User Manual V1.48





Ground vibration logger





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# **1 PRODUCT DESCRIPTION**

## 1.1 Overview

AutoBlast is a ground vibration monitoring and logging device. It measures the ground vibration level using a packet of velocity sensors (geophones) and Air Overpressure level using a microphone. It stores the measurement into a built-in storage memory. The stored data can downloaded to a PC via Bluetooth. It can be configured to perform a sensor check operation before the start of monitoring to make sure the sensors are functioning properly.

AutoBlast can be configured to capture events and raise alarms or notifications. The events can be automatically recorded when the measurement level of the vibration noise exceeds a threshold value (trigger value). At the instance of an event, AutoBlast can raise auxiliary alarms (i.e. light signal or siren) as well as send out notification messages by Email or SMS using the built-in modem.

AutoBlast has an operational battery life of about 10 days. The length of the battery life depends on the capacity of the battery in addition to configurations and the number of events transmitted by the modem.



Figure 1. Overview diagram of AutoBlast.

AutoBlast can be interfaced with a PC or a tablet operating on Microsoft Windows. The PC software allows recorded measurement data to be retrieved to the PC. The recorded data can be downloaded via Bluetooth. Alternatively, if AutoBlast is connected to the Internet, the recorded data could also be accessed via the Internet. Once the vibration data is downloaded to the PC, users will be able to view reports of the recorded data on the computer screen. The PC software also allows users to setup the device configurations from a PC. Users can also specify notes (Job no, site information, comments, etc) for each test.

### 1.2 Applications of AutoBlast

AutoBlast is useful for various applications of Civil Engineering such as industrial vibration monitoring, ground transportation traffic vibration monitoring, construction site monitoring, noise, and vibration monitoring in a blasting zone. It is also useful in the fields of Earthquake Engineering for monitoring the structures of buildings, bridges, and dams.

#### **1.3 List of Accessories**

AutoTest AutoBlast is provided with the following list of items:

- 1. AutoBlast unit
- 2. Geophone sensor pack
- 3. Power cable
- 4. PC software CD

Optional accessories (at extra cost) are listed below:

- 1. Microphone
- 2. Visual aid (RED, AMBER) for auxiliary alarms
- 3. Siren / Speaker for auxiliary alarms
- 4. Solar panel

#### 1.3.1 AutoBlast unit

The AutoBlast main unit performs the measurement, calculation, and data logging. It includes a LCD screen and three push buttons for user-interface. It can be operated with 1-2 external 12V rechargeable batteries. The external battery pack can be charged using the provided 12V DC charger. The external battery pack can also be charged with a solar panel. A built-in 3G/4G modem allows access to the Internet. It contains an internal flash memory for storing measurement and configuration data. It includes a Bluetooth interface for allowing it to connect to the PC.

#### 1.3.2 Geophone sensor pack

The geophone sensor pack includes a set of three geophone sensors oriented in such a way to make the unit measure 3D vibration levels. The sensors sense vibration levels along Lateral (L), Transversal (T) and Vertical (V) axes. The specifications of the sensor pack are listed in the specification section of this document.

### 1.3.3 Microphone (Optional)

The AutoBlast microphone is optional and can be used to capture sound wave pressure. The specifications of the microphone are listed in the specification section of this document.

#### 1.3.4 PC Software

The PC software allows access to the measurement data and the configuration data stored on the AutoBlast unit. The software can display the stored data in a printable report format.

The PC software requires Microsoft Windows XP or above and .NET Framework 2.0. A Bluetooth interface is also required on the PC to communicate with AutoTest AutoBlast. The minimum hardware specifications of the PC are listed below:

- 1.8 GHz Processor
- 2 GB RAM
- 10 GB Hard Disk

#### 1.3.5 Accessory wiring information (optional)

Below is a table of pins used for the plugs into the AutoBlast which can be used to attach optional accessories such as a solar panel, manual switch, alarm lights or a speaker.

Connector/Location	Colour	Pin	Function
Top Left	white	1	Relay NO1
4-pin Female	blue	2	Relay Cmn1
	green	3	Relay NO 2
	yellow	4	Relay Cmn2
Bottom Right	brown	1	Solar +
4-pin Male	blue	2	Solar -
	red	3	Ex Batt +
	black	4	Ex Batt -
Top Right	red	1	Charge +
4-pin Male	black	2	Charge -
	purple	3	Rem Sw
	purple	4	Rem Sw

For more details about connecting optional accessories please call our on-site AutoTest Service Team on (03) 8840 3016

## 2 SETUP & INSTALLATION

The AutoBlast is quick and easy to setup. Take out the AutoBlast unit from the box and connect the vibration sensor. Connect the external battery pack to the dedicated input port on the AutoBlast. Press the ON/OFF key to turn the unit ON.

