# vb100

# Instrument Reference Guide

Revision 301104

Commtest Instruments Ltd
28-b Moorhouse Avenue
Christchurch
New Zealand
E-mail help@commtest.com

Printed in New Zealand.

**Disclaimer**

Information in this document is subject to change without notice. Names and data used in examples are fictitious unless otherwise noted. This document is distributed as is, without warranty of any kind, either expressed or implied, respecting the contents of this document, including but not limited to implied warranties for the document's quality, performance, merchantability, or fitness for any particular purpose. Neither Commtest Instruments Ltd nor its employees, dealers, or distributors shall be liable to the user of this document or any other person or entity with respect to any liability, loss, or damage caused or alleged to be caused directly or indirectly by this document.

**Trademark Notice**

vb™, vb100™ and PROFLASH™ are trademarks of Commtest Instruments Ltd.
vbSeries® is a registered trademark of Commtest Instruments Ltd. Other trademarks and registered trademarks belong to their respective owners.

# Contents

# Section 1: Introduction

The vb100 incorporates the latest technology to make vibration measurement and analysis easier and, as you will already appreciate, much more affordable.

The vb100 uses a simple 'Red/Yellow/Green' approach to vibration analysis to ensure that your machinery is operating within ISO guidelines.

This manual has been formatted to allow you to quickly and easily learn how to use your vb100. Please keep this manual for future reference and read it before operating your vb100.

If you have any questions not answered by this manual or would like to make a suggestion, please contact us at our website, www.commtest.com.

**Disclaimer:** Although this document makes use of common vibration analysis concepts, it is not intended as a comprehensive guide or training manual. Please ensure you have the relevant knowledge and experience to carry out the procedures described. It is essential to follow all appropriate safety precautions when working near rotating machinery.

# Standard Features

- DSP for fast, accurate calculations
- 16-bit A/D converter providing high-precision measurements
- Displacement, velocity, and acceleration measurements
- Frequency and time domain measurements
- 256 KB nonvolatile memory capable of storing up to 10 000 recordings
- Time and date stamped recordings
- PROFLASH upgradeable firmware
- 1500 mAh Ni-Cad (Nickel Cadmium) battery pack
- Battery charger and conditioner
- RS232 interface to communicate with your PC
- Route creation capabilities
- Route and off-route recording modes

# Standard Kit Items

- vb100 with protective boot with strap
- Power transformer (13.5 ± 1.5) V DC, 1 A output
- USB to serial adapter (BAFO BF-810)
- Data-transfer cable
- Accelerometer (ICP® type)
- Accelerometer coiled cable
- Accelerometer magnetic mounting base
- Instrument Reference Guide
- Warranty card
- QA card
- Carry bag

# Instrument Icons

In the Select Recording Menu, this icon indicates that the instrument is in Review Mode.

The instrument is in recording mode i.e. you have taken a recording and are now saving it to a machine.

The instrument is in route mode i.e. you are in the process of creating a route.

Indicates a machine, point, or direction is part of a route.

Only some points or directions on this machine have been selected for a route.

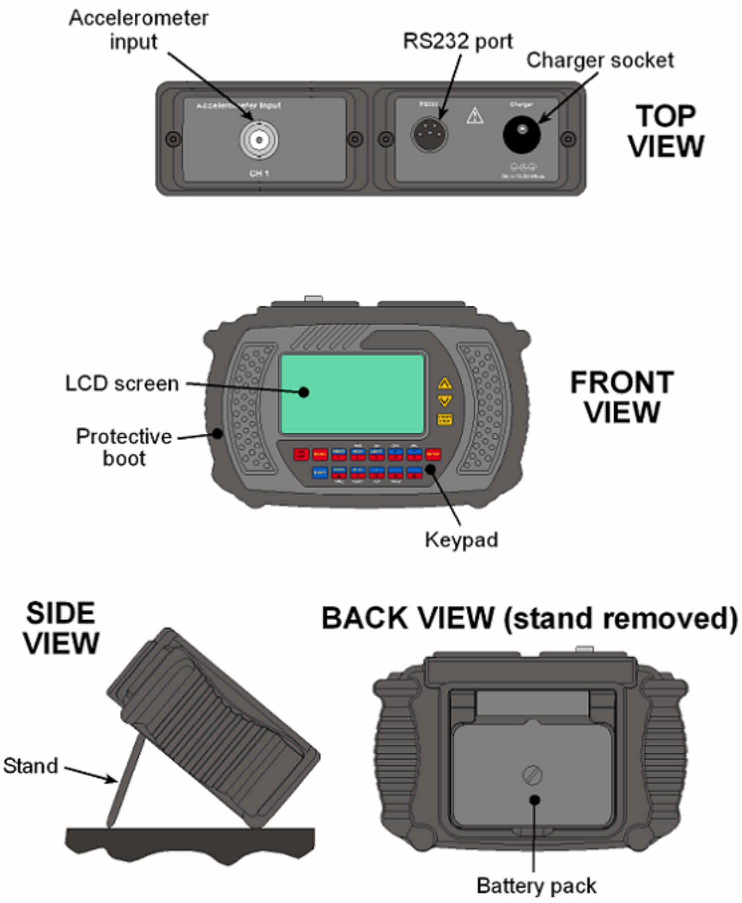
This icon indicates that a machine has been created with at least one point and direction defined, but no recordings have been taken.

One or more recordings have been taken.

Indicates that this is a baseline recording.

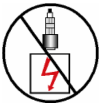
The battery is running low and needs charging.

# Summary of Parts

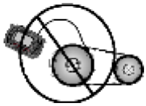


# Precautions

Please read and understand this section before operating your instrument. Heed all warnings and recommendations to prevent data loss, data inaccuracy, damage to the instrument, or injury to yourself.



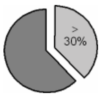
Do not attach the accelerometer or tachometer to any object with a high potential voltage i.e. a voltage that exceeds 50 V DC or 32 V AC or the ‘safety extra low voltage’ (SELV) defined by your local power authority.



Ensure the cables and bootstrap cannot become entangled with any rotating or moving machinery.

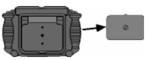
Do not bring any objects sensitive to magnetic fields (e.g. cardiac pacemakers, credit cards, floppy disks, video tapes, audio cassette tapes, mechanical watches) near the magnetic mounting bases.

Do not operate the instrument in an explosive environment.



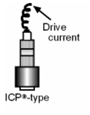

Charge the battery pack up to at least 30% capacity before taking a recording. If using the instrument for 4 hours or more, first ensure that the battery pack is fully charged.

Constantly charging the battery when it is not fully drained will create a 'Memory' effect and eventually shorten the amount of charge that the battery can hold.

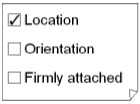


Do not detach the battery pack from the instrument for more than 2 hours as data and settings may be lost from the instrument.

Transfer data stored in the instrument to a PC before reprogramming the instrument. PROFLASHING the vb with new firmware may erase all data stored in the instrument.




When using an ICP®-type accelerometer, ensure that the drive current is turned on, otherwise the measurements will be incorrect.




Mount the accelerometer properly before taking measurements or recordings. Otherwise, the data will be incorrect and/or inconsistent.

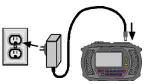
To clean the instrument use a mild detergent diluted in warm water. Do not use abrasive or polishing substances, hydrocarbons, petrochemicals or solvents as they degrade the plastic.


Do not place the vb or the magnetic mounting base in a hot place where the temperature exceeds 140 °F (60 °C). Otherwise, the battery pack or magnet will degrade.

Although the instrument has a rugged construction, do not expose it to wet conditions or store it in a damp place where the relative humidity exceeds 95%.


If the instrument malfunctions, return it to an authorized dealer. Do not attempt to repair the instrument yourself, as this will invalidate the warranty.

Ensure that the battery pack is securely fastened (but not over-tightened) to the instrument before operating.



Use only an approved instrument power transformer (13.5 ± 1.5) V DC, 1 A output, center positive) and ensure its voltage and frequency rating matches that of your mains AC power.

# Section 2: Basic Operation

This section describes how to perform basic operations on your vb.

You will learn to:

- Power up the vb
- Navigate through initial screens
- Select an option
- Create a machine
- Enter and edit names
- Set up the accelerometer

**Caution: Read Section 1: Precautions, before operating your instrument.**

# Powering Up

- Press the ON OFF key to power up the instrument or turn it off.

The following screen is displayed at power up.

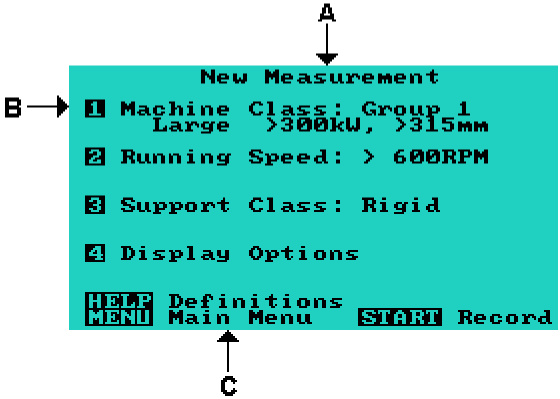

The displayed firmware version and creation date will reflect the currently installed firmware in your instrument. Updated firmware versions can be downloaded from www.commtest.com.

After five seconds the power up screen will be replaced by the Main Menu screen of the instrument.

- To bypass the power up screen press MENU

# Menu Navigation

Most screens found on the vb follow a standard format, making menu navigation easy and intuitive. The following describes the components of a typical screen:




**A** The menu title is displayed at the top of each screen.

**B** Navigation of all menus is accomplished by pressing the key corresponding to the number or word beside the menu item e.g. pressing HELP 2 will toggle the machine running speed, pressing MENU will take you to the Main Menu.

**C** Pressing the MENU key will normally return you to the previous screen or the Main Menu (depending on your current location). Key prompts e.g. HELP in the example above, are displayed at the bottom of each screen as needed.

Pressing and holding down the SHIFT key together with a number key will access the function labeled on the **upper** command of that key e.g. pressing SHIFT + LIGHT 3 allows you to toggle the LCD backlight on and off.

# Returning to a Previous Screen

Pressing the MENU key will normally return you to the previous screen or the Main Menu (depending on your current location).

In some menus, pressing SHIFT + BACK 6 will return you to the previous screen.

# Main Menu

The Main Menu provides access to the vb's main operational tasks.


- To access this menu, press MENU from most screens.

In some cases, you may need to press other keys or press MENU more than once - follow the onscreen instructions in these situations.

RESET 1 **New Measurement** - Used to select machine definitions, select and name machines, points, and measurement directions, take recordings and set the vb's display options. Recordings that have been taken using this menu can be reviewed using Record / Review / Report.

