Martin Lishman

BeetLog

Instruction Manual

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Betterave Connectée

Introduction

The Beetlog data logger identifies damage and bruise-causing areas in all types of sugar beet handling machinery from the harvester to the packing line. It records impact forces received while moving with real sugar beet and locates damage and bruise-causing parts of machinery. It comprises a data logger embedded in a synthetic shape designed to mimic the size, shape and density of a sugar beet. The data logger records impacts and temperature values during each measurement which can be stored in the logger itself or transferred by USB connection or Bluetooth to a PC, tablet or smartphone. *BeetLog* allows data to be viewed in real-time via Bluetooth interface on Android tablet or smartphone.

A rechargeable battery is recharged by connecting to the USB interface of a computer or with the USB charging kit supplied.

When placed into the machine being tested, the use of the sealing-cap is strongly recommended. Do not use the BeetLog in conditions where high heat levels may exist.

BeetLog should be used regularly so that bruising problems can be detected quickly. Combined with bruise testing *BeetLog* can help to ensure bruise-free working and provide peace of mind that quality standards are being maintained. *BeetLog* will not indicate bruise levels in real sugar beets and may not always discover all the sources of damage and bruising in handling machinery. But with experience the user can interpret information given by *BeetLog* which will help to eliminate quality problems in production.

Typical measurement procedure and interpretation of results

An initial run through a machine will give an impression of where the problem areas are. The length of run will often be determined by safe access to the machine, but it is best to concentrate on short sections, such as the drop from one web to another, and carry out repeat measurements in each section. Very high readings indicate high levels of bruising.

Repeat measurements give an average figure for an impact. This can be compared to bruise test results from real sugar beets passing through the same section of the machine. Making this comparison in a number of different situations will provide the experience to interpret the results very quickly.

Following is a guide to the levels of impact that can be generated by *BeetLog* from a specific drop onto a specific surface:

Fall from a height of	onto PVC surface	onto steel surface
10cm	~ 55g	~ 175g
25cm	~ 155g	~ 275g
50cm	~ 285g	~ 330g

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IMPORTANT

BeetLog PTR600 - follow instructions beginning on page 5

BeetLog PTR700 - follow instructions beginning on page 23

This instruction manual is available in the following languages on the USB/memory drive supplied:

Ce manuel est disponible dans les langues suivantes sur la Lecteur / mémoire USB fourni:

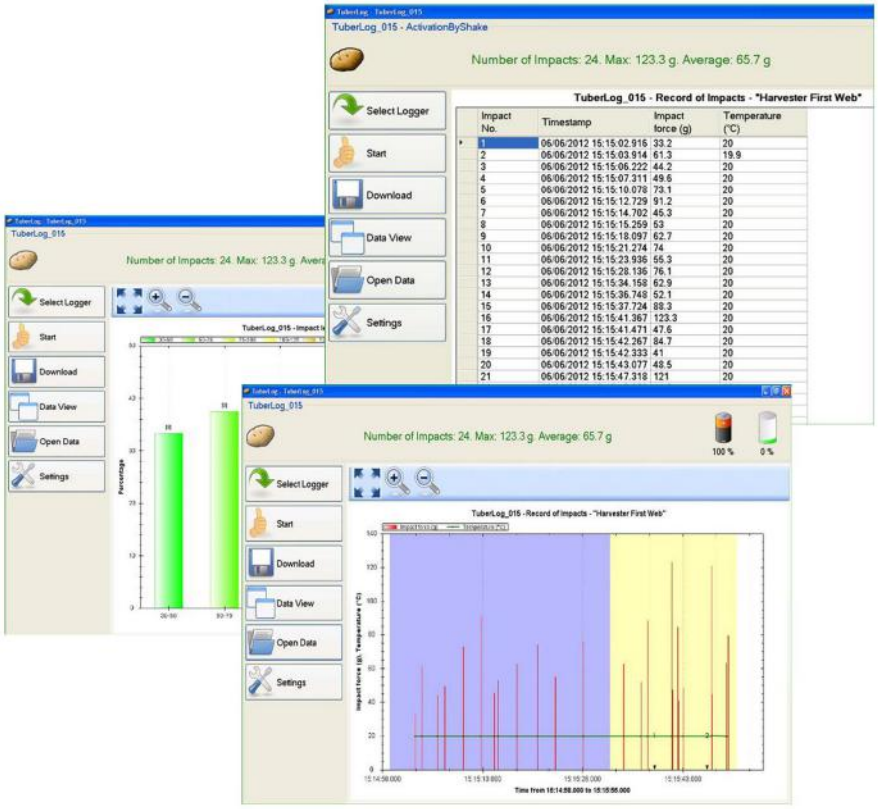
Diese Bedienungsanleitung ist in folgenden Sprachen verfügbar auf der USB / Speicherlaufwerk geliefert:

Este manual de instrucciones está disponible en los siguientes idiomas en la Unidad USB / tarjeta de memoria suministrada:

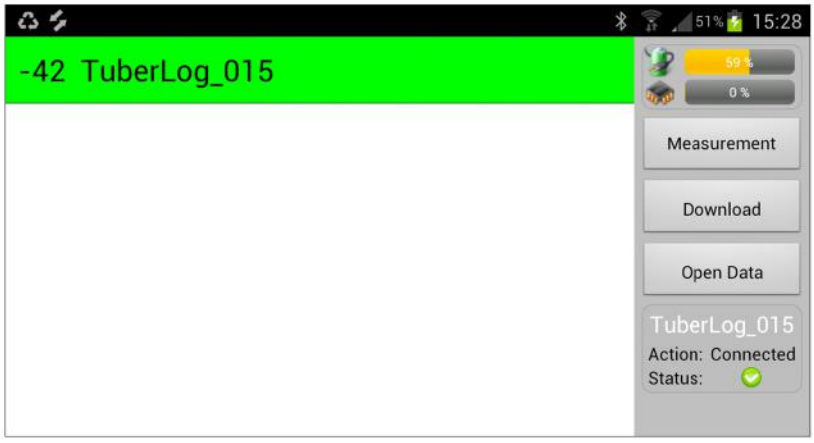
English

PTR600

BeetLog



PC Software



App for Android

BeetLog PTR600
with
App for Android

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1. Initial Set-up - Using the BeetLog with an Android device

<u>IMPORTANT:</u> Before using the *BeetLog* Android App on your Android device, you must first install the PC software on your PC or laptop and then connect the data logger to the computer by following these steps:

1.1 Install the software before connecting the data logger

- Insert the USB Memory Stick into a USB port on the PC or laptop. A window should automatically appear on the screen
- Click ***Open folder to view files using Windows Explorer***
- Click ***PTR600*** and select ***PC Software***
- Click ***setup.exe*** and follow the installation instructions displayed
- To create a shortcut on the PC desktop, drag the ***BeetLog*** sugar beet symbol onto your desktop from the program list attached to the Start menu

1.2 Communication between the data logger and the computer

- Connect the data logger to the PC using the USB cable. The USB driver supplied will be installed automatically.
- Bluetooth will be switched on automatically when the data logger is connected using the USB cable. If the Bluetooth adapter is required it should be installed in a USB port. It will be installed automatically and the Bluetooth icon should appear in the task tray. Right click on the icon and select ***Add device***. A list of available Bluetooth-enabled devices will appear. Select ***BeetLog*** and enter the pairing code (default: 1234) so that the data logger is recognised.

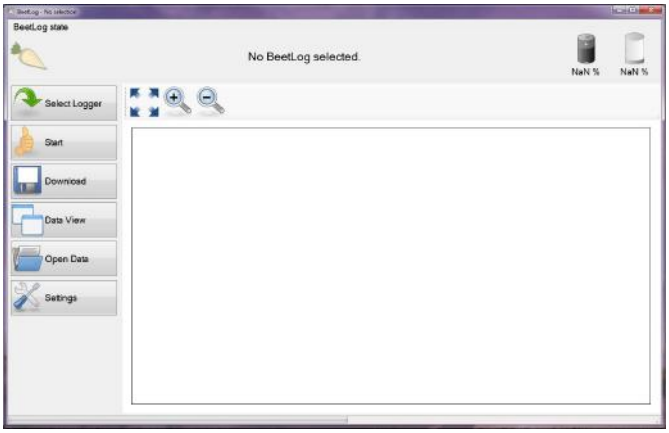
1.3 Charging the data logger battery

The data logger's battery can be re-charged via the USB interface using the connection cable or with the charging kit supplied. Data saved in the data logger is not lost when the battery is empty. The charge level is indicated when the data logger is selected for use. After fully charging the battery will last for about one month if the *Vibration Sensor Mode* in *Bluetooth Settings* (see 1.4) is set to *Activation by Shake* or *Always Off.* If set to *Always On* it will last for about 4 days without use or about 10 hours if used continuously.

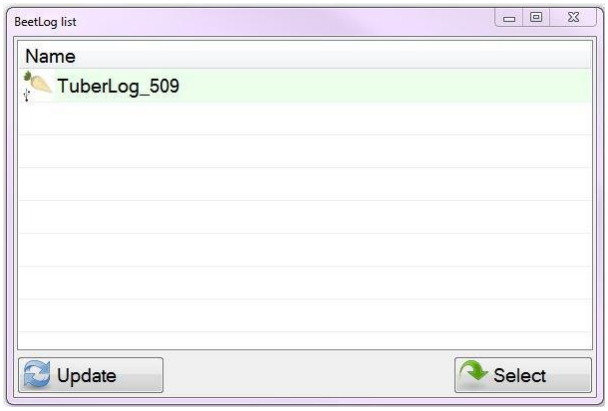
1.4 Data logger settings

The operating and download settings are set by the user once the data logger has been selected, as below:

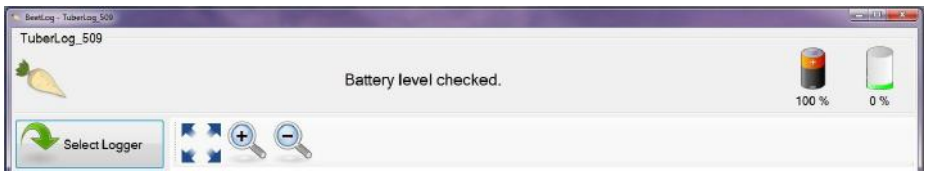
- Open the *BeetLog* software. The following screen will appear:



- Click **Select Logger**
- Connect the data logger to the computer by the USB cable or, if using the Bluetooth interface, gently knock the data logger on a hard surface. This activates the data logger
- The serial number of the connected data logger will be shown in the ***BeetLog list:***



- Click on the serial number and then click **Select**
- The serial number, battery charge and data logger memory levels are then displayed at the top of the screen, as below:



- Click **Settings**
  (If required, the following selected settings can be saved to a folder in the computer and recalled using **Import** and **Export** at the bottom of the *Settings* window.)

The setting options are as follows:

Set-up
Select the display language

Bluetooth
Select the Bluetooth setting. **Activation By Shake** uses battery power most efficiently.