### 2.1 Battery charging

The AutoBlast includes a 12V DC charger to charge an external battery pack. Use care when charging the external battery. Never swap the polarity on the battery terminals.

#### 2.2 Software Installation

The PC software can be installed from the supplied CD. In case if the supplied CD is misplaced, the software can also be downloaded from the AutoTest website <a href="http://autotest.net.au">http://autotest.net.au</a>. To install the software from the CD, insert the CD into the CD/DVD drive of the PC and wait until the PC begins to load the CD. The installation program should start-up automatically once the software CD is inserted into the PC. If the installation program does not start automatically, the setup program can be run by browsing to the CD/DVD directory and the executing 'Setup.exe' file.

## **3 OPERATION**

### 3.1 Input Buttons

AutoBlast contains easy to use interface to configuring and operating. It includes an ON/OFF button and three push buttons to navigate through menus.

Button	Operation		
ON/OFF	Turns the unit ON and OFF		
Up	Displays the next screen. Increments a		
	value.		
Down	Displays the previous screen.		
	Decrements a value.		
Enter	Opens the selected menu. Performs		
	acknowledgement.		

## 3.2 Display screens

The LCD screen used in AutoBlast displays various information and status. Use the UP and DOWN keys to switch between different screens. Press ENTER to open a submenu or run a selected command.

Sc	reen	Description					
1.	Longitudinal <sup>1</sup>	Displays the current value of the longitudinal (L) geophone as x.xx in mm/s or inch/s (depending on the current unit setting). The frequency value is shown as YY in hertz.					
		L:X.XX F:YY Hz					
2.	Transverse <sup>1</sup>	Displays the current value of the transverse (T) geophone as x.xx in mm/s or inch/s (depending on the current unit setting). The frequency is shown as YY in hertz.					
		T:X.XX F:YY Hz					
	N/ 41 14						
3.	Vertical	mm/s or inch/s (depending on the current unit setting) The					
		frequency is shown as YY in hertz.					
		V:X.XX F:YY HZ					
4.	Air over	Displays the current value of the microphone channel. It displays					
	pressure <sup>1</sup>	the current Peak Sound Pressure (PSP) as x.xx in Pascal/PSI/dB (depending on the current unit settings). The frequency is shown as YY in hertz.					
		PSP:X.XX F:YY Hz					
5.	Date/time	Displays the current date and time of the device					
		10/11/15 12:52					
		10/11/15 12.53					
6.	Battery	Displays the battery level in percentage					
		Batton: XX %					
		Dallery. AA 70					

<sup>1</sup> If the device is not operating in monitoring mode, the display will show "Idle".

7. IP Address	Displays the IP address of the AutoBlast when connected to the Internet.				
		IP: 123.012.001.012			
8. Modem signal	Displays the sign	nal strength of the 3G/4G modem.			
		Signal: 40%			
	If the modem's si may display the f	ignal strength value is not available, the screen following messages:			
	Text	Description			
	Modem: Findin	ng When locating a network			
	Modem: Inactiv	ve When not able to connect to a			
		Network. When no SIM card is present			
	Modem: REMO	<b>DTE PC</b> When the 3G/4G modem is			
		connected to the PC via the Internet			
	Modem: BUSY	When the 3G/4G modem is busy			
9 Operating	Diaplaya tha aurr	cont operating made			
mode					
		Mode: Histogram			
	l				
10. Status	Displays the curr	rent monitor status.			
		Status: Standby			
	l				
	The status is star				
	The status is standby, Press OK to start monitoring. Once monitoring is started, Press OK again to stop monitoring.				
11. Calibration	Displays the date of the last calibration.				
		Cal: 10/11/2015			
12. Memory	Displays current memory usage				
		Memory: 10%			
		Nemory: 10%			

#### 3.3 Configurable Parameters

#### 3.3.1 Modes of operation

AutoBlast has four operating modes that can be configured using the PC software.

