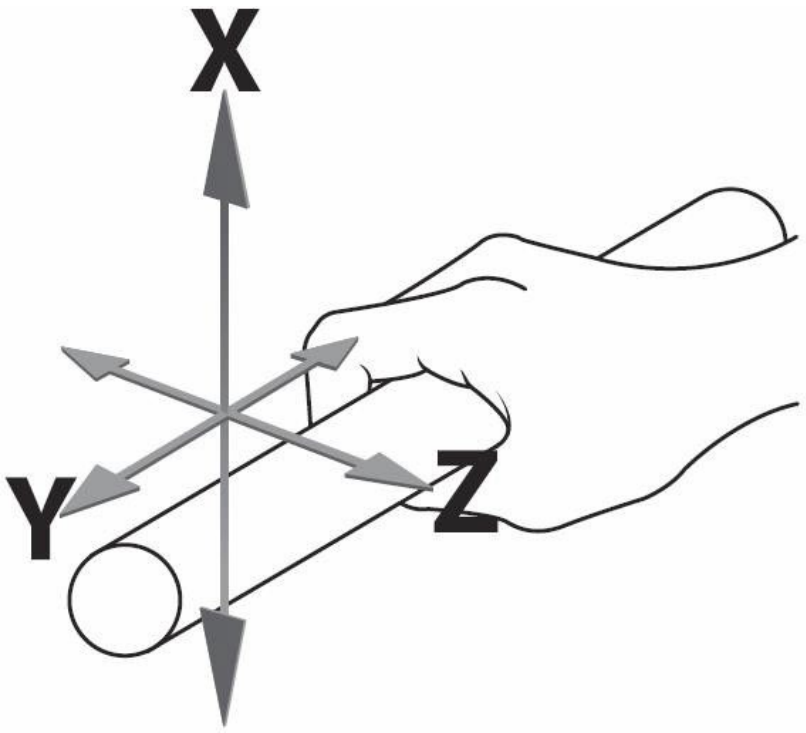


Figure 1: Recommended Axes for Hand Arm Vibration

Vibration Level

In some environments, high levels of vibration may occur. Before you record measurements take the time to ensure you have selected the optimum range for the process being recorded.

The optimum range is generally the lowest range that can be selected that does not produce an overload condition for the process being monitored.

Where high levels of vibration are encountered, the meter may register an overload and in these circumstances the meter will display that this has occurred. In such cases you will need to select the high range to accommodate the higher peak levels and if Overload conditions are still occurring on the high range it may be necessary to use an impact filter on the accelerometer.

If the vibration levels are too low for the range selected then the meter will display an under-range condition. Under these circumstances you will need to select the low range if possible.

For more detailed information see Under Range & Overload Conditions.

Under Range & Overload Conditions

Under Range Condition

An under-range condition occurs when the vibration level is equal to, or lower than the bottom of the current range the meter is set to. If this condition occurs then the UR (Under Range) indicator will be displayed on your instrument. In such circumstances it is highly recommended to change to a lower range with a higher sensitivity as your meter will be out of specification.

The under-range indicator will remain on for a minimum of 2 seconds for Hand Arm vibration and 8 seconds for Whole Body vibration, or while the under-range condition remains.

Overload Condition

An overload condition occurs when either the peak input signal approaches the maximum signal handling of the Analogue to Digital converter or the vibration level which has been set to 95% of its range, or if the vibration level exceeds the top of the selected range by 5%.

When an Overload condition occurs then the OL (Overload) indicator is displayed on your instrument.

If an overload condition occurs it is highly recommended to change to a higher range with a lower sensitivity as your meter will be out of specification.

The overload indicator will remain on for a minimum of 2 seconds or while the overload condition remains. Overload is latched on for a number of measurement parameters, this can be cleared with a short key press of the Power key during Real Time operation. During recording the OL latch cannot be reset.

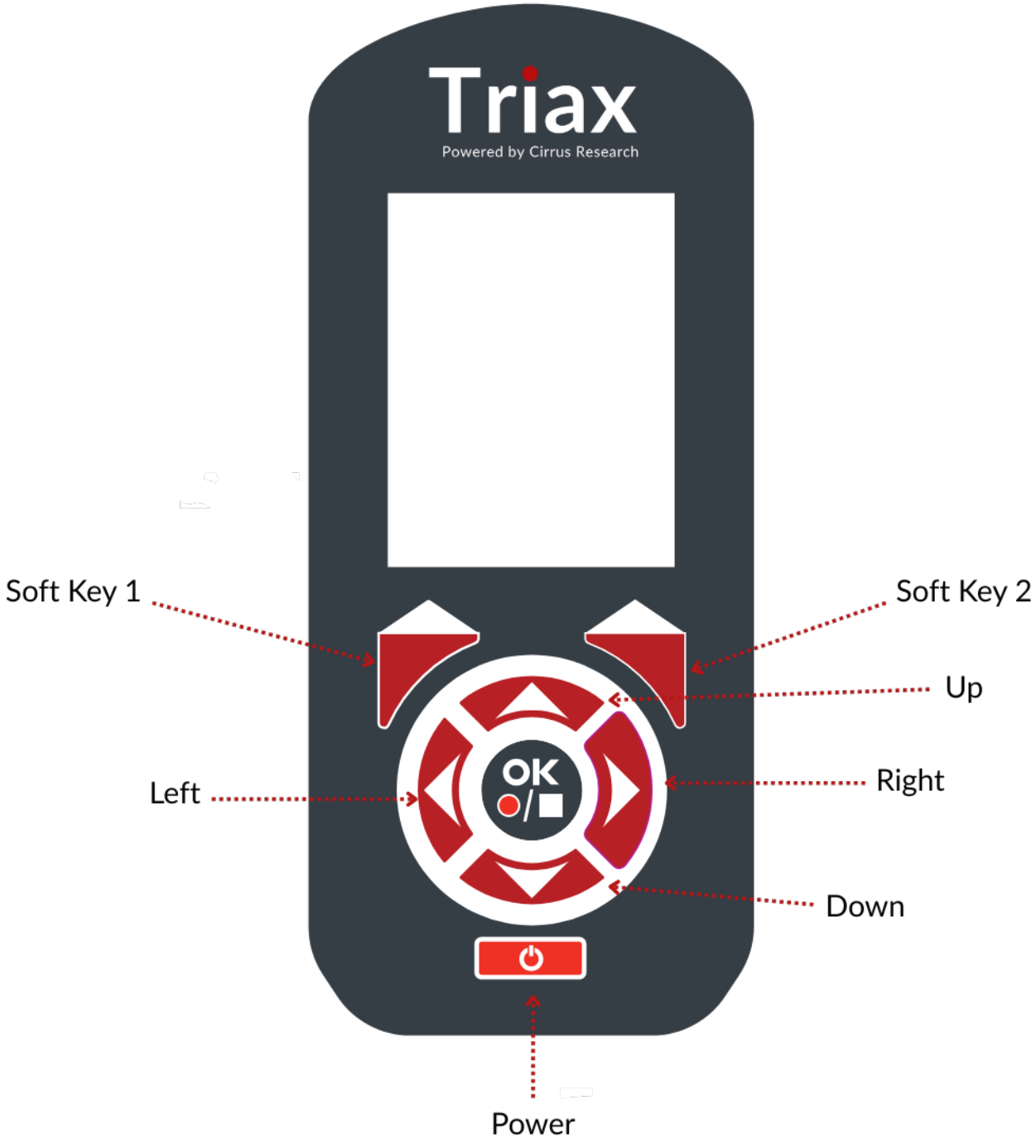
Please be aware that the selected frequency weighting may attenuate the displayed signal level below the overload triggering point but an overload can still occur. This is because the overload operates from the unweighted input signal.