BeetLog

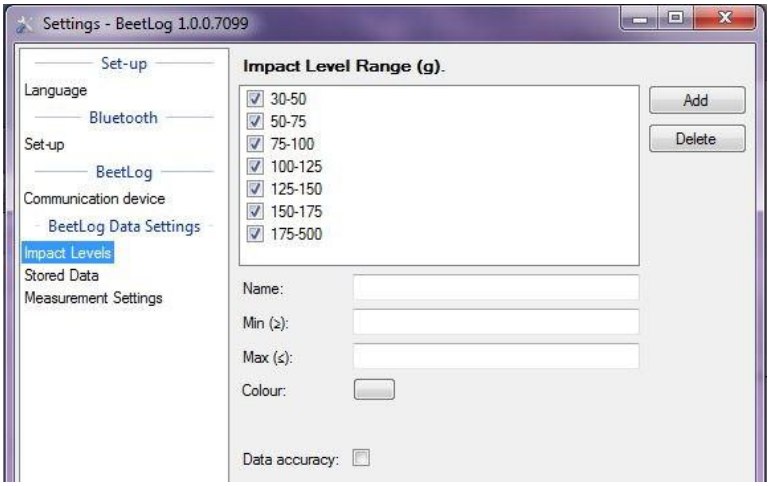
Activates the communication devices available to transmit data to the computer. Bluetooth and USB should both be selected.

BeetLog Data Settings

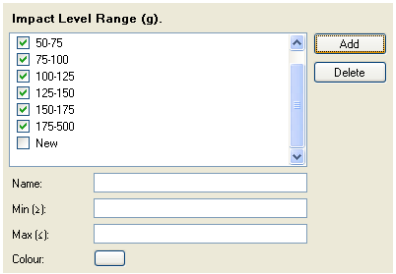
The following settings apply to data stored in the logger and accessed using the PC software.

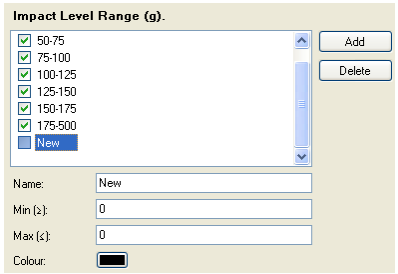
Impact Levels

- Allows pre-set impact level ranges to be selected. To exclude Impact ranges untick the relevant boxes and tick **Data accuracy**.

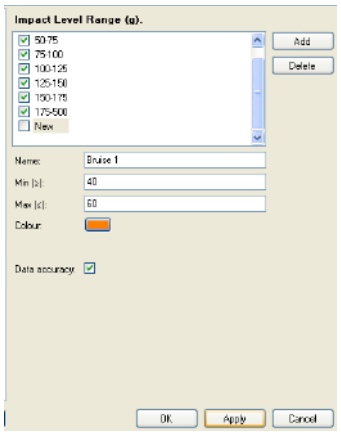


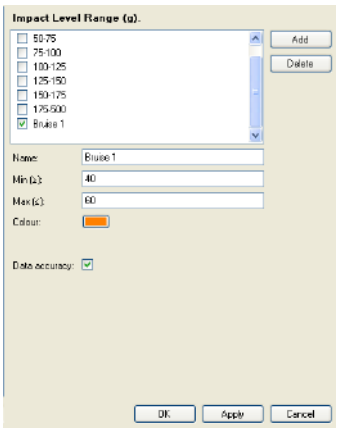
- A user-defined *Impact Level Range* can also be created:
  - Click on **Add.** A line with an un-ticked box and **New** will appear. Left click on **New** to highlight it. Default settings will appear in the fields below.





- Enter the values required and a colour that differs from the display colours used for the other *Impact Level Ranges*. To save, left click **Apply**. To select the new range tick its box, clear the ticks from the ranges that are not needed and left click **Apply** again.

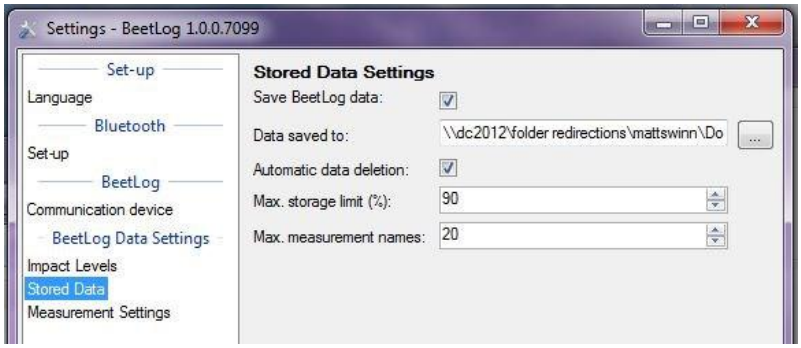




- To delete an *Impact Level Range*, left click to highlight the name, left click **Delete** and left click **Apply.**

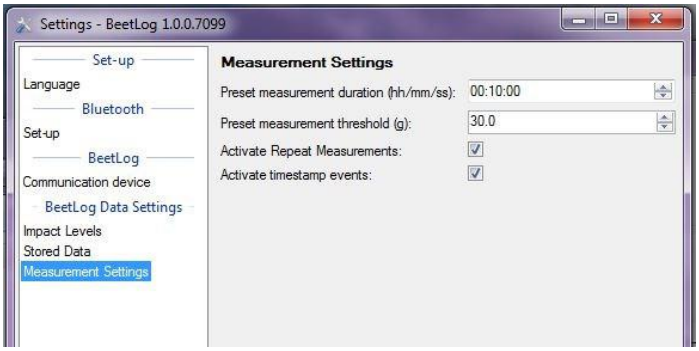
Stored Data

- Allows the user to define the parameters of the data stored in the data logger and the file location when downloaded to the computer. See section 5 for information on managing the data logger's memory.



Measurement Settings

- The **Measurement duration** is pre-set at 10 minutes, but can be changed to suit the situation.
- Setting a lower **Measurement threshold** prevents small insignificant impacts from being included in the recorded data.
- The option to set **Timestamps** and **Repeat Measurements** can be activated. See section 3.2 for more details.



1.5. Preparing to Install or Download the Android App

Enter the settings menu of the Android device. Not all Android devices have the same menus, so the instructions below should be used as a guide.

- In *Bluetooth*, ensure that Bluetooth is enabled. To avoid communication interruption during measurement, select a long *Visible time-out period* (or *Never time out*) for the Android device.
- In *Security,* select *Screen Lock* and choose *None.* Select *Device Administration – Unknown Sources* and choose *Enable.*
- In *Power Saving,* select the *Custom* power saving mode settings. Select *Screen timeout* and select a time period that matches the duration of the measurement you will be carrying out. Alternatively, turn off power saving altogether.

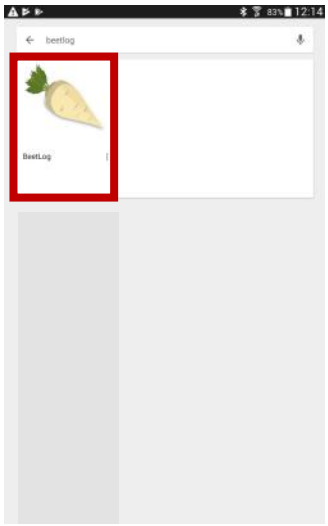
1.6. Installing the Android App

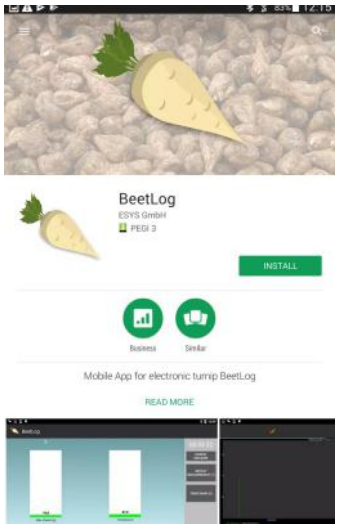
From the Google Play Store

- Go to Google Play Store on your Android device. Using the search field, search for 'BeetLog'. Click on the App in the search results (highlighted in red below).
- Click install. You may need to enter your Google Account details. A BeetLog icon should appear on your Applications screen after installation is complete.

From the USB Memory Stick

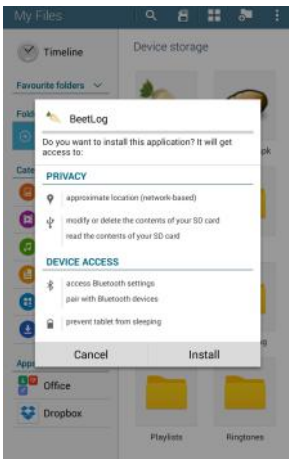
- Connect the Android device to your PC





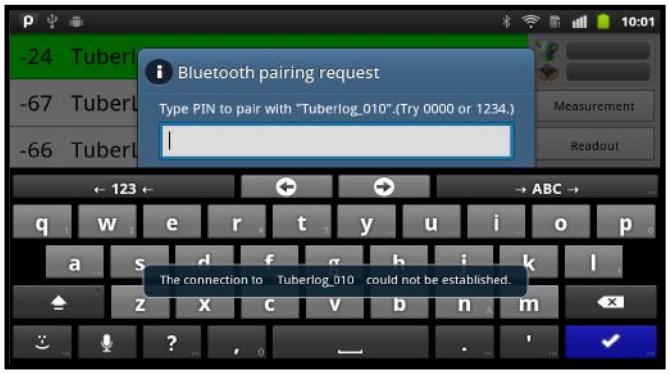
- Download the file BeetLog.apk from the USB memory stick supplied *(located in the folder PTR600 – App for Android)* onto the Android device

1.7. Communication between the data logger and Android device

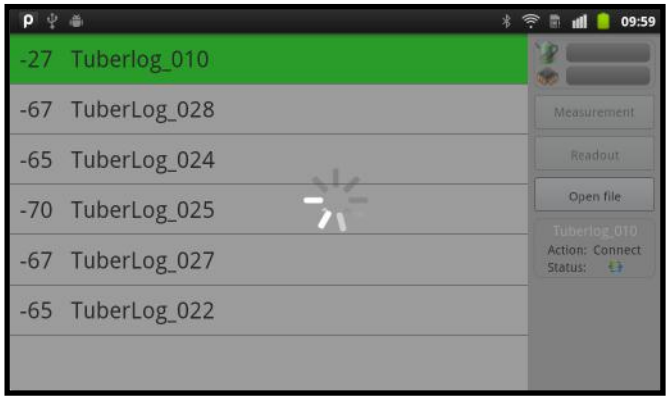


- If the data logger is set to *Activation by Shake* and within Bluetooth range of the Android device, firmly knock the logger on a hard surface. It will be detected and its Serial Number will appear on the screen. Select the data logger by touching the Serial Number on the screen.

- At first connection enter the Bluetooth pairing code (default 1234). Ignore the message on the screen that the connection could not be established.