HELP 2 **Record / Review / Report** - Performs the same recording functions as the New Measurement Menu. This menu has added functions for setting baseline recordings, reviewing recordings, copying and erasing machines and sending reports to a PC of all recordings for a particular machine, point or direction.

**Folder** - Used to create a data storage structure for machines by placing them in folders that hold up to 200 machines each.

**Route** - Used to create an ordered list of machines and their measurement locations to guide you through data collection.

**System Utils** - Used to set the date/time, manage the vb battery, adjust the LCD contrast and erase data in large blocks e.g. all recordings in a folder.

Both the New Measurement and Record / Review / Report Menus allow you to take recordings, but the order in which tasks are performed differs. When using the New Measurement Menu, you will first take a recording and then select or create a machine to store the recording. When using the Record / Review / Report Menu, you will need to first select or create the machine that is being measured and then take the recording to be saved to that machine.

# Selecting an Option

- Press the numbered key that corresponds to the option you want.

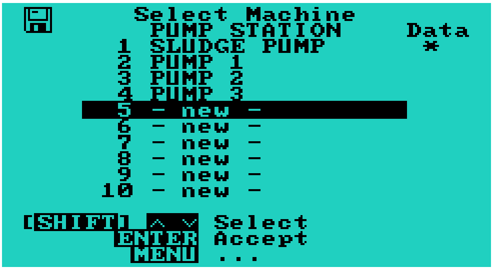
**Example:**

- Press to select the New Measurement option from the Main Menu.


You may need to press or to highlight the option then press to select the option.

**Example:**

- To select a machine, press HELP 2 Record / Review / Report.
- Use the ∧ or ∨ keys to highlight a particular machine then press ENTER to select it.

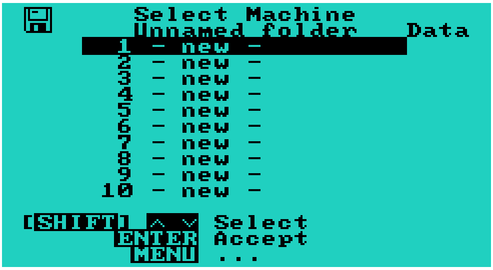



The selected machine is now in current memory and any recordings taken will be stored against this machine name.

# Creating Machines

Machines can be named and saved in a memory location either before data is collected or once measurements have been taken.

- From the Main Menu, press HELP 2 Record / Review / Report. The Select Machine Menu displays a list of numbered memory locations (1 to 200).




- To select a memory location, press HELP 2 to display the Edit Machine Menu. This screen allows you to change the settings that have been applied to your machine.


- Press RESET 1 to display the Edit Name Menu.
- Clear the current name (this will be Unnamed machine by default) by pressing SHIFT + RESET 1
- Enter the required name by following the on-screen editing instructions, which are covered next.

# Entering Text and Numbers

To enter text or numbers press the corresponding number/character key. As with a mobile phone, available character options for each key are displayed with subsequent key presses (e.g. first press of the '3' key displays '3', second press displays 'D', next press displays 'E' etc). The cursor will advance automatically after a short pause so that the next character can be entered.


Names can be up to 16 characters long in upper or lower case. To enter or edit names:

- Press the key that has the required characters displayed above it until the correct character appears above the flashing cursor.

**Example:**
To enter the word FAN

- Press LIGHT 3 four times until the F displays.


The cursor advances automatically after a short pause.

- To enter the letter A, press HELP 2 twice until the A displays.


- Press BACK 6 three times to display an N.


- Press > 0 twice to enter a space between words if required.
- Press ENTER to save when you have finished entering or editing your text.

# Other Name Editing Commands

MENU Cancels the current edit screen and retains the original name.

SHIFT > 0 Moves the cursor forward.

SHIFT < 9 Moves the cursor backward.

> 0 > 0 Enters a space at the current cursor position or deletes the character at the cursor position.

SHIFT + 4 Inserts a character at the current position.

SHIFT – 5 Deletes the character at the current position.

SHIFT RESET 1 Clears all the characters to the right of the cursor.

Λ Changes the currently selected letter to uppercase if it is currently lowercase.

V Changes the currently selected letter to lowercase if it is currently uppercase.

Λ Scrolls through the various symbols if the cursor is in a space.

# Accelerometer Setup

Plug the connector of the accelerometer into the vb accelerometer input. Now screw the accelerometer into the magnetic base and attach to the measurement point ensuring it is:

- Attached to a sturdy, rigidly mounted and non-flexible structure, where vibration from the rotating part of the machine will be accurately transmitted. Avoid attachment to sheet metal, guards, or any machine structure which is not closely coupled to the source of vibration in the spinning rotor as the vibration of such a structure will be different to the vibration source.

- Attached to a structure which is at least 10 times heavier than the sensor itself. Do not mount the accelerometer on lightweight motors or similar parts, as the weight of the accelerometer will distort the vibration signal. Use smaller accelerometers for small structures.

- Attached as closely as possible to, and in line with, the centerline of the bearings to avoid distorted signals.

- Securely attached to the mounting surface. The surface should be flat and smooth where the sensor makes contact. Attachment can be either using the supplied magnetic accelerometer base, or via a threaded stud on the machine surface. The accelerometer should not move independently of the machine part it is attached to.

- Oriented correctly, as vibration can differ greatly with respect to direction.

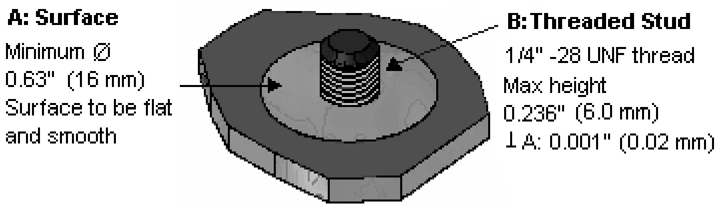
- Attached to exactly the same position as before if this is an ongoing study of a particular measurement point (mark the position if necessary).

- Clear from other cables and not twisted, kinked or tangled.

# Permanent Mounting

To mount using the stud method, prepare a mounting spot on the machine following the specifications shown in the diagram.

- Unscrew the magnetic base from the accelerometer and screw onto the threaded stud. Use of thread locking compound is suggested.




*Stud Mounting Spot*

**Caution:** Do **not** use a wrench to tighten the accelerometer as this will damage the sensor.

# Section 3: New Measurement

This section describes the procedures for taking a measurement with your vb.

You will learn to:

- Select a machine class
- Select a running speed
- Select a support class
- Choose display options
- Take a recording
- Create a machine
- Create a point
- Select a direction
- Save a recording

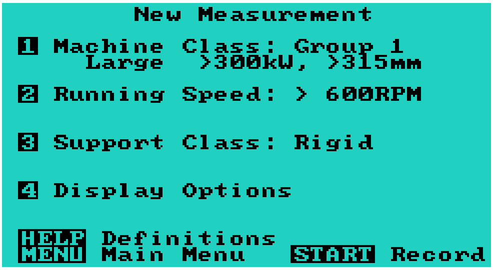
# Taking a New Measurement

The vb instrument gives you the flexibility to choose your preferred method of taking recordings. You can either set up your machine definitions **before** taking recordings, or take recordings first and create machines as you go.

When a vibration measurement is taken using the New Measurement Menu (rather than Record / Review / Report), you only need to define the basic parameters of your machine, such as machine class and running speed, before starting the recording. The machine definition (name, points and measurement directions etc) can then be created when the measurement is complete.

- Attach the accelerometer to a measurement point following the instructions in Section 1: Accelerometer Setup, then start your machine.

- From the Main Menu, select RESET 1 New Measurement.




The New Measurement Menu is displayed, allowing you to select the Machine Class, Running Speed, Support Class and Display Options for this recording.

# 1. Selecting a Machine Class

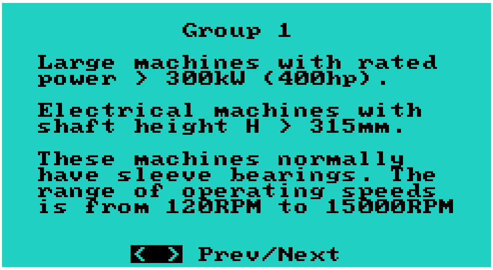
There are four Machine Class groups. These are described in detail in Appendix B: How Should Your Machine be Classified.

- Select a machine class by pressing RESET 1 repeatedly to toggle the machine class group displayed.

Your machine's vibration levels will be compared with the ISO 10816-3 / BS 7854-3 standard for the chosen machine class to determine if the level of vibration is acceptable.)

**To display an onscreen Help definition of a Machine Class**

- Press SHIFT + HELP 2 to display the definition for each machine class.




- Press SHIFT + < 9 or > 0 to cycle through the list of definitions.

- Press MENU to return to the previous menu.

# 2. Selecting the Running Speed

The vb measures Running Speed in RPM. There are two running speeds available:

**< 600RPM** (less than 600 revolutions per minute)
**> 600RPM** (greater than 600 revolutions per minute)

- Select the running speed for your machine by pressing HELP 2 to toggle the running speed displayed.

# 3. Selecting a Support Class

The Support Class is determined by the relationship between the machine and its foundation. The ISO 10816-3 / BS 7854-3 standard defines two Support Classes:

**Rigid**
**Flexible**

These are described in detail in Appendix B: How Should Your Machine be Classified.

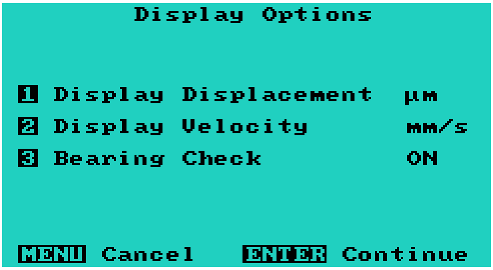
- Select a support class by pressing LIGHT 3 to toggle the support class displayed.

**To display an onscreen Help definition of Support Classes**

- Press SHIFT + HELP 2 to display the help screen.
- Press SHIFT + > 0 to cycle through the machine class definitions until the Support Class help screen displays.
- Press MENU to return to the previous menu.

# 4. Selecting Display Options

The vb records overall vibration levels using both velocity and displacement measurements.




The available measurement units are:

| | |
|---|---|
| **Displacement:** | µm, mm, mil, OFF |
| **Velocity:** | mm/s, in/s, OFF |
| **Bearing Check:** | g rms, ON/OFF |

You can choose whether to have the measurement units displayed on the LCD while taking a recording (ON/OFF), and also toggle which measurement units are used.

**Note:** When reviewing recordings, you can use Display Options to show different measurement units from those used to take the recording.