Chapter 5

Getting Started

Keypad Layout

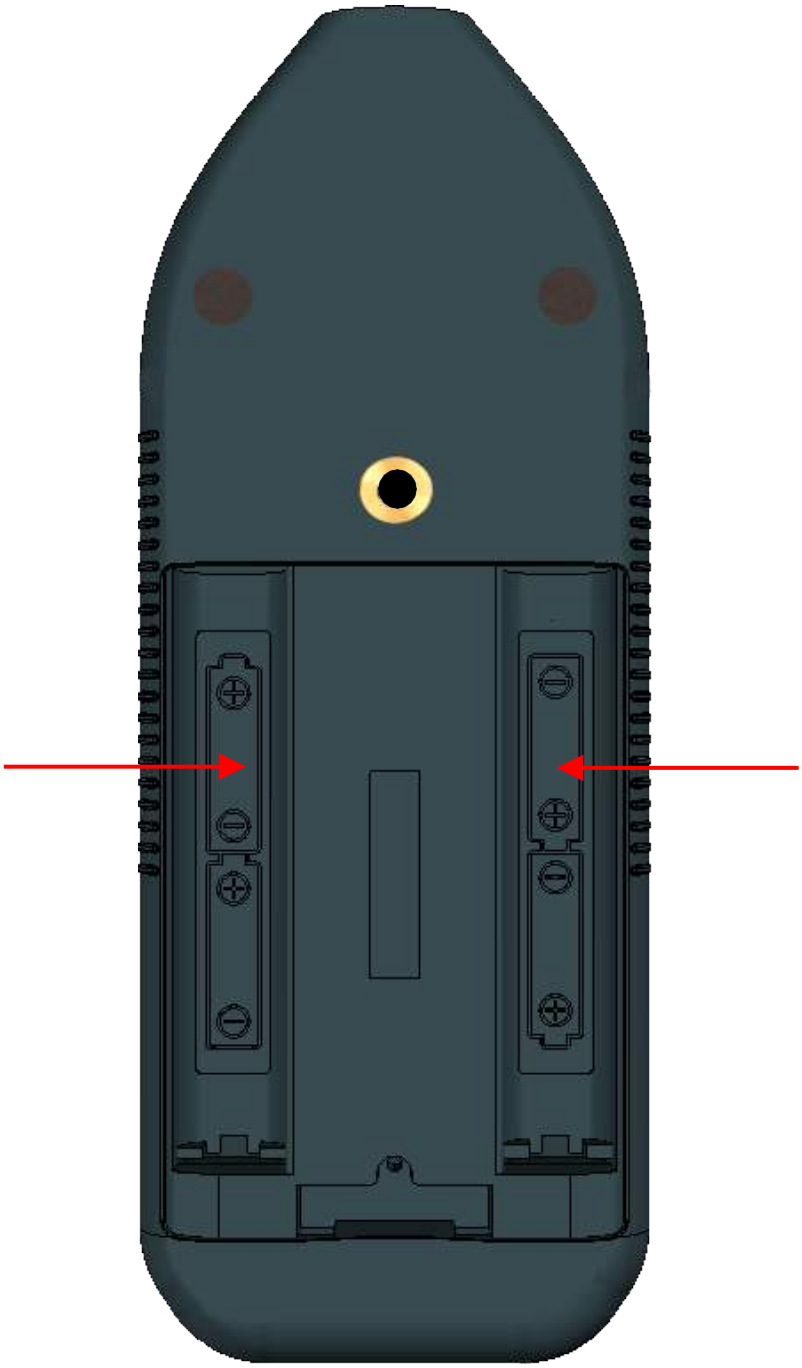
Please note that some keys have a dual function.



Powering your Triax Vibration Meter

Your Triax Vibration level meter can be powered from four 1.5V AA size batteries or the micro USB connection via a USB port or similar.