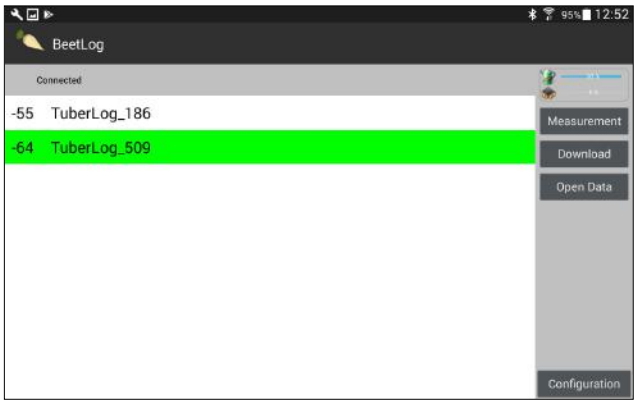


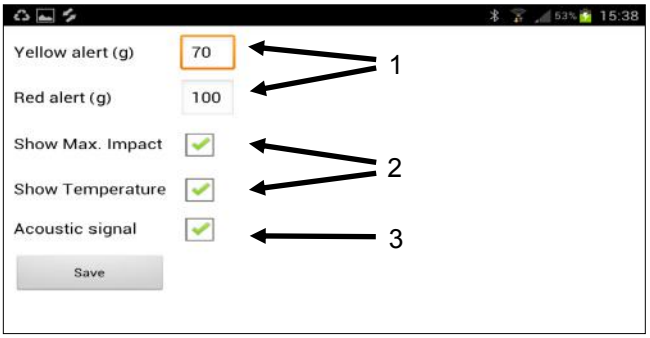
- Touch the Serial Number again to finish pairing the device.



1.8 App screen settings

- Touch the configuration button to display the two settings buttons at the top of the horizontal screen.





Online-Settings

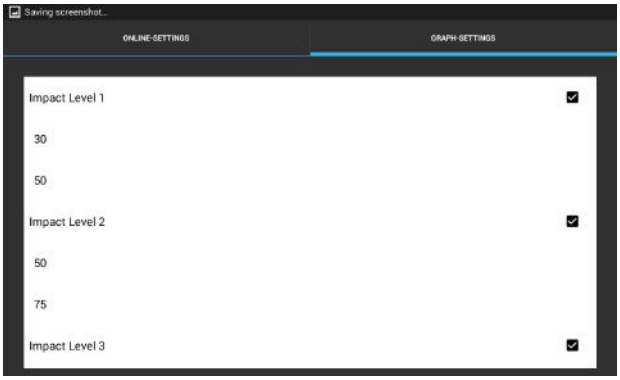
1 Sets the levels at which an impact displays as red or yellow in the bar graph – can be used to immediately highlight high levels of bruising

2 Selects the display information – the Maximum Impact bar graph and the Temperature of the data logger.

3 Turns the acoustic signal on (or off) – a sound will be generated whenever an impact is recorded by the data logger. If connected, the sound will also be heard in the device earphones.

Graph-Settings

- Allows 7 preset impact level ranges to be selected to display the percentage distribution of impacts. To avoid possible distortion of the displayed results, ensure the lower value of each level range is the same as the higher value of the previous level range.



2. Using *BeetLog* with the App

2.1 Open the App

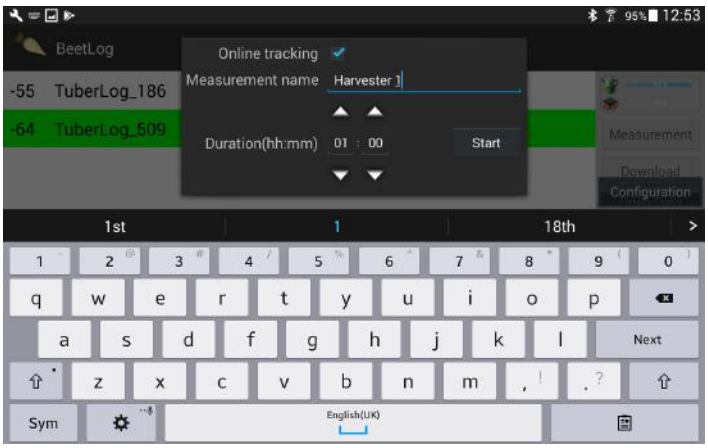
- Touch the *BeetLog* icon to open the App.

2.2 Select the data logger

- Touch the Serial Number of the BeetLog you wish to use. If it is not shown, but is within range of the Android device, activate it by shaking it or knocking it on a firm surface. The data logger should be connected and the following information will appear on the screen:
- Ensure the data logger battery is adequately charged.

2.3 Start the measurement

- Touch *Measurement* in the right menu bar (see above) to display the *Start Measurement* window.
- Enter a Measurement Name and Measurement duration.
- To follow the measurement on the screen as it happens, select *Online Tracking*.
- Touch *Start*.



2.4 Place the data logger in the machine to be tested

- The remaining measurement duration will count down at the top of the screen.

Each impact will be indicated as it happens, on the screen and also by an audible tone (if selected).

2.5 Repeat Measurement and Timestamp

Repeat Measurement

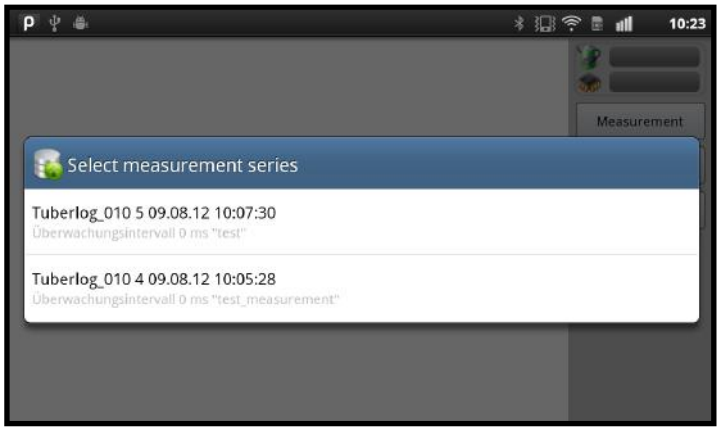
- Touch this button to mark a new beginning of a run through a machine without having to re-start the logger. This can be useful when investigating a specific part of a machine. For example, repeating the drop from one conveyor to another can be used to check if a large impact occurs on every drop or only occasionally. Each repeated run is distinguished by colour in the graphical display of measured values.

Timestamp

- Touching this button registers in the data the time at which it was pressed. This allows, for example, the moment just before the data logger drops from one conveyor to another, to be recorded. The timestamps are visible in the graphical display of results, making it easy to locate specific impacts.

2.6 Displaying data logger data

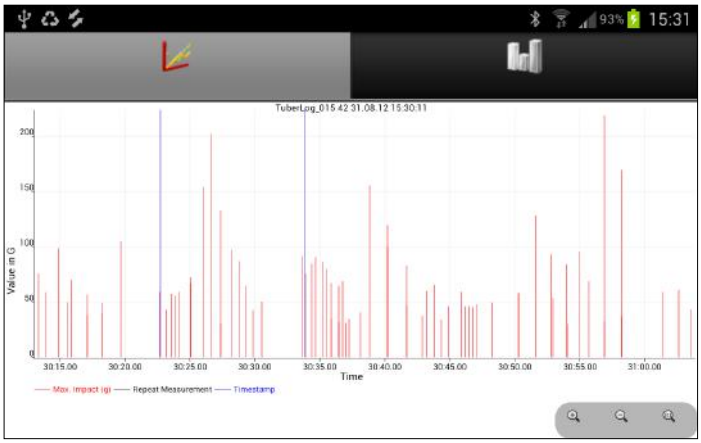
- If the measurement timer is still running, click *Cancel measure* in the right menu bar (see above). Touch *Download* to display the list of measurement names;

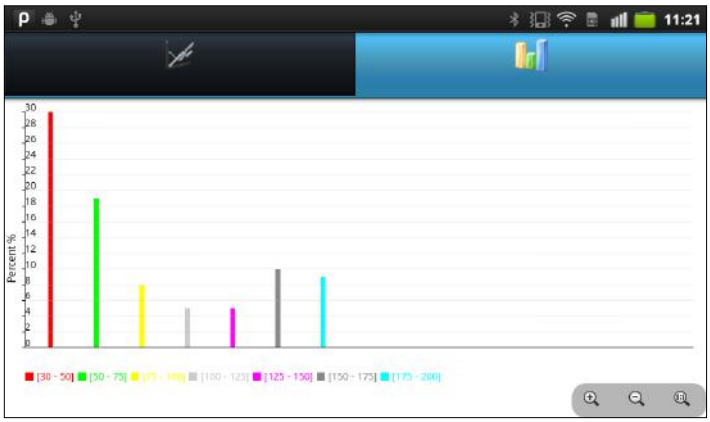


touch to highlight the required measurement. The data will be displayed.

Measurements marked Green are already stored on the Android device.
Measurements marked Yellow have no data.

- Touch the button *Open Data* to download measurements which are stored on the Android device.





2.7 Changing the data display

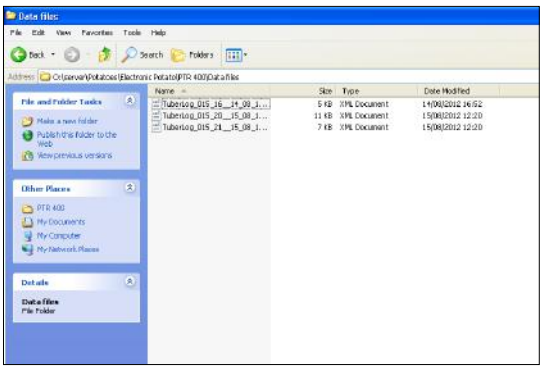
- Touch the graph icons above the data to change the display between a timeline graph and the percentage distribution of the impacts.

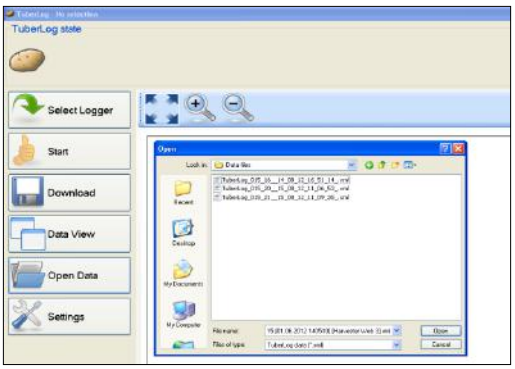
Graph of impacts during a measurement

Graph of the percentage distribution of impacts

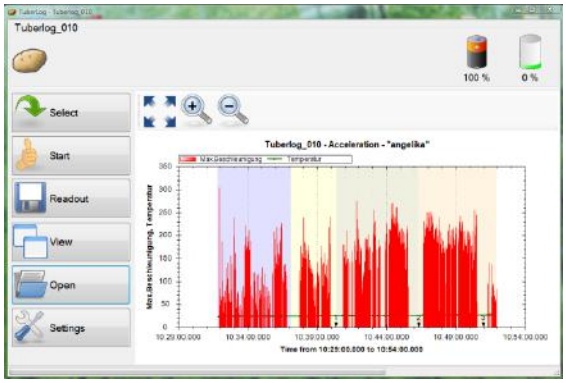
2.8 Exporting data to the PC

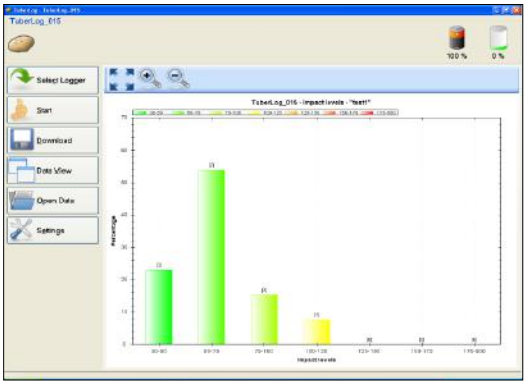
- Downloaded measurement files from the data logger are automatically stored in XML format in the BeetLog directory on the Android device SD card. This is accessed via My Files/BeetLog (folder names may differ on some devices). The data can be copied to the computer and processed using the *BeetLog* PC software.