Mode	Operation
Waveform	Can capture a waveform of the ground vibration and air overpressure during an event
Histogram	Can continuously record vibration levels at defined intervals. Waveform is not captured during an event
Mix Mode	Waveform events are captured during an event. Histograms are also recorded.
Waveform manual	Can capture a waveform at the instance when the unit is manually triggered

#### 3.3.2 Sampling Rate

AutoBlast can be configured to select the sampling rate from the following list of supported sampling rates.

50, 100, 200, 400, 500, 800, 1000, 1600, 2000 Hz

Note: If the sampling rate is set to 2000 Hz, the maximum fixed recording time for an event waveform is limited to 2.56 sec.

#### 3.3.3 Trigger source

AutoBlast can be configured to select a trigger source during monitoring. The following table lists the trigger sources supported by AutoBlast.

Trigger source	Description		
Vibration only	Only the geophone vibration		
	sensors are used		
Air-overpressure only	Only the microphone channel is		
	used		
Vibration and air-	Geophone sensors and the		
overpressure	microphone are both used		
Manual	Manual trigger mode		

#### 3.3.4 Trigger level

AutoBlast uses the trigger level as the threshold level for the measurement signal to determine when an event should be recorded. The trigger level can set for the geophone sensors and the microphone.

Channel Type	Trigger level
Vibration	0.13 mm/s to 250 mm/s
Air-Overpressure	100 dB to 145 dB

#### 3.3.5 Recording stop mode

The following table lists the two recording stop modes used by AutoBlast:

Recording stop mode	Description		
Fixed time recording	Waveforms recorded during an		
	event have fixed length of time		
Automatic recording	Waveform data is recorded during an event until the vibration level settles below the trigger level for more than <i>AutoWindow</i> (0.25 s) length of time		

If fixed time recording is used, the length of the recorded signal will be 0.25 sec + the value of the fixed recording time specified in the configurations. For example, if the record stop mode is "Fixed time recording" and the value of the fixed recording time is 1 second, the total length of the signal will be 0.25 second (fixed pre-trigger length) + 1 second, which sums up to 1.25 second. The fixed time recording value is limited to 2.56 second when the sampling rate is set to 2000 Hz. However, if the sampling rate is less than 2000 Hz, there is no limit of the recording time.

If the recording stop mode is set to "Automatic recording", the waveform recording will stop once the measurements are below the trigger level for more than the value of Auto-window (i.e. 0.25 sec).

#### 3.3.6 Auto-window length

The Auto-window length is used when Automatic Recording Stop is enabled. The recording will stop when the measured signal level is less than the trigger level for a continuous period of time whose length is defined by the Auto-window length. If Automatic Recording Stop is enabled, the minimum length of the captured waveform will be 0.25 sec (pre-trigger signal length) plus the value of the auto-window length.

#### 3.3.7 Sensor check

AutoBlast performs a sensor check on geophone sensors to determine the presence and the validity of the sensor signal. The sensor check can be enabled to perform the sensor check before monitoring is started or disabled. The sensor check can also be run manually by pressing OK when sensor check is displayed on the LED screen.

Sensor check mode	Description
Disable	Sensor check is not performed
Enable	Sensor check is performed at the
(Before monitoring)	time when the monitoring is initiated

If sensor check is enabled, AutoBlast will automatically perform a sensor check at the start of the monitoring. The sensor check data will be saved along with any event or histogram recorded during monitoring.

#### 3.4 Connecting with PC

Connect the AutoBlast to the PC via Bluetooth or TCP/IP (Internet). Start the AutoBlast/Geophone PC software and click on 'Connect'.



Once the connection dialogue box appears, select the appropriate connection type to establish the communication.

#### 3.4.1 Connecting via Bluetooth

To connect to the AutoBlast via Bluetooth, the Bluetooth pairing will need to be established. Normally, the pairing is only required to be done once. To start the Bluetooth pairing, turn on the AutoBlast and use your computer to scan for nearby Bluetooth devices. The AutoBlast device should appear in the list of nearby Bluetooth devices as 'GEOPHXXXXX', where 'XXXXX' is the serial number of the device.



When the AutoBlast appears in the list of nearby Bluetooth devices, select the device and establish pairing.



When prompted to enter the Passkey for the Bluetooth connection, enter '1234' as the passkey.



Once the pairing is done, click on the AutoBlast in the Bluetooth window and start the Bluetooth Serial Port service.



When the Bluetooth Serial Port service is started, the Bluetooth manager will assign a serial port number to the device. Note down the serial port number when the Bluetooth assigns to the AutoBlast device. If you are not sure about the Bluetooth serial port number, you may check the port number from the status or properties of the Bluetooth device.