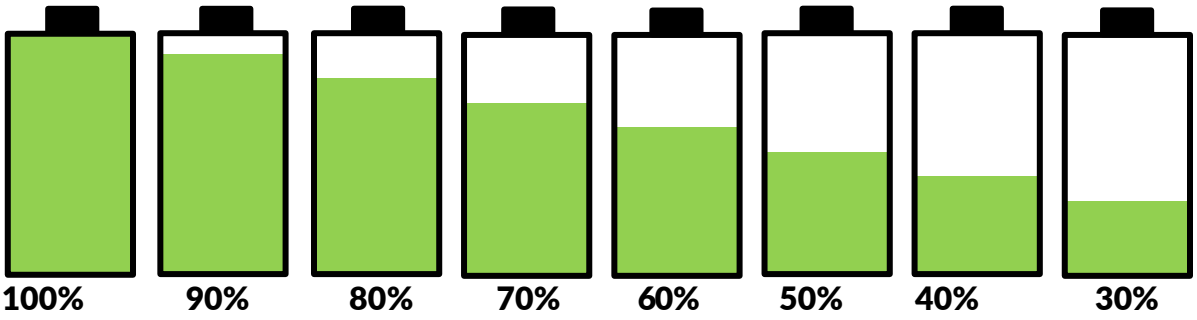
The battery compartment is located at the rear of your Vibration meter, remove the battery door and insert the batteries using the correct polarity which is shown where the batteries are fitted and indicated in the image below: -

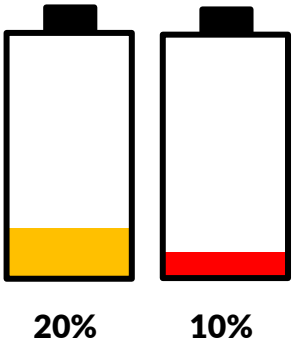


Replace the battery door securely before using the instrument.

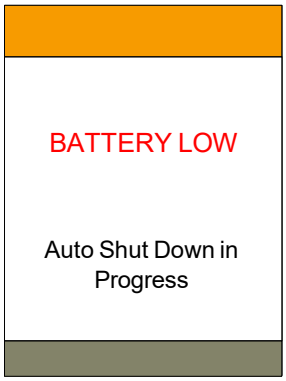
Battery Level Indicator

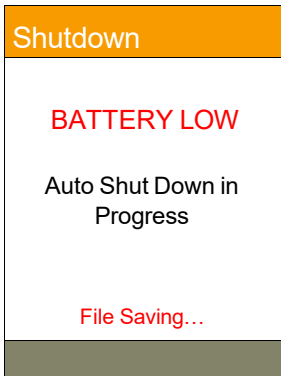
The Triax Vibration Meter is equipped with an approximate multi-level batter indicator as shown below: -

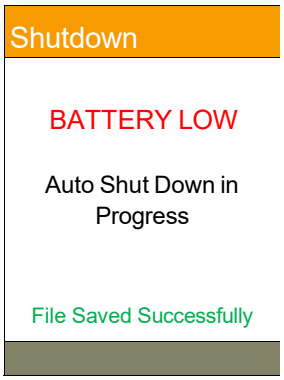




At approximately 5% charge the battery indicator will show flash RED, if the batteries are not replaced the unit will automatically shut down and save the recording if necessary.







Switching the Triax On/Off

In all power configurations press and hold the Power Key **for approximately one second to switch the instrument on.**

To switch the instrument off, hold the Power Key **down for approximately two seconds and follow the on-screen instructions.**

Auto Power Off

If no key is pressed within three minutes of switching the vibration level meter on, then the unit will automatically power down.

Some screens displayed may not be available on your instrument, depending on your model.

Instrument Icons

Several icons are used on the Triax Vibration Meter to easily identify the functionalist or useful settings of the instrument: -

LOW	Low Measuring Range Active
HIGH	High Measuring Range Active
	USB Active
	Battery Charge
	Recording Data Active
	File Review Active
HAV	Hand Arm Accelerometer Attached
WBV	Whole Body Accelerometer Attached
	More Measurement Screens Available to View

Icon Location

The top orange bar on your VibA(8) instrument displays most of the information icons, the current time, date, measurement range and the current screen selected: -

The bottom grey bar will display the Record or File Review symbols in a similar position to the image shown below. Note that the image below may have different values to those on your display: -

Chapter 6

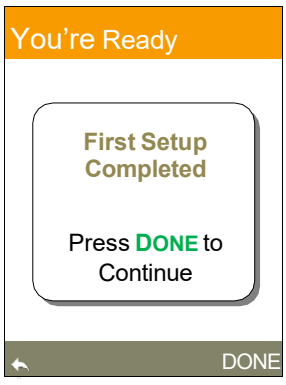
Using Your Triax

First Time Setup

When powering on your meter for the first time, the instrument will take you through a number of windows prompting you to confirm some basic settings.

Choose your Language, Date & Time settings by using the Up, Down, Left and Right arrow keys to change the selection, confirm by using Soft Key 2 on each window.

Return to the previous screen at any time by pressing Soft Key 1.



Choose DONE by pressing Soft Key 2 when you're happy with your selection.

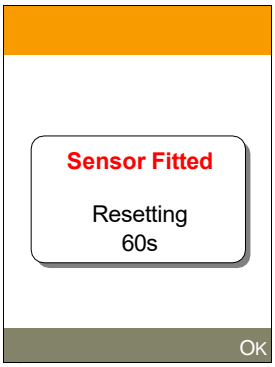
Language options not available on all models.

Accelerometer Fitting

Each time a transducer is auto-detected including if powered on with the accelerometer fitted, then a short delay of 60 seconds occurs to allow the hardware time to settle and adjust to the detected accelerometer.

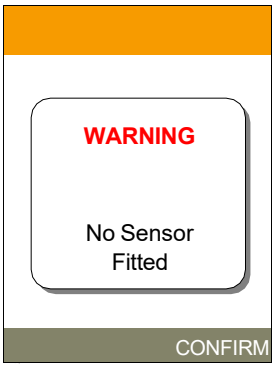
Please wait until the countdown completes before measurements are taken.

Bypassing the delay by pressing Soft Key 2 labelled OK allows access to the menu system, however it is highly recommended to wait 60 seconds before recording data.