Typical stages of data presentation using the BeetLog PC software – see Section 4 for more details



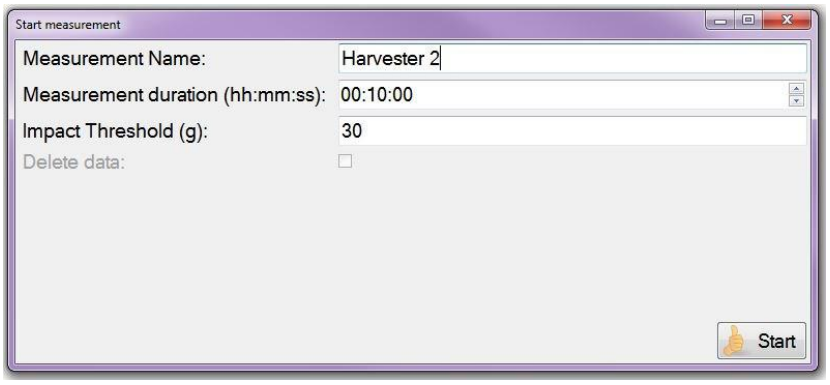


- Readings in the list of measurement series will be deleted from the Android device database after one month, so make sure that required data has been downloaded to the BeetLog directory. The XML files will remain in the directory unless deliberately deleted by the user.
- See section 4.x for more information on displaying the data using the PC software.

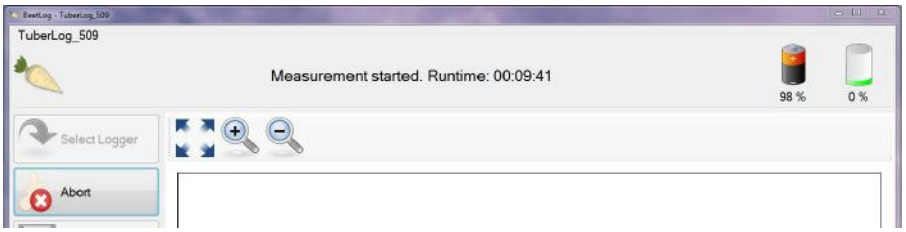
3. Using *BeetLog* with the PC software (without using the App)

3.1 Making a Measurement

- Open the PC software
- Activate the data logger by shaking or knocking firmly on a hard surface
- Click on the **Start** button. The *Start Measurement* window appears



- Set **Measurement duration,** lower **Impact Threshold** (minimum of 10g) and **Measurement Name**
- Click **Start**.
- The remaining runtime of the measurement is displayed, as below:



- The data logger can now be placed into the machine being tested.

3.2 Repeat Measurement and Timestamp

After clicking on *Start*, two additional buttons will appear on the bottom of the menu bar:

Repeat Measurement

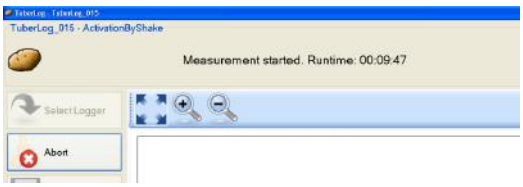
- Click this button to mark a new beginning of a run through a machine without having to re-start the logger. This can be useful when investigating a specific part of a machine. For example, repeating the drop from one conveyor to another can be used to check if a large impact occurs on every drop or only occasionally. Each repeated run is distinguished by colour in the graphical display of measured values.

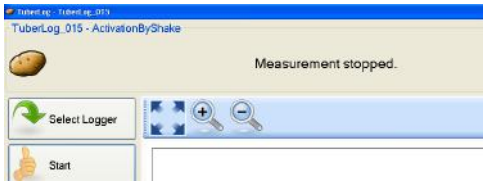
Timestamp

- Clicking this button registers in the data the time at which it was pressed. This allows, for example, the moment just before the data logger drops from one conveyor to another, to be recorded. The timestamps are visible in the graphical display of results, making it easy to locate specific impacts. To ensure an accurate *Timestamp*, check the time setting of the computer.

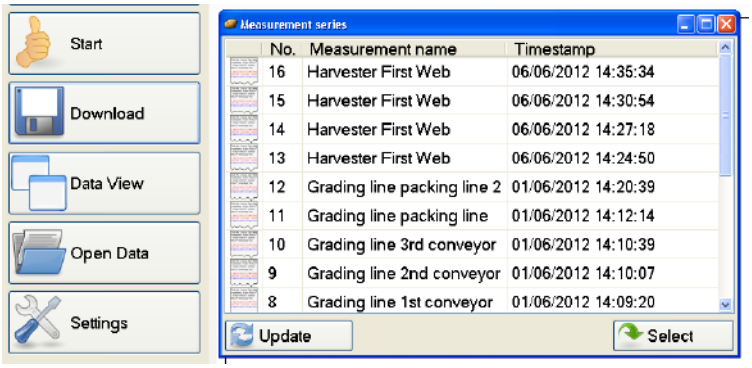
3.3 Selecting data for display

- To display measurements from the data logger while a measurement run is still in progress, click **Abort**. The measurement will then stop.





- Click **Download.** A new window shows the measurement runs and their recording date that are stored in the data logger. Click on the measurement you wish to view and then click **Select**.

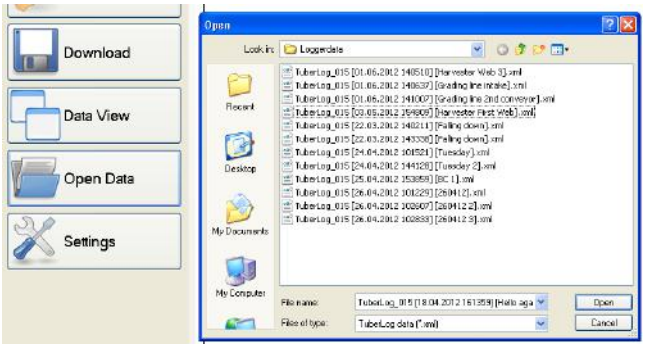


- The data will be displayed more quickly via the USB interface than the wireless Bluetooth interface.

- If the option to *Save BeetLog Data* has been ticked under *Settings/Stored Data*, each measurement run will be saved in the data folder set up during the software installation. The filename is formatted as:
  BeetLog serial number [Date and time of measurement][Measurementname].xml

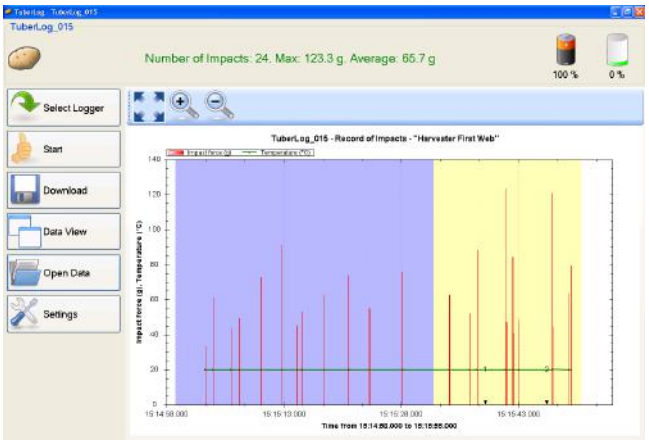
4. Displaying *BeetLog* data on the PC

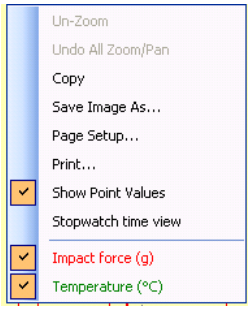
- Using the PC software, click **Open Data** to display the measurement runs which have already been saved from the Android device or the PC software to the data folder. Highlight the file to be viewed and click **Open**.



- To change the data display of the measurement run that has been selected, click on **Data View.** There is a choice of 3 ways to view the data. Click **Data View** again to change between them.

4.1 Timeline of the impacts during a measurement



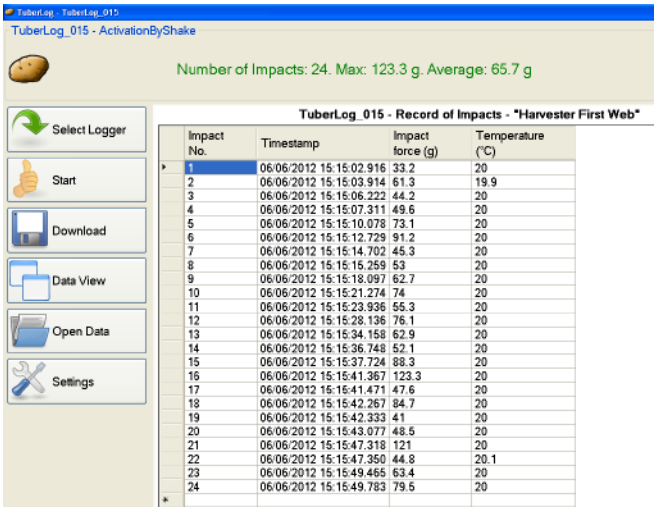


- Repeat measurement runs (blue and yellow) with two time stamps (1, 2) are shown. The horizontal green line is the temperature recorded by the data logger.
- Buttons above the graph are for zooming in and out and for resetting to the original state. The time period displayed can be reduced by drawing a rectangle onto the graph while holding down the left mouse key.
- Right click on the graph to open a menu with further adjustable settings for visual display and printout.
- The result can be saved to the clipboard *(Copy)* or as an image file.

4.2 Percentage distribution of the impacts from a measurement

In addition to the percentage distribution, this graph also shows the number recorded in each group of impact levels. If the *Data accuracy* option is ticked in *BeetLog Data Settings/Impact levels,* only the records which fit into the preset groups of impact levels will be included in the percentage calculation. This graph type can be manipulated, printed and saved in the same ways as in 4.1.