Remote Device Status							
General							
	Connection -						
	Device Name	e:	GEOPHO	2345			
	Status:		Connecte	ed.			
	Duration:		00:02:49				
	Paired:		Yes				
	Role:		Slave				
	COM Port:		COM6(SF	PP)			
	Activity						
		Sent	- 2	. ——	Received		
	Bytes:	224		•	307		
	Radio Signal S	trength -					
	Weak	C	Good		Strong		
	Properties		Disconr	nect	Unpair		
		ОК		Cancel	н	elp	

Once the Bluetooth pairing is completed, run AutoBlast PC software and select the connection type as 'Bluetooth' and set the port to the Bluetooth Serial Port number obtained during the Bluetooth pairing.

GeoPhone - Login	<b>X</b>
Connection Bluetooth: Port:	COM11 -
TCP/IP: IP/Host: Port:	120.157.120.156     ▼       45677
	Login Close

Click on Login to start the communication.

### 3.4.3 Connecting via TCP/IP (Internet)

AutoBlast can be connected via the Internet using the IP address of the device. Before connecting to the device via the TCP/IP connection, make sure the device already configured as a server and that the listening port is known. When AutoBlast is configured as a listening server, the device will display its IP address on the LCD screen (see 0). Enter the IP address of the device as shown on the LCD and the TCP/IP port number at which the device is listening. Click Login to establish the connection.

GeoPhone - Login	X
Connection Bluetooth: Port: • TCP/IP: IP/Host: Port:	COM11 120.157.120.156 45677
	Login Close

If the device does not display the IP address or the IP address is not acquirable, make sure the SIM card is inserted in properly and the modem's antenna is connected properly. Also, make sure the GPRS configurations and TCP server are already configured via Bluetooth.

## 3.5 Downloading

The waveforms and histograms stored in the AutoBlast can be downloaded via Bluetooth and TCP/IP. Before downloading the stored data on the device, make sure the device is connected to the PC. Click on 'Download' to open the download window.



When the download window appears, click on Start to start downloading stored data. The downloading application will only search for the records/files that are not downloaded yet.

🐥 GeoPhone - Download Wiza	ird 🗖 🗖 🗾
Records	
Total Events:	12
Total Histogram files:	136
Record type to download:	All Records
Status: Downloading	
Filename: histog_0274.htg	1,500 of 54,393 bytes (2%)
File type: Histogram	Files Downloaded: 2 of 3
Cancel	Close

### 3.6 Configuration

The device configurations can be changed via the software once the device is connected to the PC. To open the configuration window, click on 'Settings'.



#### 3.6.1 Device settings

The device configuration tab allows device related configurations to be changed.

Device Sensors Tes	t Setup   Notes   Alarms   Modem   Storage   Auto Start
Serial No:	44984
Version:	1.46
Timezone:	+10.0 H
Daylight Saving:	Off 🔹
Daily self check:	Disabled
Unit System:	Metric
Pressure Unit:	dB
Beep on:	on key press on trigger
LCD Auto Off:	Always on 🔹
	Set PC time

## 3.6.2 Sensor settings

The sensors tab displays an overview of the sensors' calibration and configuration data.

evice	Sensors	Test Setup	Notes	Alarms	Modem	Storage	Auto Start	
Param		Longitudir	nal Ti	ransverse	Ve	rtical	Micropho	one
Enable	ed	Yes	Y	es	Ye	s	Yes	
Cal. D	ate	31/03/20	17 3	1/03/201	7 31	/03/2017	31/03/2	017
LPF C	utoff	800.00 Ha	: 8	00.00 Hz	80	0.00 Hz	800.00 H	lz
Gain		0.0100	0	.0100	0.0	0100	0.0100	
Offset		-14.0	-2	747.0	-9.	0	0.0	
Compli	iance	-	-		-		-	
Serial	No	SE12582	S	E12582	SE	12582	SE00000	)
Part N	0	720A2001	7	20A2001	72	0A2001	0000000	
LP	F Cutoff	800.00		Hz		800.0	0	Hz
	а		b		с		d	DC
L:	0.0000	00.0	00000	0.00	00000	0.000	0000	0.0100000
T:	0.0000	0.00	00000	0.00	00000	0.000	0000	0.0100000
V:	0.0000	00.0	00000	0.00	00000	0.000	0000	0.0100000
Mic:	0.0000	00.0	00000	0.00	00000	0.000	0000	0.0100000

### 3.6.3 Test settings

The test setup tab allows test related configurations to be adjusted.