- Press 

 to enter the Display Options Menu.
- Press 

 to toggle Displacement units.
- Press 

 to toggle Velocity units.
- Press 

 to toggle the Bearing Check ON or OFF.
- Press 

 to continue when all display options have been set.

The display options chosen will also be used for any output reports that list this recording.

# The Bearing Check

The Bearing Check is intended to provide an early indication of bearing wear and lubrication problems. It can also be applied to any other machine fault that generates high frequency noise, for example gear faults or pump cavitation.

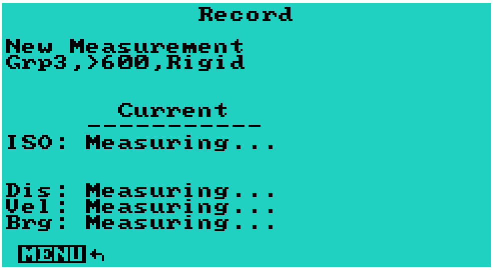
The Bearing Check measures the overall acceleration level in the band (2 to 5) kHz, displayed in units of g rms. For slow speed machines, with running speeds less than 600 RPM, the band is changed to (1 to 5) kHz. Note that this adjustment is analogous to the ISO levels themselves. The 5 kHz upper limit was carefully chosen as a compromise between a high value (to include all bearing noise), and a low value (to improve the consistency and repeatability of measurements.)

The energy path of high frequency vibration from its source in the bearing (or other component), out through the machine housing to your accelerometer can have a large influence on the level of vibration recorded. Hence, there are no ISO thresholds specified for these high frequency readings, as variations between individual machines, and even variations between accelerometer locations, have too large an influence on the recorded value. However, the vb provides a powerful tool as an alternative to ISO thresholds - namely the ability to create baseline recordings. Current vibration levels can be compared with baseline recordings to show the percentage of change over time. As a guideline, a doubling in vibration level (+ 200%) from the baseline indicates that further investigation is warranted. More information on baselines and how to create them is provided in Section 4: Making a Baseline Recording.

# Begin Recording

- From the New Measurement Menu, press START STOP to begin recording.

The instrument will show the following screen while a recording is being taken.




Once the recording is finished, the instrument will display the current ISO Alarm Level and also the displacement, velocity and bearing check if you have set these in the Display Options Menu.


- If you wish to retake the recording, press START STOP
- To save your recording press ENTER

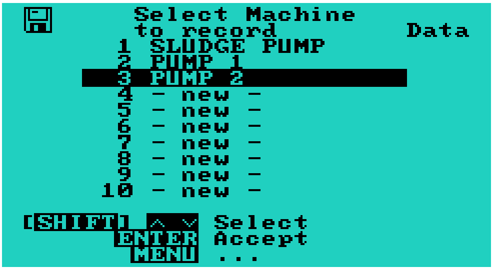
The Select Machine Menu will be displayed. You can now select an existing machine from the list (if you have previously created any) or create a new machine to store this recording.

**Note:** When you save to an existing machine, the machine class, running speed and support class **must** match the parameters that have been set for this recording or you will get an error message.

# Creating a Machine

If you have just taken a new recording using the New Measurement Menu, the Select Machine Menu will already be displayed.

The Select Machine Menu displays a list of numbered memory locations (1 to 200).




If you have not yet created any machines, the screen will contain numbered slots labeled **- new -**.


- To select an existing machine from the list, press  or  to highlight the machine then press   to select it. This will take you to the Select Point Menu.

**Note:** Before saving to an existing machine, ensure that the machine parameters match those of the recording i.e. the machine class, running speed and support class are identical.

## To create a machine

- Use the ^ or v keys to scroll to one of the slots labeled **- new -** then press HELP 2 to display the Edit Machine Menu. This menu allows you to set the parameters for your machine.


- To create a name for this machine, press RESET 1 to display the Edit Name Menu.


- Clear the current name (this will be Unnamed machine by default) by pressing SHIFT + RESET 1

- Enter a name for the machine by choosing characters from the keyboard (see Section 2: Entering Text and Numbers, for details of how to do this).

- Press ENTER to save the name and return to the Edit Machine Menu.

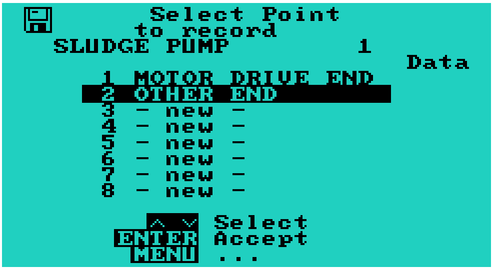
- Press ENTER again to return to the Select Machine Menu. Your new machine name will be highlighted.

- Press ENTER to accept this machine. This will display the Select Point Menu.

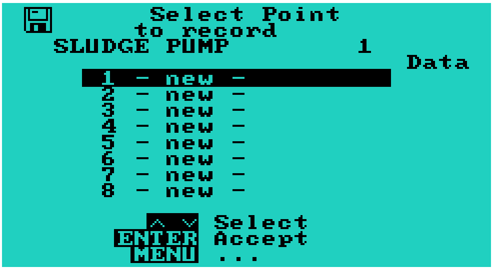
You will now need to tell the vb which point on this machine the recording was taken at.

# Creating a Point

The Select Point Menu displays a list of numbered memory locations (1 to 15).




If you have not yet created any points, the screen will contain numbered slots labeled **- new -**.




- To select an existing point from the list, press or to highlight the point then press ENTER to select it. This will take you to the Select Direction Menu.

### To create a point

- Use the or keys to scroll to one of the slots labeled **- new -** then press HELP 2 to display the Edit Name Menu.

- Enter a name for the point by choosing characters from the keyboard (see Section 2: Entering Text and Numbers, for details of how to do this).

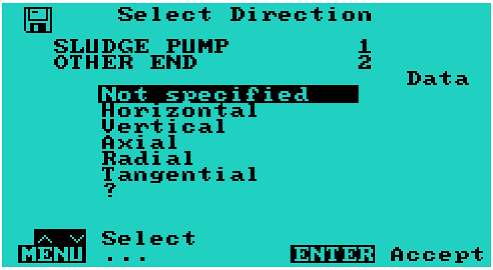
- Press ENTER to save the name and return to the Select Point Menu. Your new point name will be highlighted.

- Press ENTER to accept this point. This will display the Select Direction Menu.

You will now need to tell the vb which direction on this point the recording was taken at.

# Selecting a Direction

The Select Direction Menu displays the available directions for taking measurements on a bearing housing.




- To select an existing direction from the list, press or to highlight the direction then press ENTER to select it.

The recording will now be saved and you will be returned to the New Measurement Menu. You can now continue taking recordings at this machine by attaching the accelerometer to the same point using a different direction, or to a new measurement point. Continue to create points for this machine as needed following the instructions in this section. If you intend to take a recording at a different machine, you will need to create a new machine and point to save this recording under - follow the instructions in Section 3: Taking a New Measurement.

**To create a new direction**

- Use the or keys to scroll to one of the slots labeled **?** then press to display the Edit Name Menu.

**Note:** The first six default direction names cannot be edited.

- Enter a name for the direction by choosing characters from the keyboard (see Section 2: Entering Text and Numbers, for details of how to do this).

- Press to save the name and return to the Select Direction Menu. Your new direction name will be highlighted.

- Press to accept this direction and save the recording.

# Section 4: Record / Review / Report

This section describes the functions available under the Record / Review / Report Menu.

You will learn to:

- Take a new measurement
- Review your recordings
- Mark a recording as being baseline
- Copy machines and points
- Erase machines, points and recordings
- Display and use pop-up menus
- Create a report

# Taking a New Measurement

Once your machine structure is in place Record / Review / Report Menu is the main menu you will work with when revisiting machines.

When a vibration measurement is taken using the Record / Review / Report Menu (rather than the New Measurement Menu), the order of tasks differs. The order of tasks for each menu is summarized in the following table.

| | **New Measurement Menu** | **Record / Review / Report Menu** |
|---|---|---|
| Step 1 | Set machine parameters (class, running speed, support class) | Select machine |
| Step 2 | Set display options if required or skip this step to use the defaults | Set machine parameters (class, running speed, support class) |
| Step 3 | **Take a measurement** | Select point |
| Step 4 | Select machine (optional) | Select direction |
| Step 5 | Select point (optional) | **Take a measurement** |
| Step 6 | Select direction (optional) | Save measurement |
| Step 7 | Save measurement (optional) | |

When using the New Measurement Menu, you take a measurement first, and then select or create a machine to store the recording if you wish to do so. When using the **Record / Review / Report Menu**, you select or create the machine that is being measured first, and then take the recording to be saved to that machine.

Display options (displacement, velocity and bearing check) can only be set from the New Measurement Menu. Once set, the vb will display these during all subsequent recordings until you change them.

**To take a measurement using the Record / Review / Report menu**

Follow the steps outlined below. For a detailed explanation of each step, please refer to the instructions in section 4 for selecting a machine, point and direction, and section 3 for selecting a machine class.

- From the Main Menu, press HELP 2 Record / Review / Report. This displays the Select Machine Menu.
- Select a machine name from the list or create a new machine and set its parameters (class, running speed and support class). Press ENTER to accept the machine name and display the Select Point Menu.
- Select a point for the measurement and press ENTER to accept. This displays the Select Direction Menu.
- Select a direction and press START STOP to begin recording.

Wait for the accelerometer and the vb to settle and for the vb to collect data. When the instrument has finished collecting the data the screen will display a reading with your current ISO level for the selected machine, point, and direction.

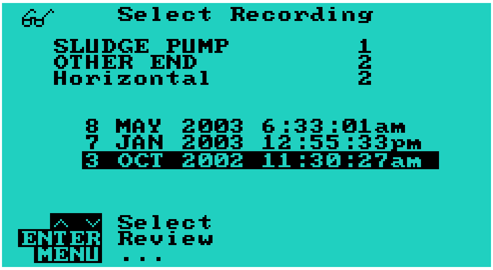
- When recording is complete, press ENTER to save.

# Review Recording

All recordings, including those taken from the New Measurement Menu, can be reviewed from the Review / Record / Report Menu.

- From the Main Menu, press HELP 2 Record / Review / Report. The Select Machine Menu will display.
- Use the or keys to highlight the machine to be reviewed then press ENTER to select the machine. The Select Point Menu will display.
- Highlight the point to be reviewed then press ENTER. The Select Direction Menu will display.
- Highlight the direction to be reviewed then press ENTER. The Select Recording Menu will display.