4.3 Table of the impacts during a measurement



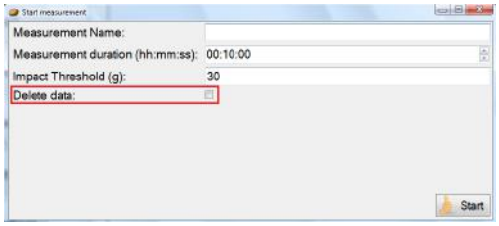
Impact No.	Timestamp	Impact force (g)	Temperature (°C)
1	06/06/2012 15:15:02.916	33.2	20
2	06/06/2012 15:15:03.914	61.3	19.9
3	06/06/2012 15:15:06.222	44.2	20
4	06/06/2012 15:15:07.311	49.6	20
5	06/06/2012 15:15:10.078	73.1	20
6	06/06/2012 15:15:12.729	91.2	20
7	06/06/2012 15:15:14.702	45.3	20
8	06/06/2012 15:15:15.259	53	20
9	06/06/2012 15:15:18.097	62.7	20
10	06/06/2012 15:15:21.274	74	20
11	06/06/2012 15:15:23.936	55.3	20
12	06/06/2012 15:15:28.136	76.1	20
13	06/06/2012 15:15:34.158	62.9	20
14	06/06/2012 15:15:36.748	52.1	20
15	06/06/2012 15:15:37.724	88.3	20
16	06/06/2012 15:15:41.367	123.3	20
17	06/06/2012 15:15:41.471	47.6	20
18	06/06/2012 15:15:42.267	84.7	20
19	06/06/2012 15:15:42.333	41	20
20	06/06/2012 15:15:43.077	48.5	20
21	06/06/2012 15:15:47.318	121	20
22	06/06/2012 15:15:47.350	44.8	20.1
23	06/06/2012 15:15:49.465	63.4	20
24	06/06/2012 15:15:49.783	79.5	20

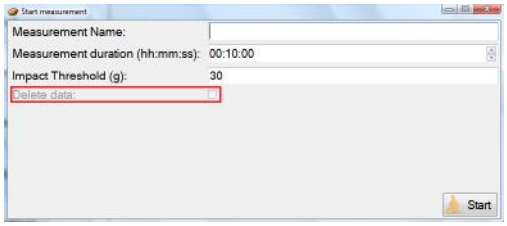
Transferring Data to Microsoft Excel

- To select a record in the table left click in the grey column to the left of the impact number. The whole row will be highlighted.
- Hold down **Ctrl** and press **C** on your keyboard, then release **C** first and then **Ctrl**. The record is now copied.
- Open a new Microsoft Excel spreadsheet and left click in to a cell so the curser is flashing in the cell. Hold down **Ctrl** and press **V** on your keyboard to paste the data into the spreadsheet.
- To select a sequence of records or several non-sequential records, hold down **Ctrl** and left click in the empty box parallel to the impact number and copy and paste as instructed above.

5. Data logger memory and data deletion (using the PC software)

- To clear the data logger memory before starting a new measurement, click **Start** at the same time as **CTRL.**
- The *Delete data* option will then be enabled in the *Start Measurement* window
- Tick the **Delete data** option before clicking **Start**. You will always be asked to confirm if you want to delete the data before the measurement run begins.

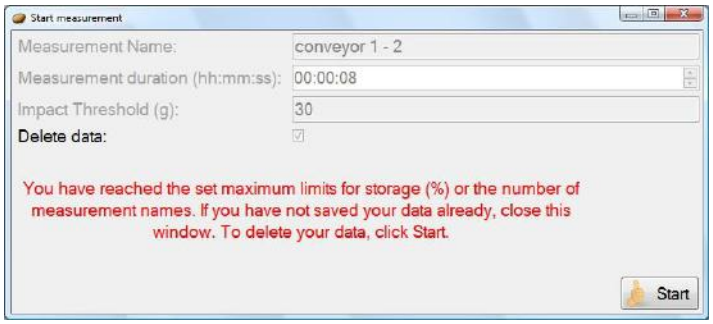




- If *CTRL+ Start* is not clicked in the main window the *Delete data* option is not enabled and remains greyed out.

Clicking CTRL+Start enables the option to Delete Data *CTRL+Start was not clicked so there is no option to Delete Data*

If the data logger memory is full the newest measurement values will automatically overwrite the oldest entries. Impacts below the set Impact Threshold will not enter the memory, so the time before the memory is filled can be extended by setting a higher threshold. Measurements that must be kept for quality assurance purposes should always be downloaded to a PC before the memory is full. The memory level is indicated at the top of the screen every time the data logger is selected before starting a measurement.



If *Automatic Data Deletion* is ticked in *Stored Data Settings* the software will monitor the data logger's memory in relation to the two set limits (*Max. storage limit (%)* and *Max. measurement names)* and warn you about the possibility of data deletion.

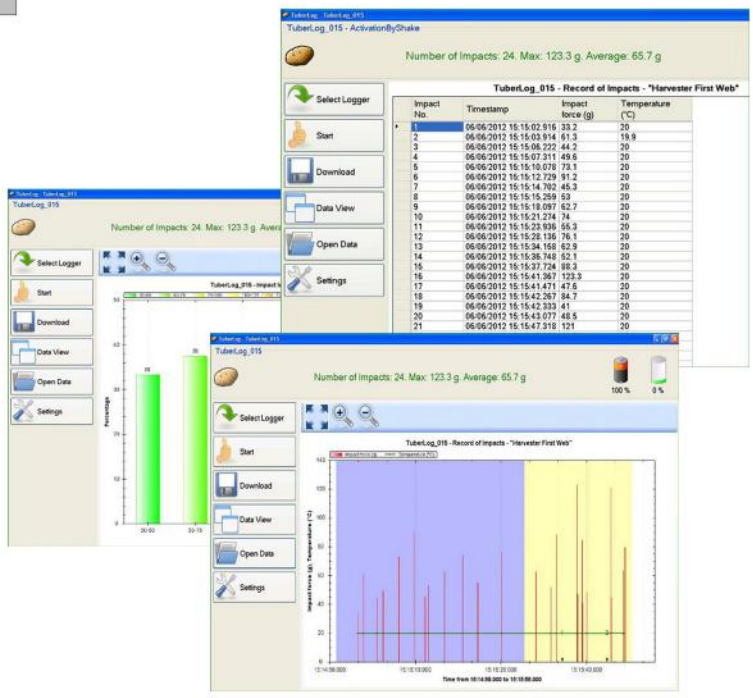
If one of the limits has been reached, **Delete Data** will automatically be ticked in the *Start Measurement* window. You will not be able to untick this option unless space is created in the memory. If you have not been saving your measurements to the computer, simply close the window and download them. To continue without saving any data, click **Start**.

PTR700

BeetLog

Android Tablet

App for Android



PC Software

BeetLog PTR700

with

App for Android and Samsung Tablet

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IMPORTANT: Your Samsung tablet is pre-loaded with the *BeetLog* Android App. Before using the App, install the PC software on your PC or laptop and then connect the data logger to the computer.

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1. Initial Set-up - Using the BeetLog with the Samsung tablet

IMPORTANT: Your Samsung tablet is pre-loaded with the *BeetLog* Android App. Before using the App, install the PC software on your PC or laptop and then connect the data logger to the computer.

1.1 Install the software before connecting the data logger

- Insert the USB Memory Stick into a USB port on the PC or laptop. A window should automatically appear on the screen
- Click ***Open folder to view files using Windows Explorer***
- Click ***PTR600*** and select ***PC Software***
- Click ***setup.exe*** and follow the installation instructions displayed
- To create a shortcut on the PC desktop, drag the ***BeetLog*** sugar beet symbol onto your desktop from the program list attached to the Start menu

1.2 Communication between the data logger and the computer

Connect the data logger to the PC using the USB cable. The USB driver supplied will be installed automatically. Bluetooth will be switched on automatically when the data logger is connected using the USB cable. If the Bluetooth adapter is required it should be installed in a USB port. It will be installed automatically and the Bluetooth icon should appear in the task tray. Right click on the icon and select ***Add device***. A list of available Bluetooth-enabled devices will appear. Select ***BeetLog*** and enter the pairing code (default: 1234) so that the data logger is recognised.

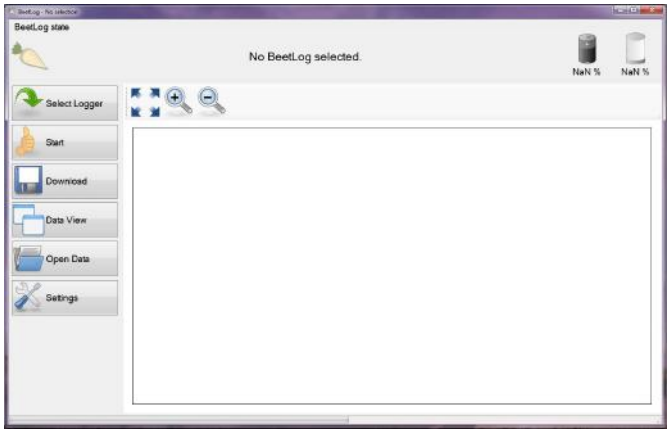
1.3 Charging the data logger battery

The data logger's battery can be re-charged via the USB interface using the connection cable or with the charging kit supplied. Data saved in the data logger is not lost when the battery is empty. The charge level is indicated when the data logger is selected for use. After fully charging the battery will last for about one month if the *Vibration Sensor Mode* in *Bluetooth Settings* (see 1.4) is set to *Activation by Shake* or *Always Off.* If set to *Always On* it will last for about 4 days without use or about 10 hours if used continuously.

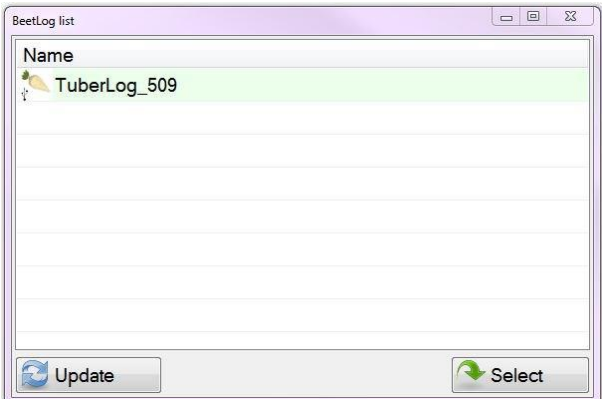
1.4 Data logger settings

The operating and download settings are set by the user once the data logger has been selected, as below:

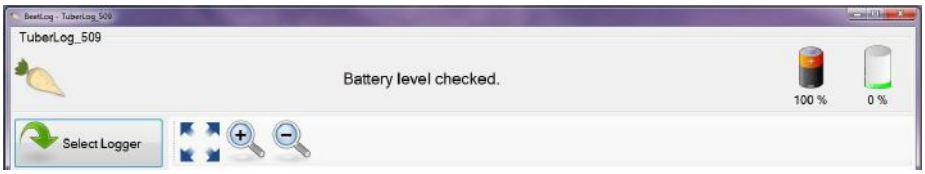
- Open the *BeetLog* software. The following screen will appear:



- Click **Select Logger**
- Connect the data logger to the computer by the USB cable or, if using the Bluetooth interface, gently knock the data logger on a hard surface. This activates the data logger
- The serial number of the connected data logger will be shown in the ***BeetLog list:***



- Click on the serial number and then click **Select**
- The serial number, battery charge and data logger memory levels are then displayed at the top of the screen, as below:



- Click **Settings**
  (If required, the following selected settings can be saved to a folder in the computer and recalled using **Import** and **Export** at the bottom of the *Settings* window.)