Cample Pate:	1000			
Sample nate.	Tubu sps		•	
Trigger Source:	Vibration		•	
Interval:	5 sec		•	
Recording Mode:	Histogram & Wa	veform	•	
Stop Mode	Fixed Time	•		
Recording Time:	2.500 sec		•	
Auto Window:	0.250 sec		-	
Sensor Check:	Before Monitorin	g	•	
Record Channels:	Vibration		Pressure	
	Vibration Sensor		Microphone	
Trigger 1 (Warning)	50.00	mm/s	50.00	dB
Trigger 2 (Critical)	100.00	mm/s	100.00	dB

The notes tab allows users to set test notes on the device. The test notes will be embedded along with each histogram and waveform record in the future.

evice Sensors Test S	Setup Notes A	Narms Modem	Storage A	luto Start				
Job Number:	Test1							
Usemame:	Jon							
Client:	AutoTest	AutoTest						
General:	General							
Extended Notes:	Test bench							
				Ŧ				
Location:	Melbourne							
GPS Coord:	Latitude:	-37.830983		•				
	Longitude:	144.945634		•				

#### 3.6.4 Alarms

The alarm tab allows the AutoBlast to alert the users via SMS, email or pin out (siren / strobe light) upon detecting a reading above the warning and/or critical trigger level set in previous tab (Test Setup).

Title	Enabled	Actions	Hold-on time	
Geophone				
Warning Alarm	Yes	Email	5 sec	
Microphone	tes	Email	TU SEC	
Warning Alarm	No	Email, SMS, Pin out	5 sec	
Critical Alarm	No	Email, SMS, Pin out	10 sec	
Edit Alarm				_
Enable Alarm:		🔵 Yes 💿 No		
Actions:		Email SMS	Pin out	
Hold-on time:		sec		

#### 3.6.5 Modem

The modem tab allows users to control all things relating to the AutoBlast modem and its remote connectivity. The AutoBlast uses a 4G modem; please ensure that a correct mobile plan has been setup and tested before deploying the unit to be used in the field.

A typically modem setup would be; configure the device to make regularly connections back to a designated desktop / server where it will upload its data periodically. To achieve this, users will only need to change settings under the GPRS and Remote Service tab.

#### 3.6.5.1 SMS

Any SMS notifications and/or alerts will be sent to all numbers added to the list. Similarly, by disabling SMS notification or clearing the list, no SMS will be send out from the unit.

	Sensors	Test Setup	Notes	Alarms	Modem	Storage Au	to Start	
Mode	m Informat	ion						
IM	EI:							
Ver	sion No:							
Sta	tus:		Inactive					
Sig	nal Level:		-1 %					
		0	eophone	44984				
			eonhone	44984				
SI	VS From:	G						
SI SI	MS From: MS Recipie	ent(s):				Add to list		
SI SI	MS From: MS Recipie	ent(s):				Add to list Remove		
SI SI	MS From: MS Recipie	ent(s):				Add to list Remove		
SI SI	IS From: IS Recipie	ent(s):				Add to list Remove		

#### 3.6.5.2 GPRS

The GPRS tab configures how the modem connects to the internet via the mobile network. A typical APN for a Telstra SIM card is "telstra.internet". However, if the mobile device is required to act as a server, then a special type of APN may be required. For the example, a Telstra SIM card with the correct mobile plan (contact your mobile ISP) can use "telstra.extranet".

The checkbox "notify new IP address" option can alert users via SMS or email whenever device's IP address has changed. This is particularly important if the user need to connect to the device on demand remotely.

vice   Sensors	Test Setup	Notes	Alarms	Modem	Storage	Auto St	art
Modem Inform	ation						
IMEI:							
Version No:							
Status:		Inactive					
Signal Leve	i:	-1 %					
APN:	te	lstra.extrar	net				
APN:	te	lstra.extrar	net				
Usemame:							
Password:							
Password: Gateway:							

#### 3.6.5.3 Email

The email tab allows users to designate 1 email address where all emails are to be sent to.