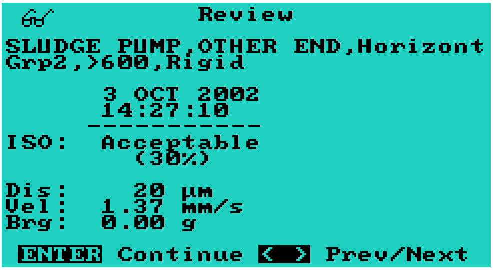
The icon appears at the top left of the screen to indicate that you are in review mode.



In the example, there are three recordings in the list differentiated by the date on which they were taken. Information about the machine is shown at the top of the screen. SLUDGE PUMP is the name of the machine, OTHER END is the name of the point and HORIZONTAL is the direction at which a recording has been taken. The numbers beside each name simply indicate the memory location used e.g. SLUDGE PUMP is the first machine in the Select Machine Menu list, OTHER END is the 2nd point in the Select Point Menu list. The numbers do **not** refer to how many points or measurement directions are attached to the machine.

- Use the ∧ or ∨ keys to highlight the recording to be reviewed.

- Press ENTER to review the highlighted recording.




- Use SHIFT + < 9 or > 0 to scroll through the recordings for the selected location. You can also return directly to the Select Recording Menu to choose another recording by pressing ENTER

**To select a different machine, point or direction to review**

- To return to a previous screen, press SHIFT + BACK 6 repeatedly until the required screen displays. You can then select recordings under other machines, points, and directions.

**To change the measurement units displayed**

- From the Main Menu press RESET 1 New Measurement.

- Press Display Options and use the number keys to toggle the measurement units displayed. See Section 3: Selecting Display Options for instructions on how to do this.

- When you have selected the required measurement units, return to the Review Menu (follow previous instructions in this section). The measurement units will update to match the new display options.

# Making a Baseline Recording

A baseline recording is an initial measure of vibration levels against which all future recordings can be compared. Ideally you should take a baseline recording when the machine is in good condition i.e. its vibration falls within the 'acceptable' ISO level.

A machine can have many baseline recordings defined but it cannot have more than one baseline on the same axis. For example, a single machine point can have both vertical and horizontal baseline recordings, but it cannot have two horizontal baselines.

- From the Main Menu, press Record / Review / Report. The Select Machine Menu will display.

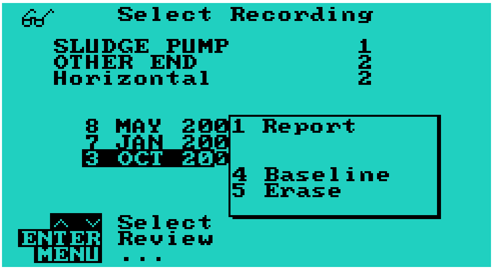
- Use the or keys to highlight the machine containing the recording you wish to mark as a baseline, then press to select the machine. The Select Point Menu will display.

- Highlight the point containing the recording, then press . The Select Direction Menu will display.

- Highlight the required direction, then press . The Select Recording Menu will display.

- Highlight the recording you wish to mark as baseline, then press 

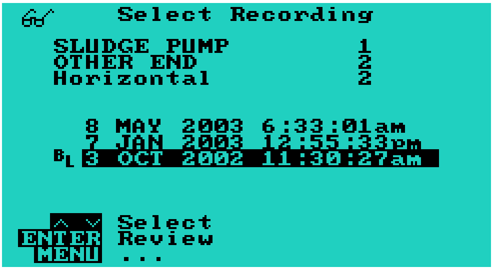
to display a pop-up menu containing the Baseline option.



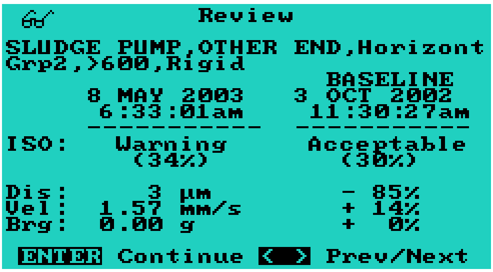

- Press 

. The letters 

now appear to the left of the recording indicating that it is a baseline recording.




In the example, the horizontal axis has a baseline recording set. When one of the other recordings in the list is selected for reviewing, both it and the baseline recording appear on the Review Menu.



Any change in vibration level is shown as a percentage of difference in the BASELINE column.

**To change which recording is set as the baseline**
Follow the previous instructions for setting a baseline. When the new recording is set as the baseline, the previous baseline will lose the  indicating that it is now a normal recording.

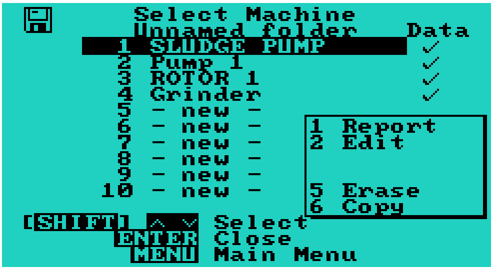
# Copying a Machine

If you have many identical machines you can save a lot of set up time by using the vb's copy function. Copying a machine creates a new machine with the same machine class, running speed, number of points and directions etc. Any recordings taken on the original machine are **not** copied to the new machine.

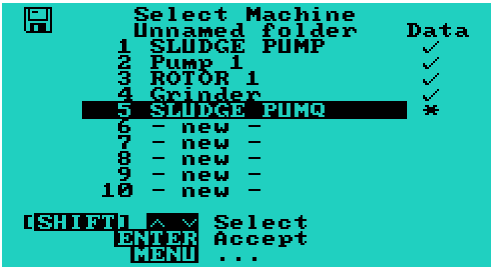
- From the Main Menu, press 

Record / Review / Report, to display the Select Machine Menu.
- Use the   keys to highlight the machine you wish to copy.
- Press 

to display a pop-up menu containing the Copy option.



- Press BACK 6 to select the Copy option. The copied machine appears in the first unused slot in the list.




The name is the same as that of the original machine except for the last character, which is automatically incremented. The * icon appears to the right of the new machine to indicate that it has one or more points and directions defined, but that no recordings have been taken.

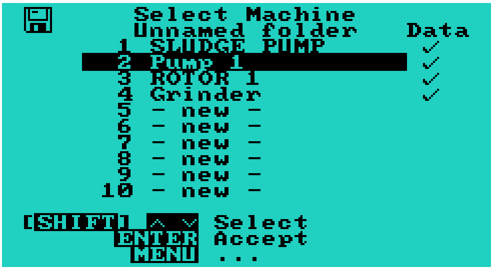
# Erasing a Machine

Erasing a machine will remove both it, and any recordings saved under that machine name, permanently from memory. To erase all machines at once, see Section 7: Erasing all Machines.

- From the Main Menu, press 

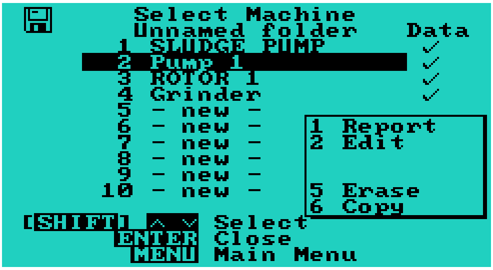
Record / Review / Report, to display the Select Machine Menu.

- Use the   keys to highlight the machine you wish to erase.




- Press 

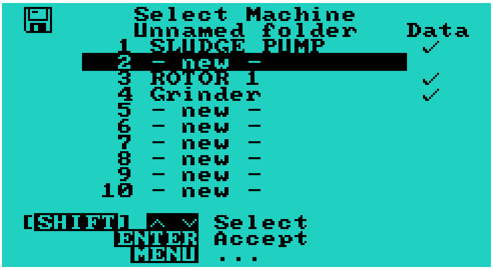
to display a pop-up menu containing the Erase option.



- Press 5 to select the Erase option. A message appears asking you to confirm the erasure. This message will vary depending on whether you have collected recordings for this machine or saved recordings to a PC.

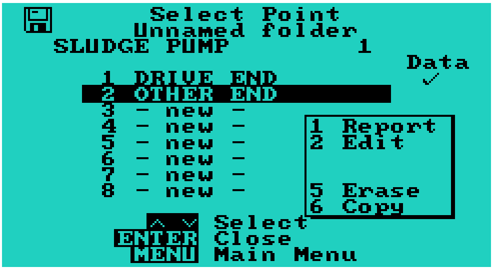

- Press SHIFT + RESET 1 to erase the machine. If another confirmation message appears, press these keys again.

The machine will now be removed from the list and the empty slot will be re-labeled **- new -**.



# Copying/Erasing a Point

Copying and erasing points is performed in the same manner as copying and erasing machines. Follow the previous instructions in this section for copying or erasing a machine but ensure that you have the Select Point Menu displayed instead of the Select Machine Menu.



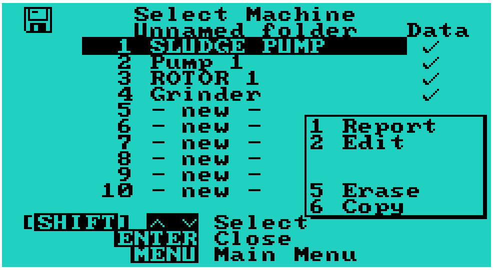

- To display the Select Point Menu, from the Main Menu press  Record / Review / Report. This displays the Select Machine Menu.

- Press  to display the Select Point Menu and follow previous instructions for copying/erasing a machine.

# Displaying Pop-Up Menus

Wherever MENU··· appears at the bottom of the screen, you can press MENU to display a pop-up list of all the available options for the current menu. In the following example, pressing MENU in the Select Machine Menu displays these options:

**1. Report** (outputs a report to a PC)
**2. Edit** (change the name of the selected machine)
**5. Erase** (delete the machine and its recordings from memory)
**6. Copy** (create a copy of the machine)




The number beside each menu item indicates the key that must be pressed to perform that function e.g. pressing BACK 6 will copy the currently selected machine. These functions can all be accessed directly e.g. with the Select Machine Menu displayed, pressing BACK 6 will copy the currently selected machine without having to display the pop-up menu. The pop-up menus are used as a reminder of commonly used functions so that you do not have to memorize the number key for each function.

The pop-up menu will disappear automatically within a few seconds or you can cancel it by pressing ENTER. To keep the window on screen, hold down MENU.

# Erasing a Recording

Erasing a recording will remove it permanently from memory. To erase all recordings for all machines, see Section 7: Erasing all recordings.

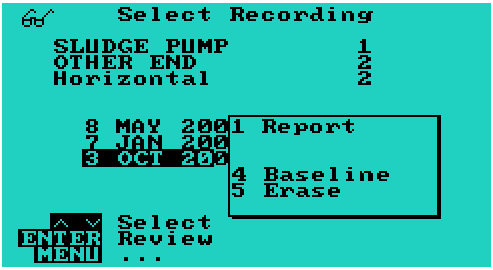
- From the Main Menu, press HELP 2 Record / Review / Report. The Select Machine Menu will display.