The setting options are as follows:

Set-up
Select the display language

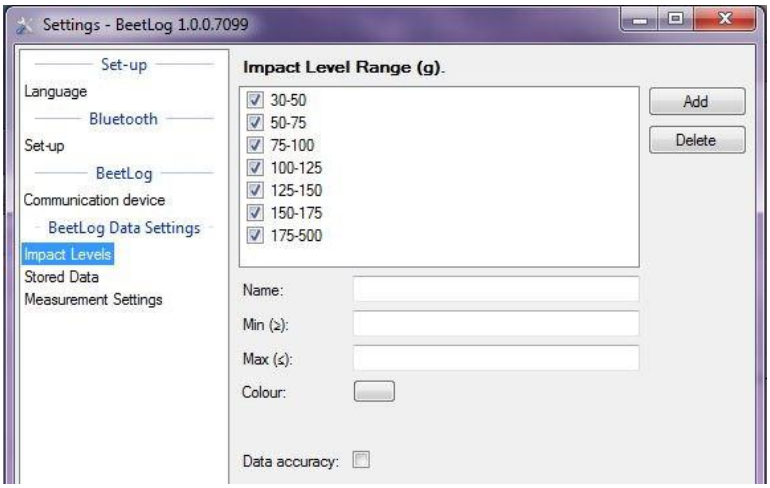
Bluetooth
Select the Bluetooth setting. **Activation By Shake** uses battery power most efficiently.

BeetLog
Activates the communication devices available to transmit data to the computer. Bluetooth and USB should both be selected.

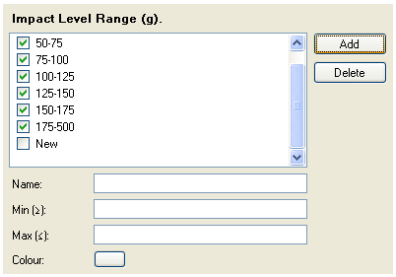
BeetLog Data Settings
The following settings apply to data stored in the logger and accessed using the PC software.

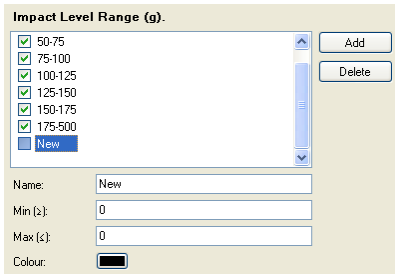
Impact Levels

- Allows pre-set impact level ranges to be selected. To exclude Impact ranges untick the relevant boxes and tick **Data accuracy**.

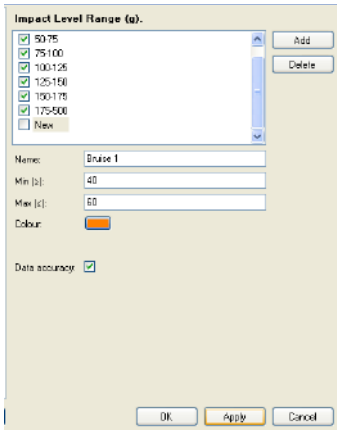


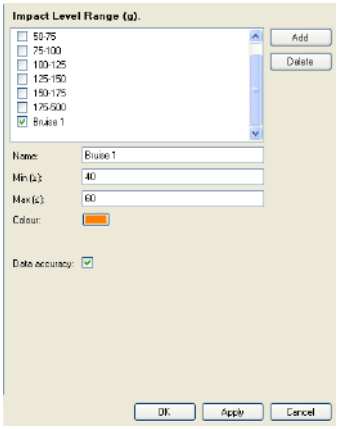
- A user-defined *Impact Level Range* can also be created:
  - Click on **Add.** A line with an un-ticked box and **New** will appear. Left click on **New** to highlight it. Default settings will appear in the fields below.





- Enter the values required and a colour that differs from the display colours used for the other *Impact Level Ranges*. To save, left click **Apply**. To select the new range tick its box, clear the ticks from the ranges that are not needed and left click **Apply** again.

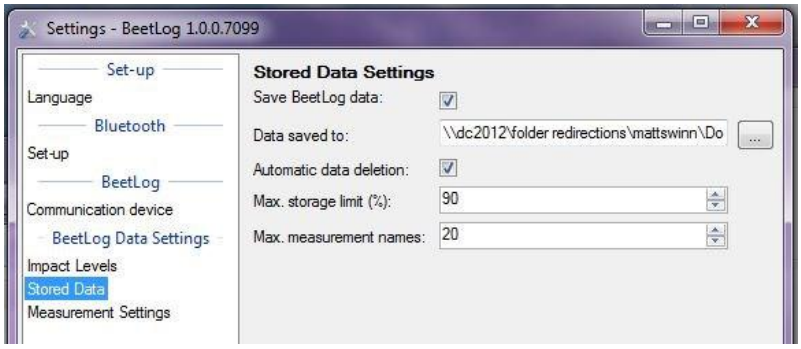




- To delete an *Impact Level Range*, left click to highlight the name, left click **Delete** and left click **Apply.**

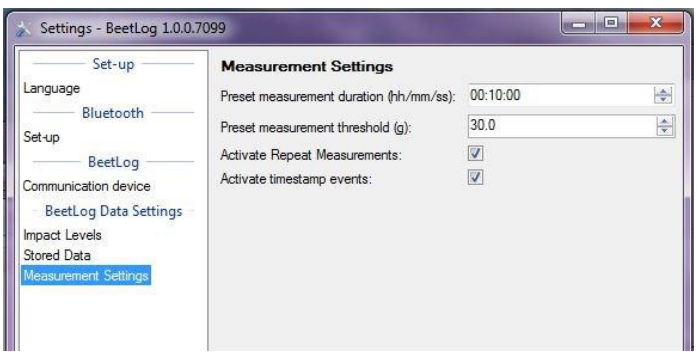
Stored Data

- Allows the user to define the parameters of the data stored in the data logger and the file location when downloaded to the computer. See section 5 for information on managing the data logger's memory.



Measurement Settings

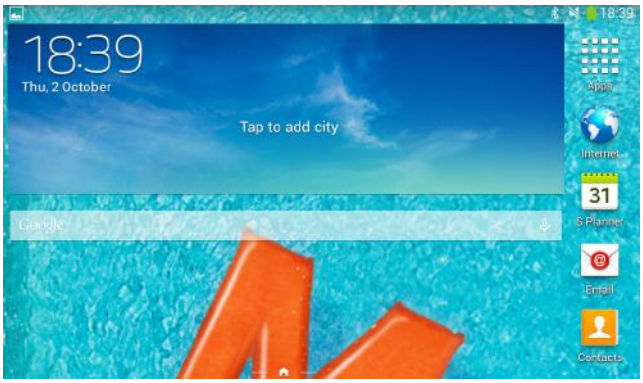
- The **Measurement duration** is pre-set at 10 minutes, but can be changed to suit the situation.
- Setting a lower **Measurement threshold** prevents small insignificant impacts from being included in the recorded data.
- The option to set **Timestamps** and **Repeat Measurements** can be activated. See section 3.2 for more details.



2. Using *BeetLog* with the App

2.1 Open the App

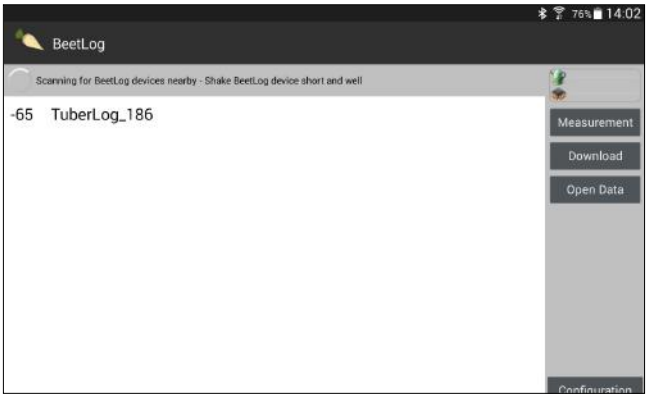
- Switch the tablet *On*.
- Place your finger on the screen and swipe to unlock the handset.
- Press the *App*s symbol.



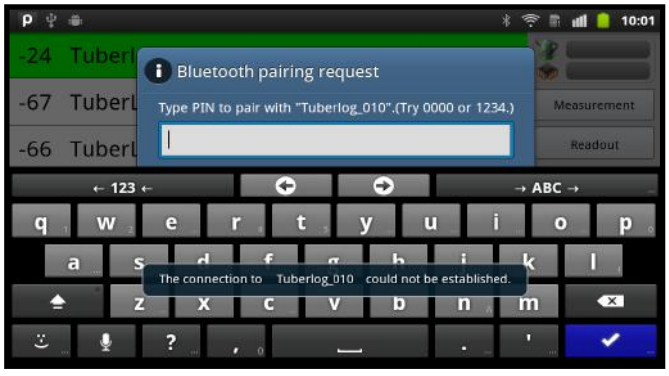
- Touch the *BeetLog* icon to open the App.

2.2 Communication between the data logger and tablet

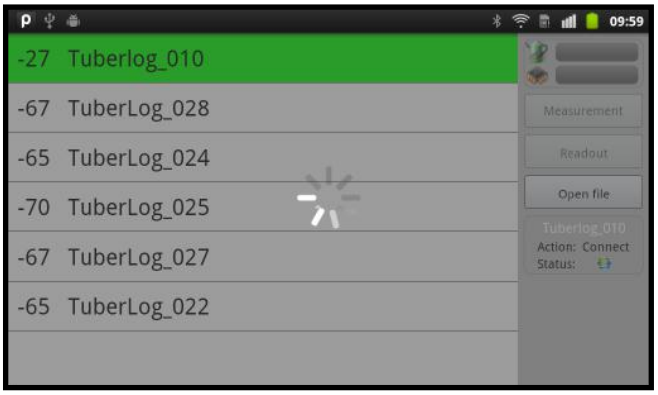
- If the data logger is set to *Activation by Shake* and within Bluetooth range of the tablet, firmly knock the logger on a hard surface. It will be detected and its Serial Number will appear on the screen. Select the data logger by touching the Serial Number on the screen.



- At first connection enter the Bluetooth pairing code (default 1234). Ignore the message on the screen that the connection could not be established.

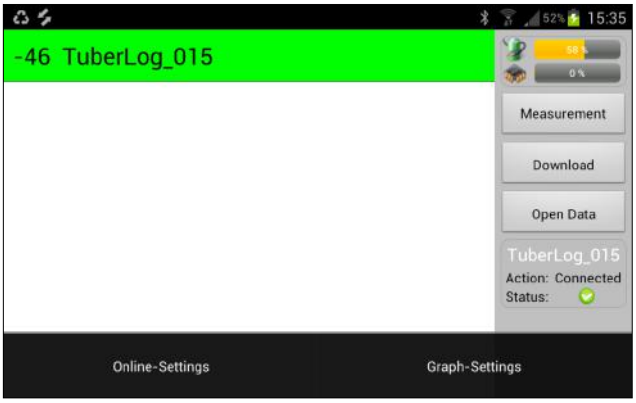


- Touch the Serial Number again to finish pairing the device.