	Selup Notes Alams Modern Storage Auto Start
Modem Information	
IMEI:	
Version No:	
Status:	Inactive
Signal Level:	-1 %
Enable email notif	lications
Enable email notif	fications
SMTP Server:	ications mail.vipac.com.au
Enable email notif SMTP Server: SMTP Server Port:	mail.vipac.com.au 25
Enable email notif     SMTP Server:     SMTP Server Port:     Usemame:	fications mail.vipac.com.au 25
<ul> <li>Enable email notif</li> <li>SMTP Server:</li> <li>SMTP Server Port:</li> <li>Usemame:</li> <li>Password:</li> </ul>	fications mail.vipac.com.au 25
Enable email notif     SMTP Server:     SMTP Server Port:     Usemame:     Password:     Sender:	ications mail.vipac.com.au 25 test@autotest.net.au

#### 3.6.5.4 TCP Server

The TCP server tab allows the device to be configured as a server (listening) mode. Please ensure that the appropriate APN value has been set before enabling.

		Addition	0.0	to otali
Modem Information				_
IMEI:				
Version No:				
Status:	Inactive			
Signal Level:	-1 %			
Server Port:	45677			

#### 3.6.5.5 Remote Service

The Remote Service tab configures the server or destination IP address which the device will make regular connections to. The poll interval refers to how often the device tries to connect. For example, the poll interval is set to 60 minutes then an attempt to connect will occur every hour.

Geophone Configuration Device Sensors Test Setup Not Modem Information IMEI: Version No: Status: Inac Signal Level: -1 % Configuration SMS GPRS Email TCP Se Enable remote service	ites Alarms	Modem	Storage	Auto Start		
Device Sensors Test Setup Not Modern Information IMEI: Version No: Status: Inac Signal Level: -1 % Configuration SMS GPRS Email TCP Se Enable remote service	tes Alarms	Modem	Storage	Auto Start		
Modem Information IMEI: Version No: Status: Inac Signal Level: -1 % Configuration SMS GPRS Email TCP Se Enable remote service						
IMEI: Version No: Status: Inac Signal Level: -1 % Configuration SMS GPRS Email TCP Se Enable remote service						
Version No: Status: Inac Signal Level: -1 % Configuration SMS GPRS Email TCP Se Enable remote service						
Status: Inac Signal Level: -1 % Configuration SMS GPRS Email TCP Se Enable remote service						
Signal Level: -1 2 Configuration SMS GPRS Email TCP Se Enable remote service	ctive					
Configuration SMS GPRS Email TCP Se	6					
SMS GPRS Email TCP Se						
Enable remote service	erver Remot	e Service	Modem 1	ime		
Enable remote service						
Script file URL:				*		
				*		
(or) Fixed server	7 50 110					
Fixed Server IP: 203.87	7.30.110					
Server Port: 456/8						
Poll interval (max. 1440): 60	0	Minutes				
					Sava	
					Jave	

#### 3.6.5.7 Modem Time

The system is designed to save power by putting the modem in standby modem as much as possible. This tab allows users to decide the duration of which the modem remain awake "Auto shutdown time" and when to wake up the modem from standby.