- Use the  or  keys to highlight the machine containing the recording you wish to erase then press ENTER to select the machine. The Select Point Menu will display.

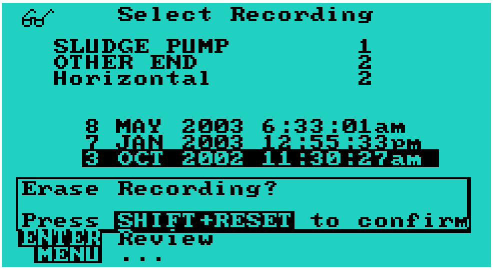
- Highlight the required point then press ENTER. The Select Direction Menu will display.

- Highlight the required direction then press ENTER. The Select Recording Menu will display a list of all the recordings taken at this direction.

- Press MENU to display a pop-up menu containing the Erase option.



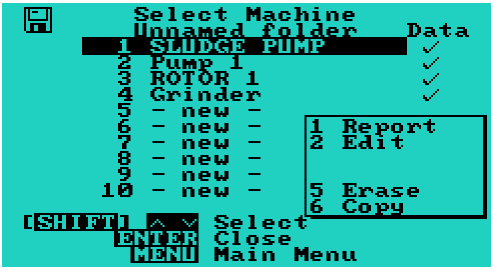
- Press 5 to select the Erase option. A message appears asking you to confirm the erasure.




- Press SHIFT + RESET 1 to erase the recording.

# Creating a Report

The Report option allows data to be transferred from the vb to a computer for record keeping or additional analysis. The Report option is available in the pop-up menu within Record / Review / Report.




Data from a selected Machine, Point or Direction is sent to the computer via a terminal communication program when the Report option is selected.

Reports on a selected machine will include the data for all its points and directions by default. Alternatively individual points and axes may similarly be reported upon.

All reports will produce a comma delimited output showing the following columns of data:

**Machine Name, Point, Axis/Direction, Date, Time, ISO Level, Units**

The report output will not include the above column headers, but will look like the following for each report option:

**All recordings on a machine**

*SLUDGE PUMP, DRIVE END, Vertical, 14 OCT 2003, 14:44:35, Warning, 29%, 5, µm, 0.16, mm/s, 0.00, g*

*SLUDGE PUMP, OTHER END, Horizontal, 14 OCT 2003, 14:27:10, Acceptable, 30%, 20, µm, 1.37, mm/s, 0.00, g*

*SLUDGE PUMP, OTHER END, Horizontal, 14 OCT 2003, 16:40:55, Acceptable, 7%, 5, µm, 0.16, mm/s, 0.00, g*

*SLUDGE PUMP, OTHER END, Horizontal, 14 OCT 2003, 16:41:30, Warning, 34%, 3, µm, 1.57, mm/s, 0.00, g*

*SLUDGE PUMP, OTHER END, Vertical, 14 OCT 2003, 14:29:34, Acceptable, 27%, 19, µm, 1.24, mm/s, 0.00, g*

*SLUDGE PUMP, OTHER END, Axial, 14 OCT 2003, 14:30:35, Warning, 31%, 2, µm, 1.41, mm/s, 0.00, g*

**All recordings on a point**

*SLUDGE PUMP, OTHER END, Horizontal, 14 OCT 2003, 14:27:10, Acceptable, 30%, 20, µm, 1.37, mm/s, 0.00, g*

*SLUDGE PUMP, OTHER END, Horizontal, 14 OCT 2003, 16:40:55, Acceptable, 7%, 5, µm, 0.16, mm/s, 0.00, g*

*SLUDGE PUMP, OTHER END, Horizontal, 14 OCT 2003, 16:41:30, Warning, 34%, 3, µm, 1.57, mm/s, 0.00, g*

*SLUDGE PUMP, OTHER END, Vertical, 14 OCT 2003, 14:29:34, Acceptable, 27%, 19, µm, 1.24, mm/s, 0.00, g*

*SLUDGE PUMP, OTHER END, Axial, 14 OCT 2003, 14:30:35, Warning, 31%, 2, µm, 1.41, mm/s, 0.00, g*

**All recordings on an axis/direction**

*SLUDGE PUMP, OTHER END, Horizontal, 14 OCT 2003, 14:27:10, Acceptable, 30%, 20, µm, 1.37, mm/s, 0.00, g*

*SLUDGE PUMP, OTHER END, Horizontal, 14 OCT 2003, 16:40:55, Acceptable, 7%, 5, µm, 0.16, mm/s, 0.00, g*

*SLUDGE PUMP, OTHER END, Horizontal, 14 OCT 2003, 16:41:30, Warning, 34%, 3, µm, 1.57, mm/s, 0.00, g*

# Transferring Data to a PC

**Note:** Any other terminal communication program such as HyperTerminal (located under Accessories>Communications on Windows systems) may be used in place of the Report Grabber.

- Connect the supplied serial cable to the RS232 port on the vb and the serial COM port on the PC.

- On the PC, open the Report Grabber software.

- Follow the onscreen instructions to enable Report Grabber to receive data from the vb.

- On the vb select the machine to report on from within Record / Review / Report.

- Press **MENU** to open the pop-up menu and select 1 Report to send the machine report to the Report Grabber.

Sent data appears in the Report Grabber and is automatically placed on the clipboard of the PC for pasting into spreadsheets and other documents.

Use the following COM port settings with any terminal communication program:

- Baud Rate: 57 600
- Data Bits: 8
- Parity: None
- Stop bits: 1
- Flow Control: Hardware

# Installing Report Grabber

Report Grabber is a terminal communication program that handles data transfer from the vb to the PC. Report Grabber is available for download from www.commtest.com under the Products link (Products>VB Series>VB100).

After downloading, install Report Grabber by double-clicking the downloaded file. This will create a desktop icon on the PC. Double-click the icon to run the Report Grabber program. Follow the on-screen commands to copy and paste data from Report Grabber into a text editor or spreadsheet program on your PC.

# Section 5: Folder Management

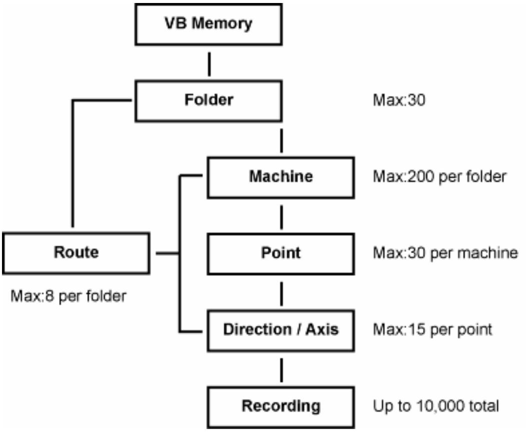
This section outlines the procedures for managing folders with your vb.

In this section you will learn to:

- Use folders to store your machines
- Select a folder
- Create a folder
- Erase a folder

# Creating a Data Storage Structure

The vb has the following recording storage structure.




Routes, folders, machines and points are identified by the names you give them. Recordings are identified by their date and time stamp.

If recordings are to be taken for a large number of machines on a regular basis, we recommend that you create your own data storage structure so that recordings can be filed away in named folders for easy selection and retrieval. Once a folder has been created, a list of all machines to be monitored can be stored in that folder. This can be done as follows:

1. Create a folder to hold a group of machines. Give it a descriptive name e.g a name that describes the type of machines that will be stored in it.

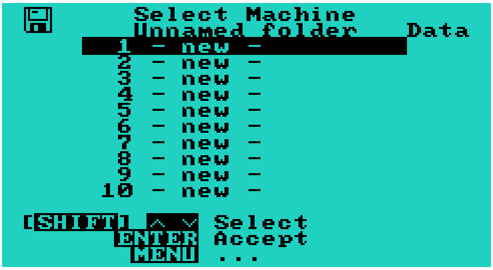
2. Create the first machine within that folder.

3. Create a point on the machine at which data will be collected, then assign directions to that point.

4. Create the rest of the points for this machine.

Once a machine is complete, you can continue to fill the folder with machines and create new folders as needed.

**Note:** The first 200 machines will be automatically stored in the vb's default folder 'Unnamed folder'. The folder name can be edited in the same manner as machine and point names. Once the first 200 memory locations within Unnamed folder are filled with machines, you will need to create a new folder. The following screen shows a partial list of memory locations within Unnamed folder that can be used to hold your machines.

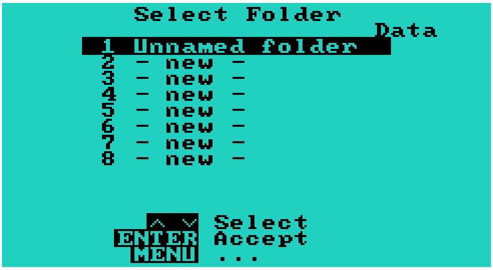


# Selecting, Creating and Erasing a Folder

Selecting a folder from the list loads it into current memory. Any new machines you create will automatically be stored in this folder until you select another folder.

### To select a folder

- From the Main Menu, press LIGHT 3 Folder to display the Select Folder Menu.




If you have not yet created any folders, the screen will contain the default folder (Unnamed folder) and numbered slots labeled **- new -**.

- To select an existing folder from the list, press ∧ or ∨ to highlight the folder then press ENTER to select it. This loads the folder into current memory and returns you to the Main Menu.

### To create a folder

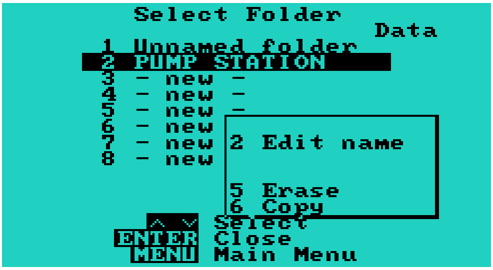
- Use the ∧ or ∨ keys to scroll to one of the slots labeled **- new -** then press HELP 2 to display the Edit Name Menu.
- Enter a name for the folder by choosing characters from the keyboard (see Section 2: Entering Text and Numbers, for details of how to do this).
- Press ENTER to save the name and return to the Select Folder Menu.

### To erase a folder

- Use the  or  keys to highlight a folder in the list.

- Press 

to display a pop-up menu containing the Erase option.




- Press 

to select the Erase option. A message appears asking you to confirm erasure.

- Press 

\+ 

to erase the folder.

The folder will be removed from the list and the empty slot will be re-labeled **- new -**.