Accelerometer Check

If no transducer is detected then regardless of what screen is active, the following is shown and is removed by the detection of an accelerometer or by pressing Soft Key 2 labelled CONFIRM which returns the instrument to the previous screen.



Operation

The Triax vibration meter has three primary operational modes, these are: -

- **Real Time**
- **Recording**
- **File Review**

Each mode can be quickly identified by viewing the bottom bar; Real Time has no icon,

Record has a standard red record symbol and File Review shows a green directional arrow.

Real Time

This is the standard mode of operation for your Triax vibration level meter.

The menu system can be accessed whilst in real time mode and the instrument settings can be changed if required.

Measurement screens are accessible but not all parameters are available whilst real time mode is active.

Use the Up or Down Arrow keys to scroll measurement screens.

Scroll between measurement parameters using the Left or Right Arrow keys. Use Soft Key 2 to swap between measurement ranges.

Press and release the Power Key to reset parameters in Real Time Mode.

Recording

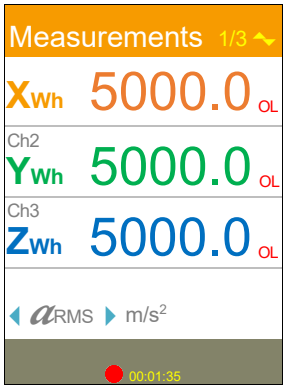
Recording data is achieved by pressing the Record key whilst in real time or playback mode.

The settings for recording are applied under Data Recording under either Hand Arm Setup or Whole Body Setup.

Data Recording under Hand Arm and Whole Body Setup are independent of each other.

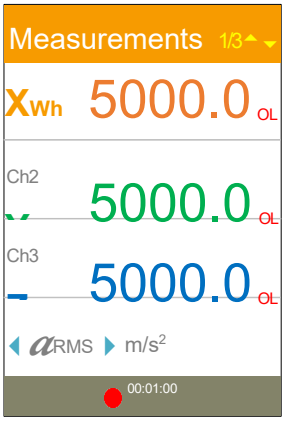
Time History Disables, with or without Duration Timer Set

If Time History is not enabled for the recording, the bottom bar will only indicate the elapsed recording time: -



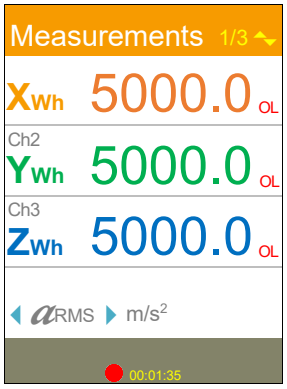
Time History Enabled, with or without Duration Timer Set

When Time History is enabled for the recording, the bottom bar will display the elapsed recording time and the current interval countdown time: -



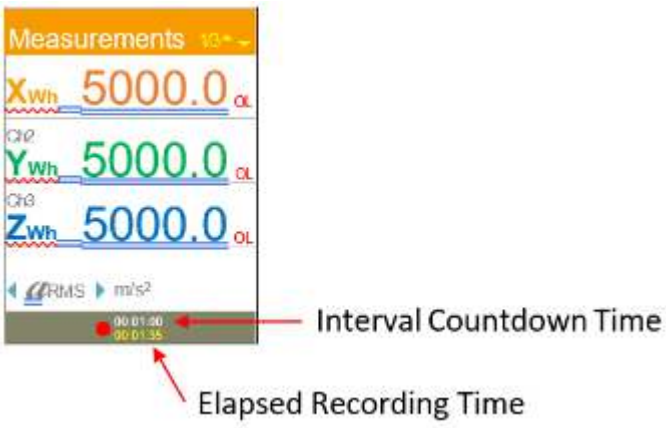
Time History Disabled, Duration Timer Set

When Time History is disabled for the recording but the Duration Timer is enabled, the bottom bar will only display the elapsed recording time: -



Time History Enabled, Duration Timer Set

When both Time History and Duration Timer are enabled for the recording, the bottom bar will display the elapsed recording time and the current interval countdown time: -



Stopping an Active Recording

Pressing the Stop key during an active recording will display the available options.

Save

Select Yes by pressing Soft Key 2.

Don’t Save

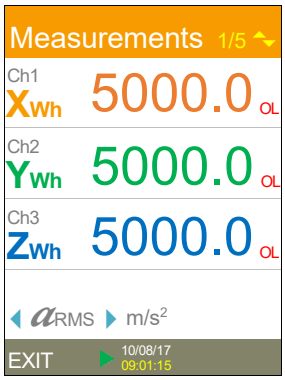
Select No by pressing Soft Key 1 to return to Real Time mode.

File Review

File Review can be accessed by either manually loading a file under File Manager or by enabling the Auto Playback function (see below).

File review allows you to view measurement information for any recordings saved on your instrument.

The main File Review screen displays general measurement information, as shown below.



You can scroll through other measurement screens as normal using the Up and Down arrow keys to view parameter information.

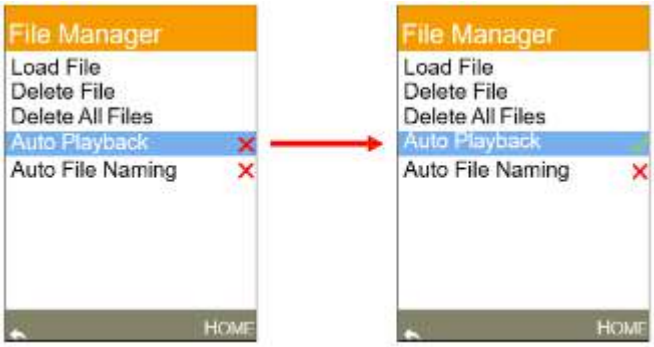
Exit

Select Exit using Soft key 1 to quit File Review and return to Real Time mode.

Auto Playback

Auto Playback is located in the File Manager section of the Main Menu, and can be enabled or disabled by pressing OK.

When enabled, after a recording has been saved, your Triax will automatically enter File Review instead of returning to Real Time mode.