Geophone Configur	ation
Device Sensors Test Set	up Notes Alarms Modem Storage Auto Start
Modem Information	
IMEI:	
Version No:	
Status:	Inactive
Sizes Laugh	1 %
Signal Level.	-1 /0
Configuration	
SMS GPRS Email	TCP Server Remote Service Modem Time
	Auto shutdown time (max, 30): 5 Minutes
Modem Operation	
Week Days	Hours
Sunday	00:00 07:00 14:00 21:00
V Sunday Monday	♥ 00:00         ♥ 07:00         ♥ 14:00         ♥ 21:00           ♥ 01:00         ♥ 08:00         ♥ 15:00         ♥ 22:00
✓ Sunday ✓ Monday ✓ Tuesday	Ø 00:00         Ø 07:00         Ø 14:00         Ø 21:00           Ø 01:00         Ø 08:00         Ø 15:00         Ø 22:00           Ø 02:00         Ø 09:00         Ø 16:00         Ø 23:00           Ø 09:00         Ø 16:00         Ø 23:00
V Sunday V Monday V Tuesday V Wednesday	V         00:00         V         07:00         V         14:00         V         21:00           V         01:00         V         08:00         V         15:00         V         22:00           V         02:00         V         09:00         V         16:00         V         23:00           V         03:00         V         10:00         V         17:00         V         17:00
V Sunday V Monday V Tuesday V Wednesday V Friday	V         00:00         V         07:00         V         14:00         V         21:00           V         01:00         V         08:00         V         15:00         V         22:00           V         02:00         V         07:00         V         16:00         V         23:00           V         03:00         V         16:00         V         15:00         V         23:00           V         03:00         V         16:00         V         17:00         V         23:00           V         04:00         V         11:00         V         18:00         V         16:00
♥     Sunday       ♥     Monday       ♥     Tuesday       ♥     Vednesday       ♥     Finday       ♥     Finday       ♥     Saturday	V         00:00         V         07:00         V         14:00         V         21:00           V         01:00         V         08:00         V         15:00         V         22:00           V         02:00         V         9:00         V         16:00         V         23:00           V         03:00         V         16:00         V         23:00         V         04:00         V         17:00           V         04:00         V         11:00         V         18:00         V         05:00         V         12:00         V         19:00           V         06:00         V         12:00         V         20:00         V         16:00         <
Image: Sunday	V         00:00         V         07:00         V         14:00         V         21:00           V         01:00         V         08:00         V         15:00         V         22:00           V         02:00         V         09:00         V         16:00         V         23:00           V         03:00         V         16:00         V         23:00         V         16:00         V         20:00           V         04:00         V         11:00         V         18:00         V         05:00         V         12:00         V         19:00         V         06:00         V         13:00         V         20:00         V         06:00         V         13:00         V         20:00         V         06:00         V         10:00         V         10:00         V         10:00         V         10:00         V         00:00         V         00:00         V         00:00         V         00:00         V         10:00         V         10:00         V         00:00         V         00:00         V         00:00         V         00:00         V         00:00         V         00:00         V
Inclusion     Sunday       Image: Constraint of the second	V         00:00         V         14:00         V         12:00           V         01:00         V         08:00         V         15:00         V         22:00           V         02:00         V         05:00         V         15:00         V         23:00           V         03:00         V         16:00         V         15:00         V         23:00           V         04:00         V         11:00         V         18:00         V         18:00           V         06:00         V         13:00         V         20:00         V         16:00
V Sanday V Monday V Monday V Husday V Hursday V Friday V Saturday	V         00:00         V         14:00         V         21:00           V         01:00         V         08:00         V         15:00         V         22:00           V         02:00         V         05:00         V         16:00         V         23:00           V         03:00         V         16:00         V         15:00         V         23:00           V         04:00         V         16:00         V         17:00         V         20:00           V         06:00         V         13:00         V         10:00         V         10:00
V Scurday ✓ Monday ✓ Tuesday ✓ Tuesday ✓ Thursday ✓ Thursday ✓ Thday ✓ Saturday	▼         00:00         ▼         07:00         ▼         14:00         ▼         21:00           ▼         01:00         ▼         08:00         ▼         15:00         ♥         22:00           ♥         02:00         ♥         05:00         ♥         15:00         ♥         23:00           ♥         03:00         ♥         16:00         ♥         15:00         ♥         23:00           ♥         04:00         ♥         11:00         ♥         15:00         ♥         20:00           ♥         06:00         ♥         13:00         ♥         20:00          Save

#### 3.6.6 Storage

The storage tab allows users to clear all the data stored on the device to free up memory, as well as clearing and restoring all configurations back to factory default state.

Geophone - Settings	X
Geophone Configuration	
Device Sensors Test Setup Notes Alarms Modern Storage Auto Start	
Erase internal memory All waveforms All histograms Erase	
Reset all settings to factory defaults	

## 3.6.7 Auto Start

This tab allows users to schedule in when the device should begin monitoring.

Geophone - Settings		X
Geophone Configurat	ion	
Device Sensors Test Setup	Notes Alams Modem Storage Auto	Start
Enable Auto Start Monitori	ng	
Week Days	Hours	
<ul> <li>✓ Sunday</li> <li>✓ Monday</li> <li>✓ Tuesday</li> <li>✓ Wednesday</li> </ul>	V 00:00         V 07:00         V 14:00         V 2'           V 01:00         V 08:00         V 15:00         V 2'           V 02:00         V 09:00         V 16:00         V 2'           V 03:00         V 10:00         V 17:00         V	1:00 2:00 3:00
<ul> <li>✓ Thursday</li> <li>✓ Friday</li> <li>✓ Saturday</li> </ul>	V         04:00         V         11:00         V         18:00           V         05:00         V         12:00         V         19:00           V         06:00         V         13:00         V         20:00	
		Save