# Section 6: Route Management

This section outlines the procedures for managing routes with your vb.

In this section you will learn to:

- Name a route
- Create route entries
- Edit a route
- Erase a route
- Use a route to take recordings

# What is a Route?

A route is an ordered list of measurement locations a user can follow when taking recordings. By using a route, the task of taking recordings becomes much simpler and the potential for mistakes, e.g. missing a measurement point, can be minimized.

Before creating a route, you must first create your measurement locations (machines, points, and axis). Each new route is created by selecting, in any order, these machines and locations.

Each folder can contain up to 8 routes. Each route can only contain machines that are stored in the same folder as the route.

# Naming a Route

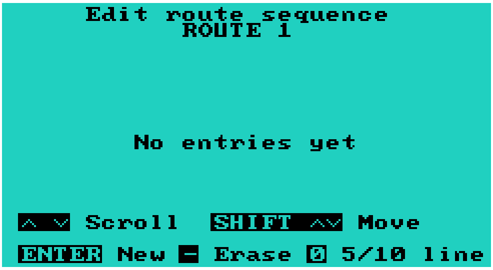
- From the Main Menu, press  to display the Select Route Menu.


- Use the  or  keys to scroll to one of the slots labeled **- new -** then press  to display the Edit Name Menu.
- Enter a name for the route by choosing characters from the keyboard (see Section 2: Entering Text and Numbers, for details of how to do this).
- Press  to save the name and return to the Select Route Menu.

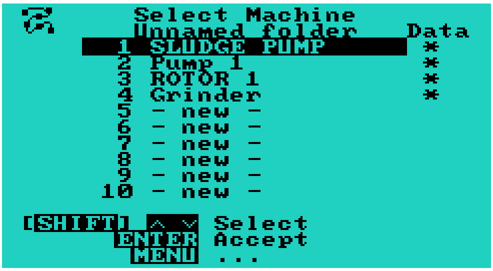
# Creating Route Entries

- Name the new route if required then press MENU from the Select Route Menu to display a pop-up menu.


- Press LIGHT 3 to display the Edit Route Sequence Menu.




- To add to the route press ENTER to display the Select Machine Menu.



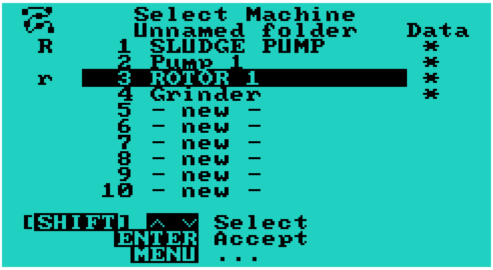
The icon appears in the top left-hand corner of the screen to indicate that items are being added to a route.

- Use the or keys to highlight a machine.

- Press RESET 1 if you wish to add the entire machine (all of its points and measurement directions) to the route. An R will appear to the left of the machine name to indicate it is now on the route.

- Alternatively, if not all points and directions on a machine are to be included in a route, press ENTER to go to the Select Points level to choose the points. Press ENTER again to go to Select Direction level to choose directions.

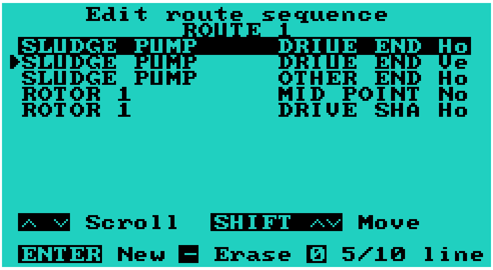
- Press RESET 1 to add the selected item to the route. An r will appear to the left of the machine/point/direction to indicate that only some items on the machine have been included in the route.




- Press SHIFT + BACK 6, repeatedly if necessary, to go up the levels from direction to point to machine.

- Continue to select machines/points/directions to add to the route.

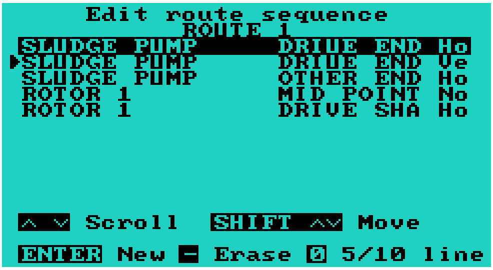
- Press LIGHT 3 to return to the Edit Route Sequence Menu. This will update to show the list of entries included in your route.



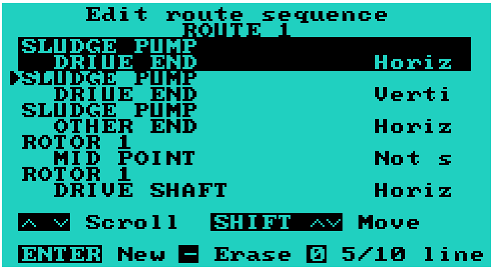

- Press MENU repeatedly to return to the Main Menu.

# Editing a Route

- From the Main Menu, press Route to access the Select Route Menu.
- Use the or keys to highlight the route to be edited.
- Press to display a pop-up menu of available options.
- Press to select the Edit Route option and display the Edit Route Sequence Menu.




- To expand the list and make it easier to read, press

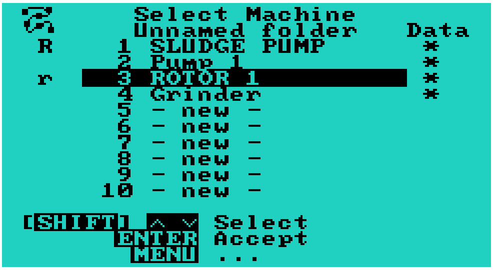



- To condense the list again, press

## Inserting an Entry Into a Route

- Use the or keys to move the icon to the location where you want to insert an entry.

- Press ENTER to display the Select Machine Menu.




- Use the or keys to scroll up and down the machine list and ENTER to go down to the next level (points and directions). Press SHIFT + BACK 6, repeatedly if necessary, to go up the levels from direction to point to machine. See this section: Creating a Route, for details of how to navigate through the menus.

- Press RESET 1 to insert the highlighted item into the route sequence. Repeat for further items.

- Press LIGHT 3 to return to the Edit Route Sequence Menu.

## Moving a Route Entry

- In the Edit Route Sequence Menu, use the or keys to highlight the route entry you wish to move.

- Press SHIFT + or SHIFT + to move the entry up or down the list.

## Erasing a Route Entry

- In the Edit Route Sequence Menu, use the ∧ or ∨ keys to highlight the route entry you wish to erase.
- Press SHIFT + −/5 to erase the entry.

# Erasing an Entire Route

**Warning:** The following procedure erases all route entries. Erasing a route does not erase the machines that make up the route entries.

- From the Main Menu, press +/4 to display the Select Route Menu.
- Use the ∧ or ∨ keys to highlight the route you wish to erase
- Press −/5 to erase the route. You will be prompted to confirm.
- Press SHIFT + RESET/1 to confirm.

# Using a Route to Take Recordings

- From the Main Menu, press + 4 Route.
- Use the ∧ or ∨ keys to highlight the route you wish to use.
- Press START STOP to go to the first entry location.

Your screen will look like this:


- Connect the accelerometer to the location shown on the vb then press START STOP to begin recording a measurement.
- Once the vb has finished recording, press START STOP to retake the measurement or ENTER to save the measurement.

The vb will automatically display the next location on the route. Repeat the process to take recordings for all route entries.

- To skip to another measurement location without taking a recording, press ∧ or ∨
- To move forward or backward to another machine, press SHIFT + ∧ or ∨

# Section 7: System Utilities

This section describes how to use the utility functions of your vb.

In this section you will learn to:

- Check memory usage
- Erase machines and recordings
- Set the date and time
- Adjust the screen contrast
- Manage the vb battery pack
- Upgrade the instrument firmware

# Memory Management

## Checking the Memory Used

The vb has a standard memory size of 256 KB that can store up to 10 000 recordings.

- From the Main Menu, press 5 System Utils.
- The percentage of memory used is displayed beside the first menu option '**1 Memory**'.

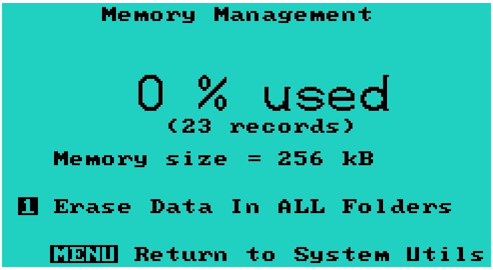
**Note:** If more than 98% of memory is used, you will need to erase some recordings before further recordings can be taken.

# Erasing all Recordings

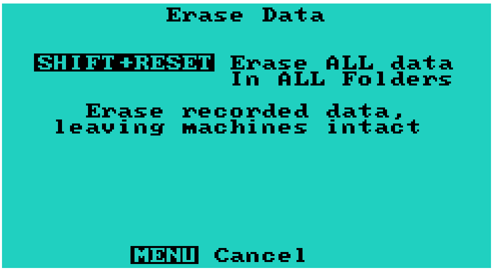
**Warning:** The following procedure will remove all recordings from every machine permanently from memory. This cannot be undone.

Erasing all recordings removes each machine's recordings permanently from memory but retains the machines, points and directions that contain the data.

- From the Main Menu, press – 5 System Utils.
- Press RESET 1 to access the Memory Management Menu.




- Press RESET 1 to select Erase Data In ALL Folders. The Erase Data Menu displays.




- Press SHIFT + RESET 1 to erase all data (recordings). You will be prompted to confirm the erasure.

- Press SHIFT + RESET 1 again to confirm or MENU to cancel. The Erase all Folders Menu displays with a message confirming there are no recordings in memory.

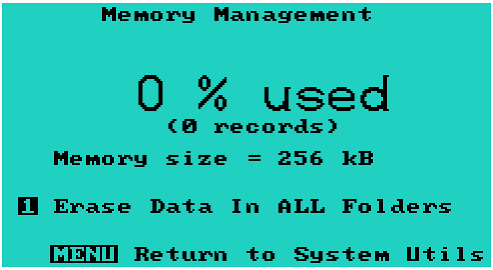
## Erasing all Machines

**Warning:** The following procedure will remove all machines and recordings permanently from memory. This cannot be undone.

Erasing machines is a two-stage process. Before erasing machines, any recordings must first be erased. See the previous topic, Erasing all Recordings, for details of how to do this.

- When the Erase all Folders Menu appears, press SHIFT + RESET 1 to erase all folders and machines contained within them. You will be prompted to confirm the erasure.

- Press SHIFT + RESET 1 again to confirm or MENU to cancel. Once the machines have been erased you will be returned to the Memory Management Menu.