Chapter 7

Software

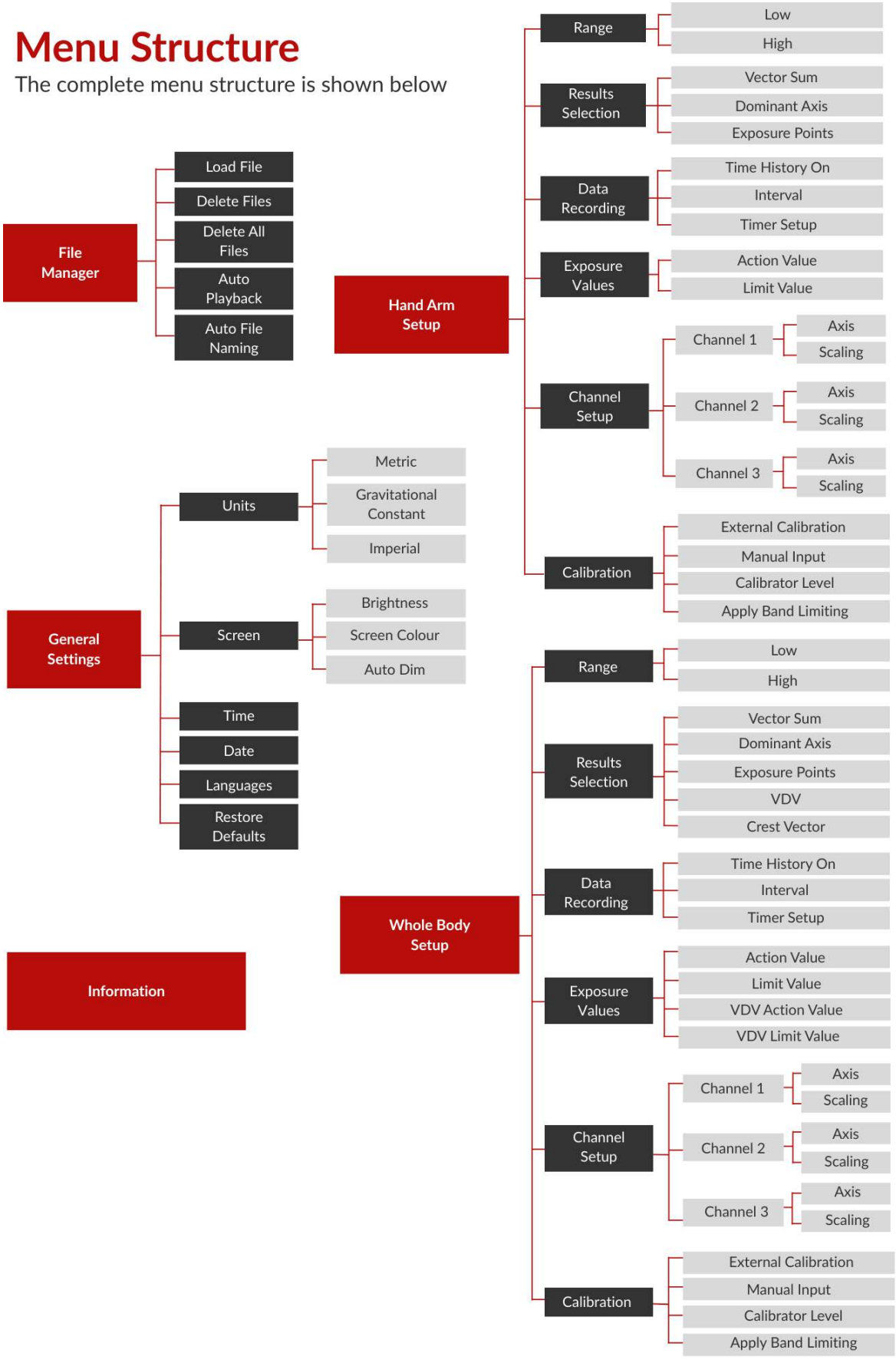
The Triax presents you with the perfect option for data analysis software; The PC based software Triax Analysis Pro. This provides a simple and free data analysis solution.

Further information can be found in the Triax Analysis Pro manual.

Chapter 8

Menu Structure

The complete menu structure is shown below



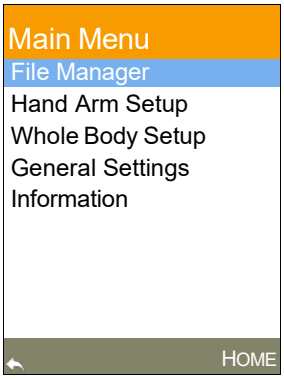
Menu Navigation & Settings

The Main Menu can be selected using Soft Key 1 when labelled as Menu.

On most screens within the Triax menu system, Soft Key 1 can be used to go back to the previous screen, this will be displayed using the symbol when available.

Similarly, Soft Key 2 can be used to go back to the measurement screen; this will be displayed as Home when available.

The Main Menu is not available when the vibration level meter is recording: -



Scroll the available options using the Up or Down Arrow keys, press OK to choose the highlighted section.

Hold down the Directional Arrow keys to rapidly amend or scroll selections.

File Manager

Select File Manager to load saved files, delete saved files and toggle Auto Playback off/on.

Option availability will depend on data files being saved: -

No Files Saved

Files Saved

Scroll the available options using Up or Down Arrow keys, press OK to choose from the following: -

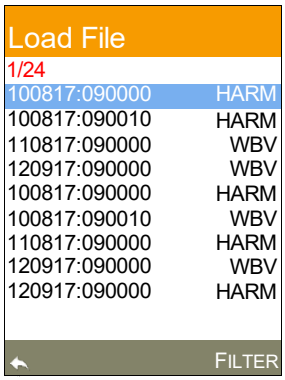
- **Load File**
- **Delete File**
- **Delete All Files**
- **Auto Playback**
- **Auto File Naming**

Load File

Scroll the saved data files using the Up or Down Arrow keys, press the OK Key to open the selected file in File Review mode.