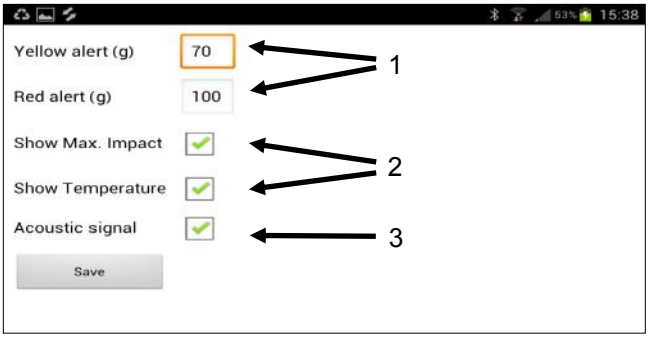


2.3 App screen settings

- Touch the configuration button of the tablet to display the two settings buttons at the top of the screen.



Online-Settings



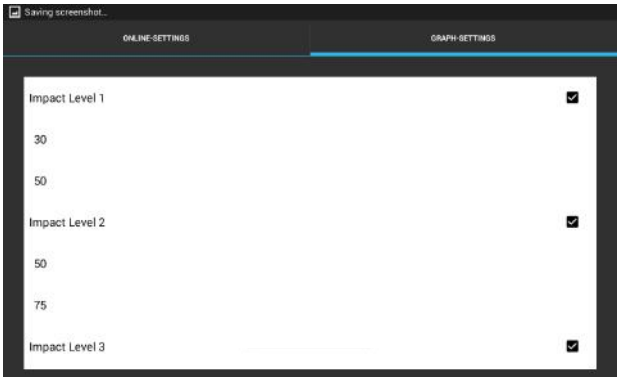
1 Sets the levels at which an impact displays as red or yellow in the bar graph – can be used to immediately highlight high levels of bruising

2 Selects the display information – the Maximum Impact bar graph and the Temperature of the data logger.

3 Turns the acoustic signal on (or off) – a sound will be generated whenever an impact is recorded by the data logger. If connected, the sound will also be heard in the device earphones.

Graph-Settings

- Allows 7 preset impact level ranges to be selected to display the percentage distribution of impacts. To avoid possible distortion of the displayed results, ensure the lower value of each level range is the same as the higher value of the previous level range.



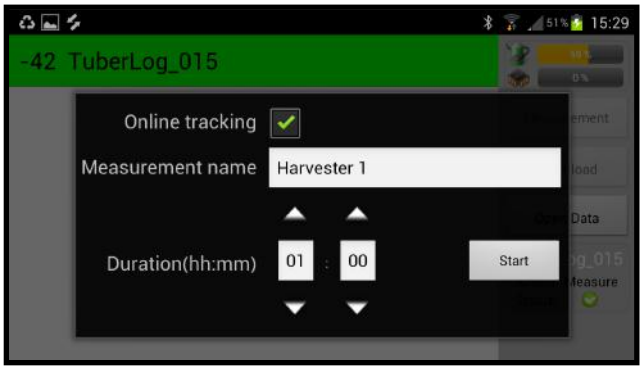
2.4 Select the data logger

- Touch the Serial Number of the *BeetLog* you wish to use. If it is not shown, but is within range of the tablet, activate it by shaking it or knocking it on a firm surface. The data logger should be connected and the following information will appear on the screen:

- Ensure the data logger battery is adequately charged.

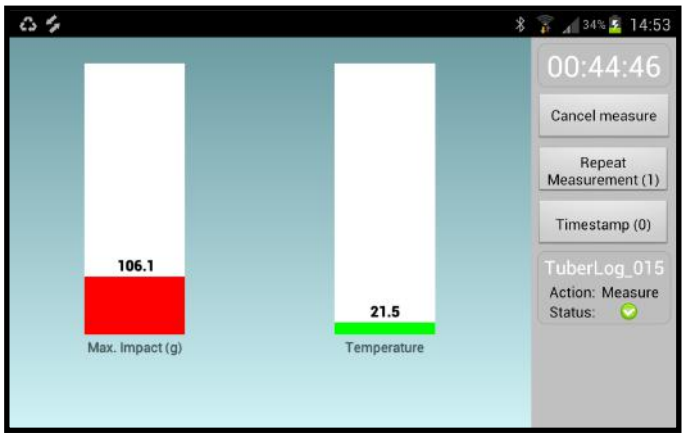
2.5 Start the measurement

- Touch *Measurement* in the right menu bar (see above) to display the *Start Measurement* window.
- Enter a Measurement Name and Measurement duration.
- To follow the measurement on the screen as it happens, select *Online Tracking*.
- Touch *Start*.



2.6 Place the data logger in the machine to be tested

- The remaining measurement duration will count down at the top of the screen. Each impact will be indicated as it happens, on the screen and also by an audible tone (if selected).



2.7 Repeat Measurement and Timestamp

Repeat Measurement

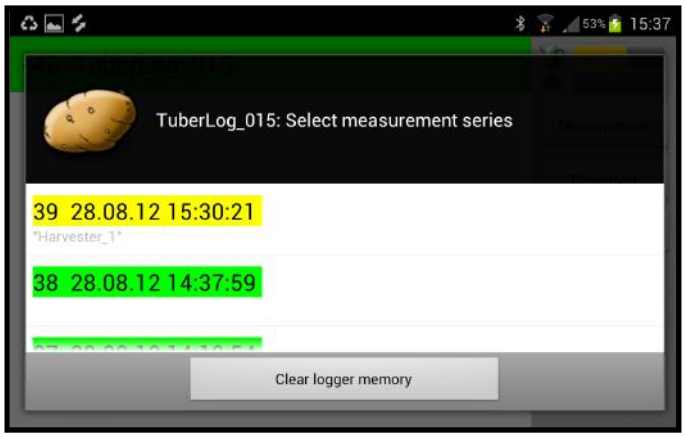
- Touch this button to mark a new beginning of a run through a machine without having to re-start the logger. This can be useful when investigating a specific part of a machine. For example, repeating the drop from one conveyor to another can be used to check if a large impact occurs on every drop or only occasionally. Each repeated run is distinguished by colour in the graphical display of measured values.

Timestamp

- Touching this button registers in the data the time at which it was pressed. This allows, for example, the moment just before the data logger drops from one conveyor to another, to be recorded. The timestamps are visible in the graphical display of results, making it easy to locate specific impacts.

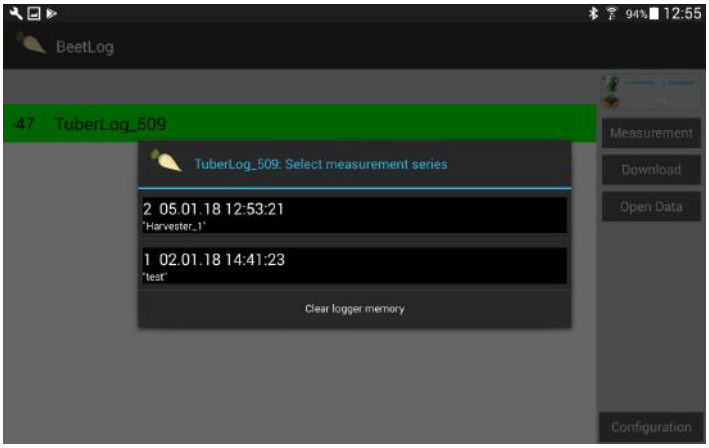
2.8 Displaying data logger data

- If the measurement timer is still running, click *Cancel measure* in the right menu bar (see above). Touch *Download* to display the list of measurement names; touch to highlight the required measurement. The data will be displayed.



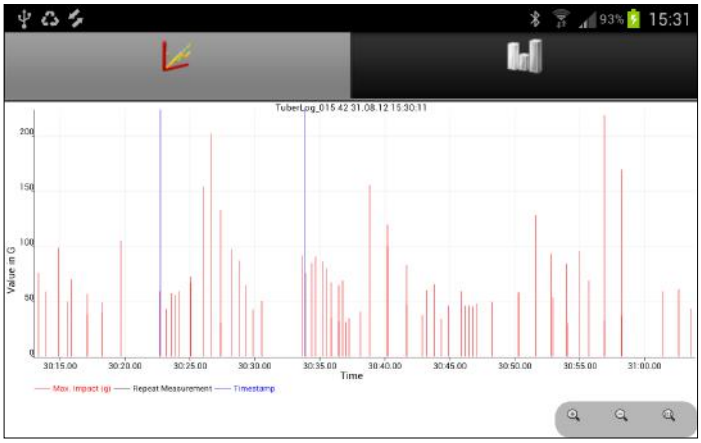
Measurements marked Green are already stored on the tablet.
Measurements marked Yellow have no data.

- Touch the button *Open Data* to download measurements which are stored on the tablet.

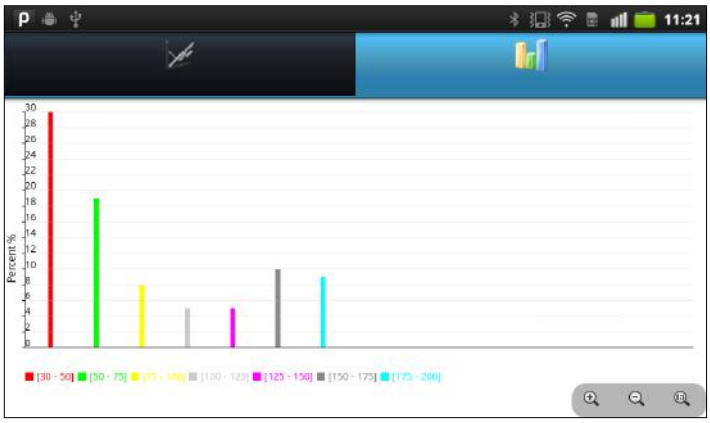


2.9 Change the data display

- Touch the graph icons above the data to change the display between a timeline graph and the percentage distribution of the impacts.