## **4 PRODUCT SPECIFICATIONS**

Vibration		
Range	Up to 250 mm/s	
Resolution	0.0077 mm/s	
Accuracy	$\pm$ 5% or $\pm$ 0.5 mm/s	
Frequency range	1 to 180 Hz	
Acceleration	Calculated from captured waveform	
Trigger levels	0.13 to 250 mm/s	
Air Overpressure Monitoring		
Weighting scales	ISEE Linear	
Range	88 to 145 dB (500 Pa peak)	
Resolution	0.0152 Pa	
Frequency Response	2 to 250 Hz	
Accuracy	$\pm$ 10% or $\pm$ 1dB	
Trigger level	100 to 145 dB in steps of 0.1dB	
Sampling rate	50, 100, 200, 400, 500, 800, 1000,	
	1600, 2000 samples/sec for each	
	channel	
Real-time Clock (RTC)	Built-in clock with backup battery	
Storage space	400 overts (at 1000 Hz, 1.25 sec	
Full wavelorm recording	length. 4 channels)	
Histogram recording	21 days (at 5 sec interval) for 4	
<b>0 0</b>	channels	
	30 davs (at 7 sec interval)	
	270 days (at 1 min interval)	
Full waveform and	30 days (at 1 min interval)	
histogram	400 events (at 1000 Hz, 1 sec length)	
(Mix Mode)		
Modem	LTE (Bands: 1, 3, 5, 7, 8, 28)	
	UMTS/DC-HSPA+ (850/900/1900/2100)	
	GSM/Edge (850/900/1800/1900)	
Bluetooth	Bluetooth Class 2 with embedded	
	antenna	
PC Connectivity via		
Bluetooth	Bluetooth class 2 (range: 3 m)	
GPRS (Internet)	TCP/IP (Internet)	
FFT Analysis	via PC software	
	Australian 2187.2-1993 Standard	
User interface	1x16 character LCD with backlight	
Alarm notification	Alarm messages via email, SMS and	
	external relay outputs	
Auxiliary Relay Output	2 Auxiliary relay outputs	
	12V 1A (12W)	
Battery Capacity	Internal 6V 7000 mAh	
Dimensions (W X h X d)	180 X 110 X 45 mm	
	$-10^{\circ}$ (0 +/0°C	
	Up to 90% non-condensing	
Supply voltage	10 - 14 V	(Ctorcelless)
Power consumption	50 MA	(Standby)
Monach -	100 mA	(Typical)
warranty	12 months	

The replacement of any components must be carried out by AutoTest™ Products or an Authorised AutoTest Products Service Centre.

## 5 WARRANTY

To ensure prompt warranty service should it be required, please complete warranty registration form, and return to AutoTest Products Pty Ltd within 10 days of purchase of the product. AutoTest Products or an Authorised Service Centre warrants this product against defects in material and workmanship for a period of 12 months from the original date of purchase. This warranty applies only to products and components supplied by AutoTest Products which can be identified by the trade name or logo affixed to them or by other documents. AutoTest™ Products does not warrant any products not supplied by AutoTest Products.

During the warranty period, AutoTest Products or an Authorised Service Centre will repair (or at its option replace), any defective component(s) without charge for labour, provided the product is returned in its original or suitable equivalent container, freight prepaid, to an authorised AutoTest Service Centre. Transit insurance and return freight will be at the owner's expense.

In order to obtain calibration, warranty or non-warranty service, ship the product, freight and insurance prepaid to your nearest AutoTest Service Centre. Attach to the product your name, address, contact numbers, description of the problem and if a warranty claim, proof of purchase (dated sales receipt or invoice). AutoTest Products or an Authorised AutoTest Service Centre reserves the right to refuse warranty repair if accident, abuse, misuse or misapplication has damaged the product in transit or as a result of service or modifications by other than an Authorised Service Centre, nor are any other warranties expressed or implied, including any regarding merchantability or fitness for any other particular purpose.

AutoTest Products or an Authorised Service Centre is not responsible for incidental or consequential damages resulting from the breach of any express or implied warranty, including damage to property and, to the extent permitted by law, damages for personal injury.



#### AUTO TEST Products Pty Ltd 69 Parsons St Kensington VIC 3031 Australia Phone: (+61 3) 8840 3000 Sales:(+61 3) 8840 3017 Service: (+61 3) 8840 3016 Email: service@autotest.net.au

Email: sales@autotest.net.au

www.autotest.net.au