The file number and total number of data files saved are located at the top left-hand side of the list.

The Left or Right Arrow keys can be used to scroll the data files by page.

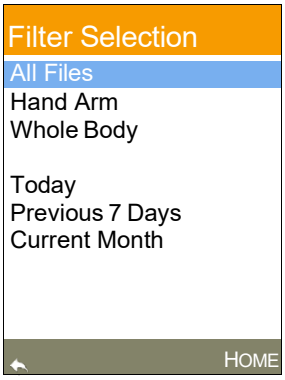


Press Soft Key 2 labelled Filter to open a new window for file filtering options.

Filter Selection

Filter the list of saved data files by the selections made.

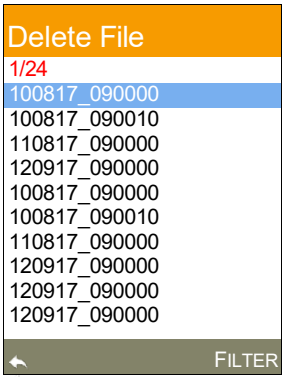
Scroll the options using the Up or Down Arrow keys to press the OK key or the Left, Right Arrow keys to toggle each available option.



Only one option from All Files, Hand Arm and Whole Body can be selected at any time. To be used in conjunction with Today, Previous 7 Days and Current Month.

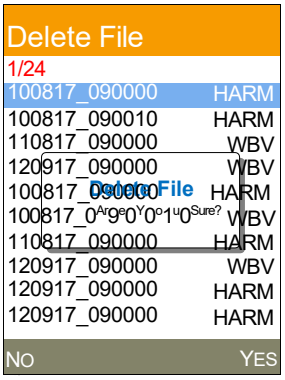
Delete File

Choose Delete File to delete one individual recording.



Scroll the available data files using the Up or Down Arrow keys, press OK to select the file to delete.

The Left or Right Arrow keys can be used to scroll the data files by page.

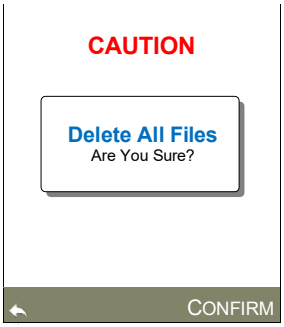


Press Soft Key 1 labelled Yes to delete the selected file.

Press Soft Key 2 labelled No to cancel.

Delete All Files

Choose Delete All Files to delete all data recordings.



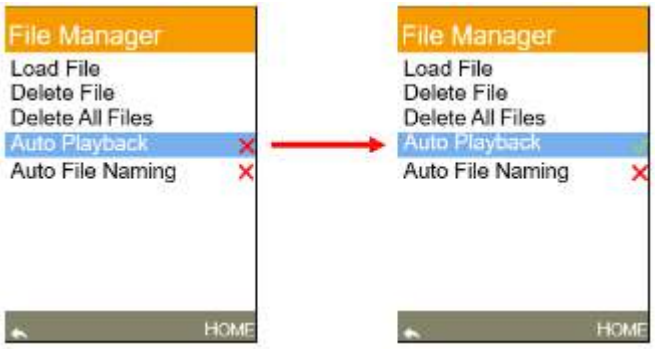
Press Soft Key 1 to cancel and go back to the previous screen.

Press Soft Key 2 labelled Confirm to delete all files.

Deleted files are unrecoverable.

Auto Playback

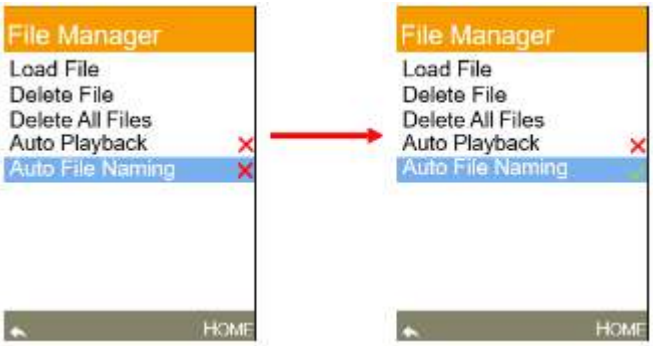
When enabled, after a recording has been saved, your Triax will automatically enter File Review instead of returning to Real Time mode.



Press the Left, Right Arrow keys or the OK key to toggle the selection.

Auto File Naming

When enabled, after a recording has been stopped, if the file is saved then your Triax will automatically save the file and give it a file name. The filename is based on the Time and Date at the start of the measurement.



Press the Left, Right Arrow Keys or the OK Key to toggle the selection.

Hand Arm and Whole Body Setup

Select either Hand Arm Setup or Whole Body Setup depending on the accelerometer you are using to change your recording settings and how information is displayed.

Scroll the available options using the Up or Down Arrow keys, press OK to choose the highlighted selection.

Range

Select Range to change the measurement range applied to each measurement.

Scroll through the available options using the Up or Down Arrow keys and use the Left or Right Arrow keys to amend the selection.

Depending on the accelerometer attached and unit selection the ranges may change.

Results Selection

Select Results selection to change the results displayed in the playback screens.

Hand Arm

Whole Body

Data Recording

Select Data Recording to enable Time History and to choose any time interval periods required.

The time periods recorded by the instrument are determined by the Time History settings, the settings made within the Timer Setup or by the user manually stopping the recording.

If the Total Recording Time has been set under Timer Setup, this will be shown on the Data Recording screen as the Total Recording Time. If no settings are made with Timer Setup, then Not Set will be shown.

Scroll the available options using the Up or Down Arrow keys.

Press OK or the Left, Right Arrow keys to toggle Time History On.

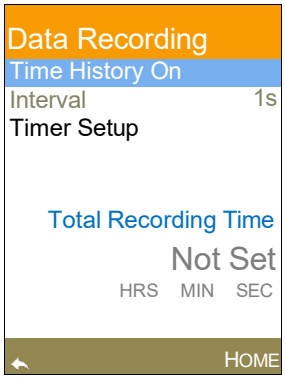
Use the Left or Right Arrow keys to amend the value for the Interval time setting.