The screen displays **( 0 records )** indicating that all data has been erased.

# Setting Date/Time

## Checking the Date and Time

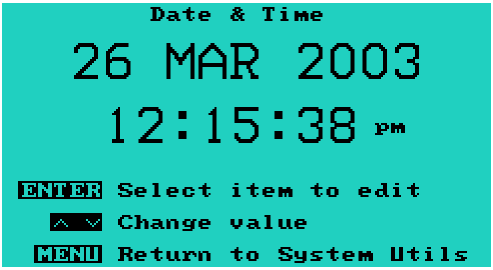
- From the Main Menu, press – 5 System Utils.

- Press HELP 2 to select the Date/Time option.

The date and time will be displayed. All recordings are date and time stamped according to the clock shown in the Date & Time Menu.

## Setting the Date and Time

- Press ENTER in the Date & Time Menu to activate the cursor.
- Press ENTER repeatedly, if necessary, to highlight the item you wish to edit. The item will flash to show that it has been selected.
- Use the ▲ or ▼ keys to increase or decrease the setting on the selected item.




- Press MENU to accept the changes and return to the Main Menu.

# Adjusting the LCD

## Adjusting the Contrast

- From the Main Menu, press 5 System Utils.
- Press and hold the ▲ or ▼ keys for several seconds to darken or lighten the screen.

## Restoring the Default Contrast

- From the System Utils Menu, press SHIFT + RESET 1 to restore the default contrast setting.

# Turning the Backlight On/Off

- From any screen, press SHIFT + LIGHT 3 to turn the backlight on or off.

**Note:** The backlight consumes a relatively high level of power and automatically turns off if the battery voltage falls below 6.1 V.

# Battery Management

The instrument is powered by a rechargeable Nickel-Cadmium (Ni-Cad) battery pack. The normal operating range is (6.0 to 8.5) V. The Battery Management Menu displays the current percentage of full battery charge available.

Some automatic features have been built into the instrument to help ensure that the battery pack is always sufficiently charged.

**Below 6.6 Volts**, the instrument displays a flashing icon at the top left corner of the screen and beeps once every minute as a reminder that the battery pack needs to be charged. In the Battery Management Menu, a flashing 'Low Battery' message is also displayed.

**Below 6.1 Volts**, the instrument automatically turns off the backlight to prevent further power draining.

**Below 80% battery capacity**, the instrument automatically begins to charge the battery pack if external power is supplied.

**At 5.5 Volts**, the instrument automatically powers down. The power saver is another feature that helps conserve power.

The instrument is equipped with an internal backup component that protects data and settings in the event the battery pack is momentarily removed from the instrument. The backup component is kept charged by the battery pack if the battery pack is functioning normally.

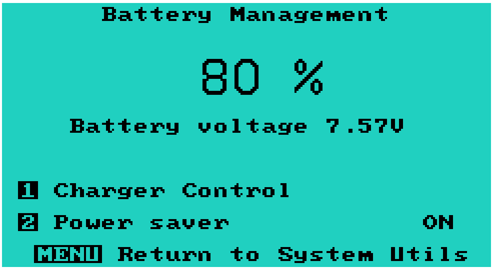
**Warning:** Do not detach the battery pack from the instrument for more than 2 hours as this will drain the backup component, thereby causing data and setting to be lost.

**Warning:** Before charging the battery pack, ensure that the power transformer used is an approved instrument power transformer (13.5 ± 1.5) V DC, 1 A output, center positive, and that the voltage and frequency of your mains AC power matches that of the power transformer.

The battery pack can be charged by supplying (13.5 ± 1.5) V DC, 1 A power to the instrument charger socket. The power transformer supplied in the kit provides this DC voltage. The optional car adapter charging lead may also be used to charge the battery pack in a vehicle with a 12 V negative-chassis power system.

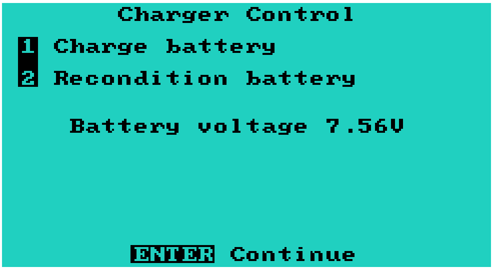
## Checking the Battery Charge and Voltage

- From the Main Menu, press 5 System Utils.
- Press LIGHT 3 to display the battery charge level and voltage.




## Charger Control

This menu allows manual control of the battery charge function. The current battery voltage and charging state are displayed.



RESET 1 **Charge Battery**
Manually begins battery charging cycle.

HELP 2 **Recondition Battery**
Fully discharges, and then automatically recharges the battery.

These options are explained in detail in the following pages.

## Recharging the vb

**Warning:** Read the warnings in Battery Management (on page 68) before charging the battery.

- Plug the power transformer into a standard power outlet and the connector to the instrument's charger socket.

If the battery charge level is less than 80% the battery will begin charging automatically. You can continue to use the vb while the battery pack is being charged.

If the battery does not begin charging automatically, access the Battery Management Menu and follow the instructions below to begin charging.

- Press RESET 1 to display the Charger Control Menu.
- Press RESET 1 to begin charging. A flashing 'CHARGING' message will be displayed.

If there is no power coming from the power transformer, a flashing 'NO CHARGER' message will be displayed. If this happens, check that the mains power is turned on and the battery adapter is connected properly.

Charging stops automatically when complete or you can press START STOP in the Charger Control Menu to stop the charging. A full charging cycle takes approximately two and a half hours.

# Reconditioning the Battery Pack

**Warning:** Read the warnings in Battery Management (on page 68) before performing this operation.

Battery reconditioning is the process of first discharging and then recharging batteries. It reduces the undesirable memory effect in the Ni-Cad battery. The battery pack should be reconditioned the first time it is used and at least once a month thereafter to prevent battery degradation. The recondition process will take up to two hours, depending on initial battery charge.

**Caution:** If the battery pack is not reconditioned the first time it is used, the battery charge displayed may be incorrect.

- Plug the instrument power transformer to a standard power outlet and its connector to the instrument charger socket.
- Access the Battery Management Menu.
- Press RESET 1 to access the Charger Control Menu.
- Press HELP 2 to recondition the battery. Discharging is indicated by the flashing 'DISCHARGING' message on the screen.

The instrument automatically proceeds to charge the battery once the battery pack is fully discharged.

## Power Saver

The power saver is a feature that helps conserve power on the vb. Power saver will turn the LCD display off after 8 minutes of inactivity (no key presses). The instrument will continue to function and any key press will turn the LCD back on to the previously displayed screen. After 15 minutes of inactivity, power saver will power down the vb. If the battery is being recharged, only the LCD screen will be turned off and the instrument will remain on until charging is complete.

The power saver is automatically turned on every time the instrument is powered up. You may turn it off temporarily by toggling power saver OFF from the Battery Management Menu.

- From the System Utils Menu, press LIGHT 3 Battery
- Press HELP 2 to turn the power saver feature on or off.

## Replacing the Battery Pack

- Lift the boot stand.
- Unscrew the battery pack using a suitable screwdriver and screw in the new one.

**Warning:** Ensure that the battery pack is securely fastened but not over-tightened.

# Upgrading Firmware Using PROFLASH

To upgrade the vb to the latest version of firmware you PROFLASH the instrument with the new firmware file. When an upgraded firmware version is available it will be posted on the Commtest Instruments Ltd website and can be downloaded free of charge from www.commtest.com under downloads>vb series download.

- To view your vb's firmware version, turn the vb off then on again. The current firmware version is displayed at power up.


**Warning:** PROFLASHING will erase ALL recordings in the instrument memory.

- With the instrument turned on, connect and turn on the charger *OR* ensure the battery voltage is 7.0 or higher.

- Connect the vb to a PC using the supplied communication cable.

- Download the latest firmware version from the Commtest website. The file will be called **VB_xxxyy.exe** where xxx = the version number and yy = language translation.

- Double-click the downloaded file and follow the on-screen instructions.

**Note:** PROFLASHING the instrument takes approximately one minute. Do **not** interrupt the process as this will damage the instrument. The vb's LCD screen will advise when the process is complete.

# Section 8: Troubleshooting

## Contacting Technical Support

If you have any problems, please contact Commtest support staff directly for assistance. Our e-mail address is help@commtest.com.

We also provide a searchable knowledge base of frequently asked questions (FAQ) on our website.

- The knowledge base can be found at www.commtest.com. Click the FAQ link to access the knowledge base.

# Resetting the vb

**Warning: If the vb does not respond to any key press while it is operating it will continuously draw power until it is reset and turned off. It is therefore important to reset a non-responding vb as soon as possible.**

- In any screen, hold down RESET 1 and press ON OFF then release to reset the instrument.

Resetting the vb does not erase data or stored settings.

# Power Problems

| Symptom | Cause | Remedy |
|---|---|---|
| Instrument cannot power up | Low battery level<br>Electrostatic discharge (ESD exceeding 8 kV) | Charge battery pack<br>Reset instrument |
| Instrument powers down when backlight is turned on | Low battery level | Charge battery pack |
| Instrument powers down shortly after powering up | Low battery level | Charge battery pack |

# Data Problems

| Symptom | Cause | Remedy |
|---|---|---|
| 'Insufficient Memory' is displayed | No memory space left for new recordings | Erase obsolete recordings |
| Measured data is inconsistentt | Accelerometer mounted to wrong location<br>Accelerometer not mounted properly<br>Accelerometer damaged | Mount accelerometer on substantial structures near bearings and in the appropriate location and orientation<br>Ensure accelerometer is mounted firmly<br>Replace accelerometer |
| 'No Route' displayed | No route present in the vb | Create a route |

# Other Problems

| Symptom | Cause | Remedy |
|---|---|---|
| vb does not respond to any key press | Electrostatic discharge exceeds 8 kV | Reset the vb |
| vb does not seems to measure | Accelerometer not connected | Connect accelerometer |
| | Accelerometer damaged | Replace accelerometer |
| | Accelerometer cable damaged | Replace accelerometer cable |

# Appendix A: Specifications

Note: These specifications may be changed without notice.