Press the OK key to select Timer Selection.

Time History On – Disabled

If Time History On is disabled, then all data recordings made will not contain any Time History data and the Interval settings become unavailable.

In this case, the instrument will record one set of measurements over the total measurement time.



Interval

When Time History On is enabled, each recording will calculate data over the Interval time selected.

The available options for Interval periods are as follows: -

- **1s, 10s, 1m, 5m, 10m, 15m, 30m, 1hr, 8hr, 12hr**

Calculations over Interval Periods are not displayes on screen

Timer Setup

Choose Timer Setup to set the overall automatic recording length.

Press OK to enable the Timer.

Use the Up or Down Arrow keys to highlight Edit and then press OK to edit the Timer Record Length.

Use the Left or Right Arrow keys to move and highlight the selection to change. Use the Up or Down Arrow keys to amend the selection. The Timer Record Length can be used with or without Time History enabled.

The settings can be amended as shown below: -

- **00 to 23 HRS, 00 to 59 MIN, 00 to 59 SEC**

Once a recording is started, it will run for the set Timer Record Length and will then stop. If Auto File Naming is selected the file will save automatically, otherwise the file naming screen will be shown.

If the file is stopped before the end of the set Timer Record Length then the measurement will be stopped and a Save File? window will be shown. To save the file press Soft Key 2 labelled YES. If Auto File Naming is selected the file will save automatically, otherwise the file naming screen will be shown.

Exposure Values

The Exposure menu allows you to alter how your Triax records Exposure data.

Scroll the available options using the directional Arrow keys and press the OK key to change the highlighted selection.

Hand Arm Values

The default values for Hand Arm Exposure Values are 2.5m/s² and 5.0m/s² for the Action and Limit values respectively, according to EU and UK law. Please refer to your local legislation to determine the correct values to set these to.

Whole Body Values

The default values for Whole Body Exposure Values are 0.5m/s² and 1.15m/s² for the Action and Limit Values respectively, according to EU and UK law. Please refer to your local legislation to determine the correct values to set these to.

The whole body exposure values will also require a VDV Action value to be set at 17.0m/s² and a VDV Limit value to be set at 17.0m/s². These are set according to the current UK guidance but can be changed to suit your local legislation.

Channel Setup

The Triax also allows the user to modify the channel settings. Changing these settings is advised for advanced users only.

Use the Up or Down Arrow keys to scroll the selection.

Axis

Use the Left or Right Arrow keys to change the Axis.

This advanced option allows the user to swap the direction of accelerometer axes inputs to allow for custom fitment of the accelerometer.

Scaling

Use the Left or Right Arrow keys to change the Scaling.

This advanced option allows the user to change the scaling factor applied to each axis for Whole Body Vibration only.

Default values are X, Y = 1.4 and Z =1.0

Scaling is not available for Hand Arm Vibration.

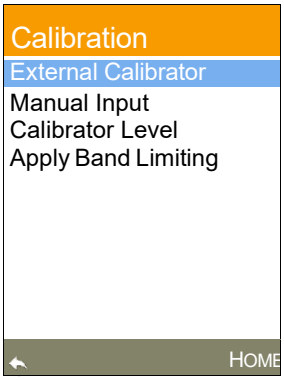
Calibration

Select Calibration to calibrate your Triax vibration level meter.

It is recommended that the calibration procedure is undertaken prior to, and after measurements have been taken using the Castle GA606 vibration calibrator.

The Triax features three alternatives for field calibration, these are as follows:

- **External Calibration**
- **Manual Input**
- **Calibrator Level**



Simply use the Arrow keys to highlight the calibration option you wish to use and select with the OK key. The appropriate calibration screen will then appear.

You may also toggle the Apply Band Limiting option in this menu; doing so will apply a band limited filter to all channels. Band limiting filters are useful for calibration and testing.

External Calibrator

Use the Up or Down Arrow keys to scroll the selection.

Use the OK key to choose the selection and begin the calibration to the set Calibrator Level for the selected channel / axis.

The message Calibrating Please Wait is shown until the calibration is complete.

A message displaying Calibration Passed will appear on a successful calibration, if unsuccessful a Calibration Failed will appear.

Manual Input

Use the Up or Down Arrow keys to scroll the selection.

Use the OK key to choose the selection.

Use the Left or Right Arrow keys to change the selection and move the cursor. Use the Up or Down Arrow keys to amend the value of the selection.

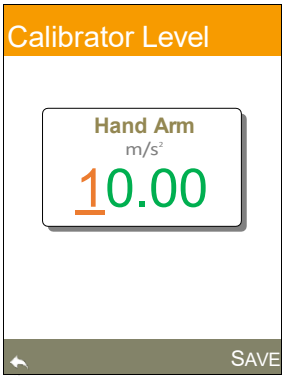
Press Soft Key 2 to save the axis offset.

These values can be found on the calibration certificate provided with your VibA(8) vibration meter.

Calibrator Level

Use the Left or Right Arrow keys to change the selection and move the cursor.

Use the Up or Down Arrow keys to amend the value of the selection.



For Hand Arm vibration the limits are as follows: -

- **00.00 to 99.99**

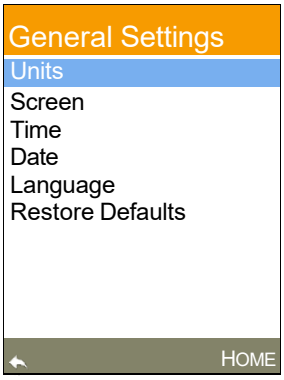
For Whole Body vibration the limits are as follows: -

- **00.00 to 99.99**

Press Soft Key 2 to save the Calibrator level.

General Settings

Select General Settings from the main menu to access instrument settings.