| Specifications | Model vb100 | Remarks |
|---|---|---|
| **Accelerometer Input** | | |
| Number of channels | 1 | |
| Type | 2-wire, low impedance piezoelectric | Commonly termed “ICP® type” |
| Sensitivity | 100 mV/g | |
| Connector | BNC | Safety feature: break-free inline connector |
| Input impedance | 500 kΩ | |
| Voltage swing | 18 V peak-to-peak | AC coupled input, allows for ± 8 V sensor output swing (80 g) |
| Sensor excitation current | 2.2 mA | 2.2 mA required for ICP® type accelerometer |
| Sensor excitation voltage | 24 V maximum | at sensor terminals with sensor attached |
| **Parameter Indication** | | |
| Displays | ISO level,% of danger level, velocity displacement | Uses ISO 10816-3 (Acceptable, Warning, Alert Danger) |
| Maximum velocity level | 71 mm/s rms (2.8 in/s rms) | Approximate, depending on individual calibration |
| Maximum displacement level | 71 mm rms (280 mils rms) | Approximate, depending on individual calibration |
| Velocity resolution | 0.01 mm rms (0.0001 in/s rms) | |
| Displacement resolution | 0.001 mm rms (0.04 mils rms) | |
| Acceleration resolution | 0.00 g | |
| Units | in/s or mm/s, mil or mm or µm, g | User selectable (all rms) |
| Accuracy | ± 1% | Measured at 100 Hz, 23 ± 5 ºC |
| Frequency range | (2 to 1000) Hz, (10 to 1000) Hz (120 to 60 000) CPM ( 600 to 60 000) CPM | Automatically selected depending upon running speed selection |
| **Time Intervals** | | |
| Typical measure and record | 4 seconds | For running speed > 600 RPM not including initial startup and settling time |
| **Logging Features** | | |
| Output formats | Text format via serial comms<br>Includes locations, date, levels | Can be pasted into spreadsheet programs |
| Data storage | 10 000 recordings | Each recording has unique time/date stamp |
| Data storage format | Up to 780 named machines in 30 Data Folders (maximum 200 machines per data folder)<br>Up to 30 multi-axial points per machine<br>Up to 8 routes per folder | User-specified machine, point and axis names (16 characters) entered from vb keypad (an external keyboard can be used to build the machine database)<br>A route guides the user through a pre-defined list of measurement locations |
| **Display** | Graphic LCD | |
| Resolution | 240 x 128 pixels | |
| Viewing area | 4.3” x 2.3” (110 x 60) mm | |
| Backlight | Electro-luminescent | |
| PROFLASH | Allows vb firmware to be upgraded via built-in serial port | Download firmware service packs via the Internet |
| **Communications** | RS232 | 15 kV ESD protected. Cable with DB9 connector. |
| Baud rate | 57 600 bits per second | |
| **Battery** | | |
| Type | Custom Nickel-Cadmium pack | |
| Voltage | 7.2 V nominal | |
| Capacity | 1500 mAh nominal | |
| Operating time (typical) | 9 hours with backlight off<br>6 hours with backlight on | Depends on mode and setup. |
| **Charger and Conditioner** | Integral charger – automatic and manual control | Power transformer with 13.5 ± 1.5 VDC, 1 A output included in kit. |
| Charge rate | 0.7 A nominal | 2.5 hours for complete charge nominal |
| Discharge rate | 0.5 A nominal | Combats NiCad battery memory effect |
| **Mechanical** | | |
| Size | 9.7" W x 6.1" L x 3.0" H (247 x 154 x 75) mm | Including protective boot |
| Weight | 4.4 lb (2 kg) | Including protective boot and strap |

| | | |
|---|---|---|
| **Environmental** | | |
| Temperature/Humidity | | |
| Operating | (32 to 122) °F (0 to 50) °C | |
| | 80% RH (32 to 86) °F | Non-condensing |
| | 70% RH (86 to 122) °F | Non-condensing |
| Storage | (14 to 140) °F (-10 to 60) °C | |
| | 95% RH | |
| EMC | EN50081-1 | Radiated and conducted emissions |
| | EN50082-1 | RF field, ESD and fast transient immunity |

# Appendix B: ISO Definitions

The vb100 implements the ISO 10816–3/BS7854-3 standard as detailed below. Other ISO standards are included in this section for reference purposes only.

**ISO 2372**
First released in 1974 and revised in 1985, this standard gives a simple overall velocity rms limit requiring minimal amount of knowledge about the machine configuration.

**ISO 10816**
A more recent standard (1995/96), this also specifies a simple overall velocity (and in some cases a displacement) rms limit. The machine categories are a little more specific - The kind of information that you need is typically machine size (power) and rotational speed.

**ISO 10816-2 / BS 7854-2**
This part of ISO 10816 is applicable to steam turbine generator sets exceeding 50 MW with a normal operating speed of 1500 r/min, 1800 r/min, 3000 r/min or 3600 r/min. It includes steam turbines and generators which are directly coupled to a gas turbine (such as for combined cycle applications), but in such cases the criteria of this part of ISO 10816 apply only to the steam turbine and the generator.

**Note:** Evaluation of the gas turbine vibration should be carried out in accordance with ISO 10816-4.

**ISO 10816-3 / BS 7854-3**
This part of the ISO applies to industrial machines with nominal power above 15 kW and nominal speeds between 120 r/min and 15000 r/min when measured in situ. The vibration criteria provided in this part of ISO 10816 apply to machine sets with, for instance, steam turbine or electrical drivers, having a power above 15 kW and operating speeds between 120 r/min and 15000 r/min.

The machine sets covered by this part of ISO 10816 include:

- steam turbines with power up to 50 MW

- steam turbine sets with power greater than 50 MW and speeds below 1500 r/min or above 3600 r/min (not included in ISO 10816-2)
- rotary compressors
- industrial gas turbines with power up to 3 MW
- pumps of centrifugal, mixed flow or axial flow type
- generators, except when used in hydraulic power generating and pumping plants
- electrical motors of any type
- blowers or fans

**Note:** The following are **excluded** from this part of the standard:
- land-based steam turbine generator sets with power greater than 50 MW and speeds of 1500 r/min, 1800 r/min, 3000 r/min, or 3600 r/min (see ISO 10816-2)
- gas turbine machines with power greater than 3 MW (see ISO 10816-4)
- machine sets in hydraulic power generating and pumping plants
- machines coupled to reciprocating
- rotary positive displacement compressors (e.g. screw compressors)
- reciprocating compressors
- reciprocating pumps
- submerged motor-pumps
- wind turbines

**ISO 10816-4 /BS 7854-4**

This part of ISO 10816 is applicable to gas turbine driven sets, excluding aircraft derivatives, and gives specific guidance for assessing the severity of vibration measured on the bearing housings or pedestals. It is applicable only to heavy-duty gas turbines used in electrical and mechanical drive applications covering the power range above 3 MW and a speed range under load between 3000 r/min and 20,000 r/min. This includes gas turbines directly coupled to other prime movers such as steam turbines. The evaluation of the steam turbine vibration is not dealt with in this part of ISO 10816 (see the exclusion list). Is also includes any driven equipment not included in the exclusion list.

The criteria are applicable only for the vibration produced by the machine set and not for vibration which is transmitted to the machine set from external sources.

# How Should Your Machine be Classified

Answer the following three questions to classify the machine for measurement according to the ISO 10816-3 / BS 7854-3 specification.

- Choose the machine group classification

**Group 1:** Large machines with rated power above 300 kW (400 hp); electrical machines with shaft height H >= 315 mm (12 in). These machines normally have sleeve bearings. The range of operating speeds is relatively broad and ranges from 120 RPM (2 Hz) to 15 000 RPM (250 Hz)

**Group 2:** Medium-size machines with a rated power above 15 kW (20 hp) up to and including 300 kW (400 hp); electrical machines with shaft height >= 160 mm (6 in). These machines normally have rolling element bearings and operating speeds above 600 RPM (10 Hz)

**Group 3:** Pumps with multi-vane impeller and with separate driver (centrifugal, mixed flow or axial flow) with rated power above 15 kW (20 hp). Machines of this group may have sleeve or rolling element bearings.

**Group 4:** Pumps with multi-vane impeller and with integrated driver (centrifugal, mixed flow or axial flow) with rated power above 15 kW (20 hp). Machines of this group mostly may have sleeve or rolling element bearings

- Choose the shaft rotational speed
  Above 600 RPM (10 Hz)
  Below or Approaching 600 RPM (10 Hz)

- Choose the support class
  Rigid
  Flexible

These support conditions are determined by the relationship between the machine and foundation flexibilities. If the lowest natural frequency of the combined machine and support system in the direction of measurement is higher than its main excitation frequency (this is in most cases the rotational frequency) by at least 25%, then the support system may be considered rigid in that direction. All other support systems may be considered flexible.

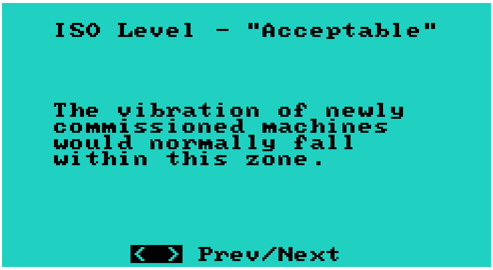
# ISO Alarm Level Definitions

| ISO Level | Definition |
|---|---|
| **Acceptable** | The vibration of newly commissioned machines would normally fall within this zone. |
| **Warning** | Machines vibrating in this zone are normally considered acceptable for unrestricted long term use. |
| **Alert** | Machines vibrating in this zone are normally considered unsatisfactory for long-term continuous operation. Generally, the machine may be operated for a limited period in this condition until a suitable time arises for action. |
| **Danger** | Vibration values within this zone are normally considered to be of sufficient severity to cause damage. |

**To display an onscreen Help definition of ISO Alarm Levels**
The ISO alarm level definitions can be displayed on your vb instrument for quick reference.

- To do this, press RESET 1 New Measurement from the Main Menu.
- Press SHIFT + HELP 2 to display the help screen.

- Press SHIFT + 0 to cycle through the machine class definitions until the ISO Level help screen displays.




- Press MENU to return to the New Measurement Menu.

# Appendix C: List of Abbreviations

| | |
|---|---|
| **AC** | Alternating Current |
| **A/D** | Analog-to-Digital |
| **CD** | Compact Disk |
| **CH** | Channel |
| **COM port** | Computer Serial Port (1 to 4) |
| **DC** | Direct Current |
| **DSP** | Digital Signal Processor |
| **ESD** | Electro-Static Discharge |
| **Hz** | Hertz |
| **In or "** | Inches |
| **ISO** | International Organization for Standardization |
| **KB** | Kilobytes |
| **kV** | Kilovolts |
| **LCD** | Liquid Crystal Display |
| **µm** | Micrometer |
| **mm** | Millimeter |
| **ms** | Millisecond |
| **Ni-Cad** | Nickel-Cadmium |
| **PC** | Personal Computer |
| **QA** | Quality Assurance |
| **RPM** | Revolutions per minute |
| **rms** | Root-mean-squared |
| **V** | Volts |
| **V DC, 1 A** | Volts DC, 1 Amp |
| **vb** | The vb series vibration measurement instrument |