Scroll the available options using the Up or Down Arrow keys, press OK to choose from the following: -

- **Units**
- **Screen**
- **Time**
- **Date**
- **Languages**
- **Restore Defaults**

Units

Select Units to change the unit of measurement your values are displayed in.

Use the Up or Down Arrow keys to scroll the selection.

Use the OK or Left / Right Arrow keys to enable the selection.

Only one option can be selected at any time.

Screen

Select Screen to alter the screen colour and access power saving features.

Brightness

Use the Left, Right Arrow keys to adjust the screen brightness as required.

Increased screen brightness reduces battery operating time.

Screen Colour

Use the Left, Right Arrow keys to toggle the screen colour between White or Black: -

Auto Dim

The Auto Dim feature will automatically dim the screen after a set period of time to reduce operating power and increase battery run time.

Use the Left, Right Arrow keys to adjust the Auto Dim as below: -

- **Off or 1 to 15 (minutes) - 1m recommended.**

Pressing any key whilst auto dim is active will return the screen to its standard brightness setting.

Date

Enter the current date using the date format specific to your region.

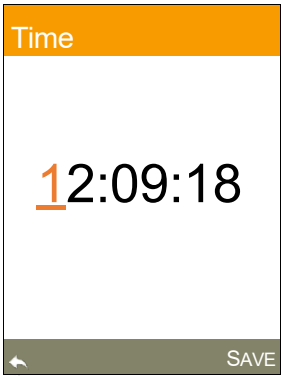
Use the Up, Down Arrow keys to adjust the value.

Use the Left, Right Arrow keys to move forward or back.

Press Soft Key 2 labelled Save to accept the date changes.

Time

Enter the current date using the time zone specific to your region.



Use the Up, Down Arrow keys to adjust the value.

Use the Left, Right Arrow keys to move forward or back.

Press Soft Key 2 labelled Save to accept the date changes.

Language

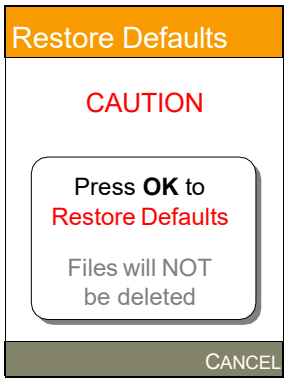
Select to change the operating language of the instrument.

Scroll the options using the Up or Down Arrow keys and press Soft Key 2 to confirm selection.

Language options not available on all models.

Restore Defaults

Restore Defaults gives you the option to restore all instrument settings to their factory default.



Use the OK key to choose the selection and restore all factory default settings with the exception of Language.

Press Soft Key 2 labelled CANCEL to return to previous screen without making any changes.

Information

Select to show instrument specific information.

This will include the name of the meter, software version, memory available, serial number and calibration due date.

Chapter 9

Measurement Screens

The Triax vibration level meter provides various measurement screens.

Scroll the available measurement screens using the Up or Down Arrow keys.

Measurement Screen 1

Your Triax instrument will always show the Measurement Screen below after powering up, defaulting to aRMS: -

The correct weighting filter is shown for each channel and cannot be changed regardless of which mode of vibration is being measured, Hand Arm or Whole Body.

The frequency weightings are as follows: -

- **Hand Arm: X, Y, Z = Wh**
- **Whole Body: X, Y = Wd, Z = Wk**

Press either the Left or Right Arrow Keys to scroll between the available parameters in the following order: -

- **aRMS, aEQ, aPK, aCF*, aVDV* (*Only available for WBV and if enabled)**

Press either the Up or Down Arrow Keys to scroll between the measurement screens.

Press OK to start a recording.

Press Soft Key 2 labelled RANGE to immediately change the measurement range.

Measurement Screen 2

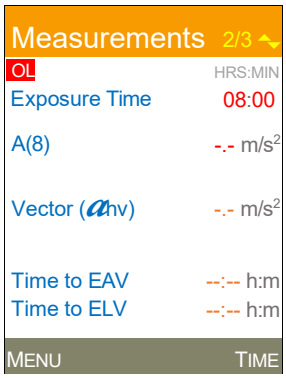
Press either the Up or Down Arrow Keys to scroll between the measurement screens.

The screen below features exposure time, press Soft Key 2 labelled TIME to adjust the Exposure Time.

Press either the Left or Right Arrow Keys to scroll between HRS and MIN. Press either the Up or Down Arrow Keys to change the value of HRS or MIN.

- **HRS 00 to 23**
- **MIN 00 to 59**

Press Soft Key 2 labelled SAVE to save the entered Exposure Time.



Changing the Exposure Time will re-calculate the A(8) value only.

Press either the Up or Down Arrow Keys to scroll between the measurement screens.

Press OK to start a recording.

Measurement Screen 3

Press either the Up or Down Arrow Keys to scroll between the measurement screens.

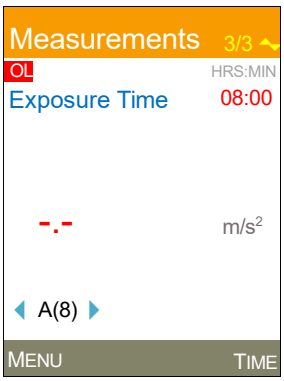
If A(8) is selected press Soft Key 2 labelled TIME to adjust the Exposure Time.

Press either the Left or Right Arrow Keys to scroll between HRS and MIN.

Press either the Up or Down Arrow Keys to change the value of HRS or MIN.

- **HRS 00 to 23**
- **MIN 00 to 59**

Press Soft Key 2 labelled SAVE to save the entered Exposure Time.



Changing the Exposure Time will re-calculate the A(8) value only.

Press either the Left or Right Arrow Keys to scroll between the available parameters.

Press either the Up or Down Arrow Keys to scroll between the measurement screens.

Press OK to start a recording.

In Real Time Mode, calculated parameters will be blank showing -.- or similar.

In File Review Mode extra screens will be available including an Information Screen.

Chapter 10

Accessories

Chapter 11

Customer Support

Warranty & After Sales Service

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