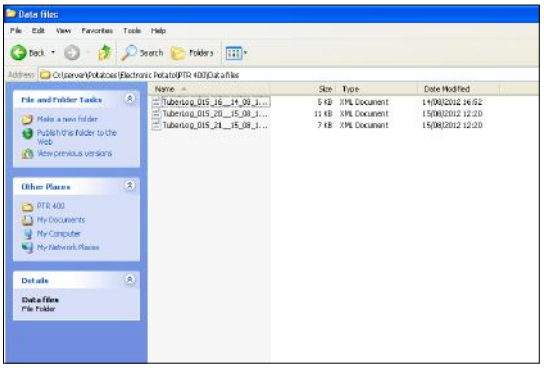
Graph of impacts during a measurement

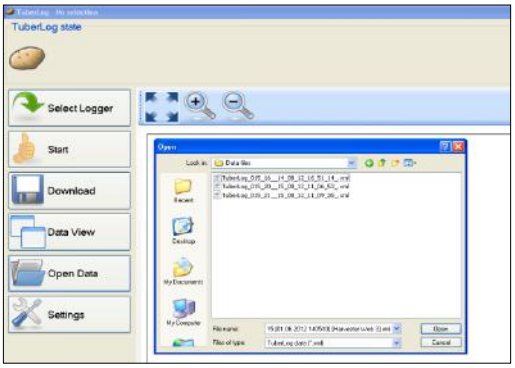


Graph of the percentage distribution of impacts

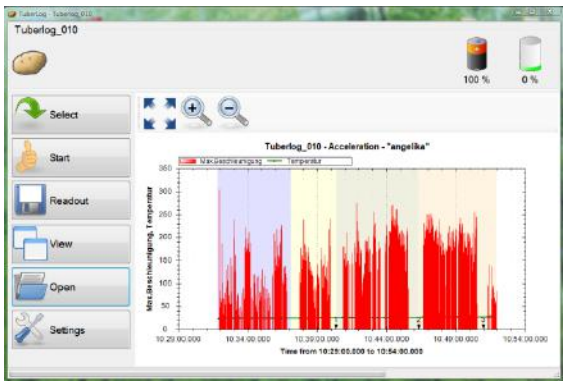
2.10 Exporting data to the PC

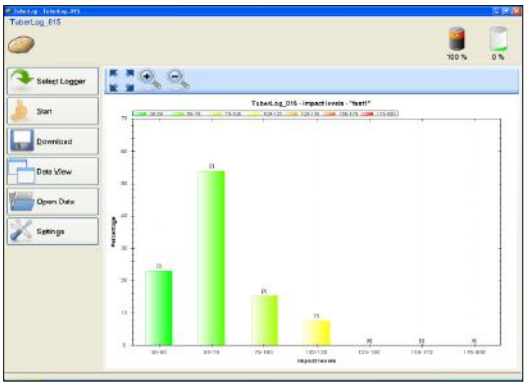
- Downloaded measurement files from the data logger are automatically stored in XML format in the BeetLog directory on the tablet SD card. This is accessed via My Files/BeetLog (folder names may differ on some devices). The data can be copied to the computer and processed using the *BeetLog* PC software.
- Readings in the list of measurement series will be deleted from the tablet database after one month, so make sure that required data has been downloaded to the BeetLog directory. The XML files will remain in the directory unless deliberately deleted by the user.
- See section 4 for more information on displaying the data using the PC software.





Typical stages of data presentation using the BeetLog PC software
– see Section 4 for more details

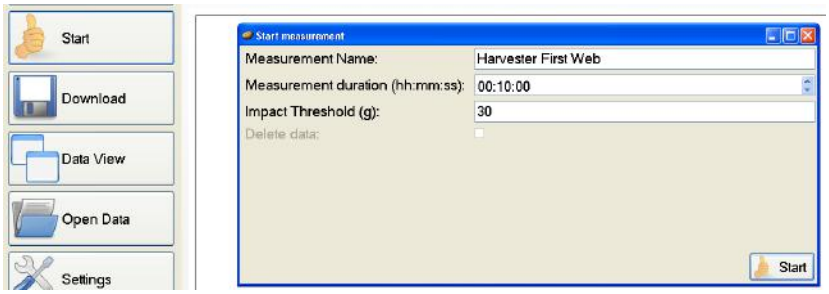




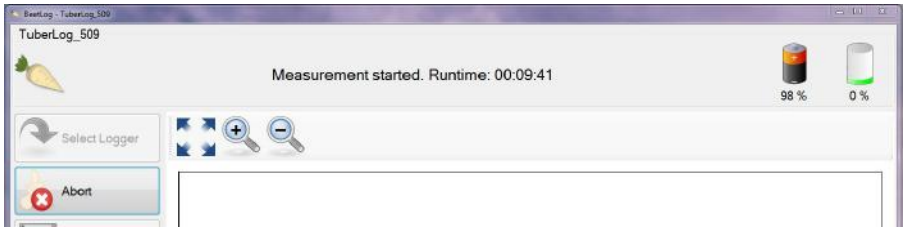
3. Using *BeetLog* with the PC software (without using the App)

3.1 Making a Measurement

- Open the PC software
- Activate the data logger by shaking or knocking firmly on a hard surface
- Click on the **Start** button. The *Start Measurement* window appears



- Set **Measurement duration,** lower **Impact Threshold** (minimum of 10g) and **Measurement Name**



- Click **Start**.
- The remaining runtime of the measurement is displayed, as below:
- The data logger can now be placed into the machine being tested.

3.2 Repeat Measurement and Timestamp

After clicking on *Start*, two additional buttons will appear on the bottom of the menu bar:

Repeat Measurement

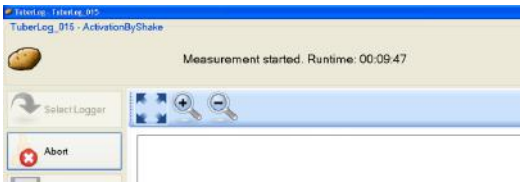
- Click this button to mark a new beginning of a run through a machine without having to re-start the logger. This can be useful when investigating a specific part of a machine. For example, repeating the drop from one conveyor to another can be used to check if a large impact occurs on every drop or only occasionally. Each repeated run is distinguished by colour in the graphical display of measured values.

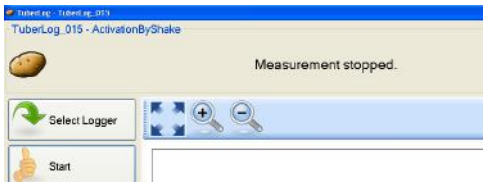
Timestamp

- Clicking this button registers in the data the time at which it was pressed. This allows, for example, the moment just before the data logger drops from one conveyor to another, to be recorded. The timestamps are visible in the graphical display of results, making it easy to locate specific impacts. To ensure an accurate *Timestamp*, check the time setting of the computer.

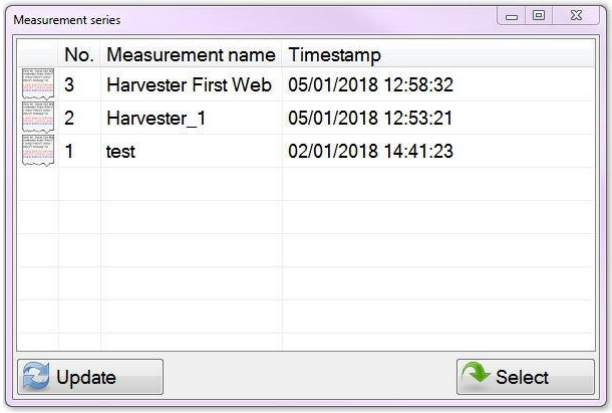
3.3 Selecting data for display

- To display measurements from the data logger while a measurement run is still in progress, click **Abort**. The measurement will then stop.





- Click **Download.** A new window shows the measurement runs and their recording date that are stored in the data logger. Click on the measurement you wish to view and then click **Select**.

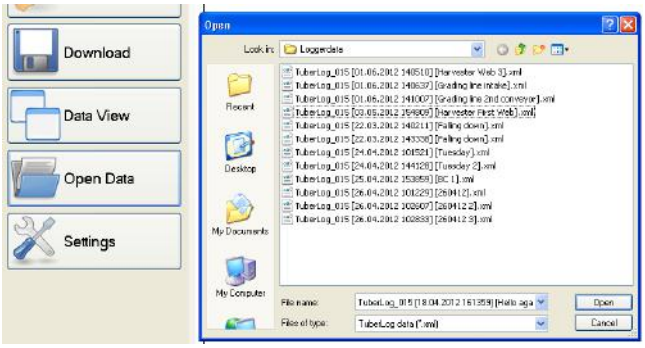


- The data will be displayed more quickly via the USB interface than the wireless Bluetooth interface.

- If the option to *Save BeetLog Data* has been ticked under *Settings/Stored Data*, each measurement run will be saved in the data folder set up during the software installation. The filename is formatted as:
  BeetLog serial number [Date and time of measurement][Measurementname].xml

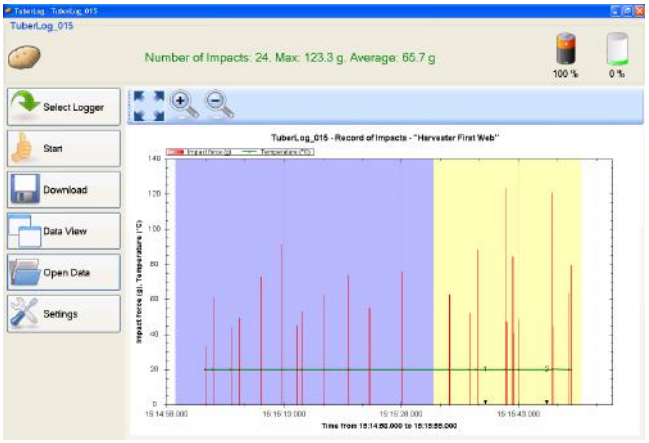
4. Displaying *BeetLog* data on the PC

- Using the PC software, click **Open Data** to display the measurement runs which have already been saved from the tablet or the PC software to the data folder. Highlight the file to be viewed and click **Open**.

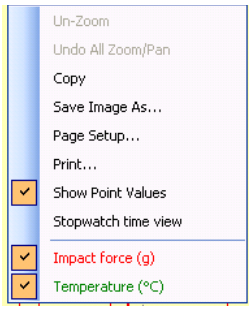


- To change the data display of the measurement run that has been selected, click on **Data View.** There is a choice of 3 ways to view the data. Click **Data View** again to change between them.

4.1 Timeline of the impacts during a measurement



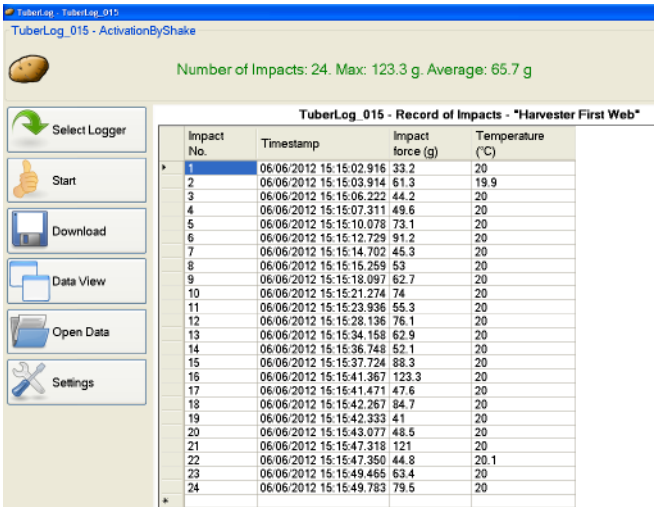
- Repeat measurement runs (blue and yellow) with two time stamps (1, 2) are shown. The horizontal green line is the temperature recorded by the data logger.
- Buttons above the graph are for zooming in and out and for resetting to the original state. The time period displayed can be reduced by drawing a rectangle onto the graph while holding down the left mouse key.
- Right click on the graph to open a menu with further adjustable settings for visual display and printout.
- The result can be saved to the clipboard *(Copy)* or as an image file.



4.2 Percentage distribution of the impacts from a measurement

In addition to the percentage distribution, this graph also shows the number recorded in each group of impact levels. If the *Data accuracy* option is ticked in *BeetLog Data Settings/Impact levels,* only the records which fit into the preset groups of impact levels will be included in the percentage calculation. This graph type can be manipulated, printed and saved in the same ways as in 4.1.

4.3 Table of the impacts during a measurement



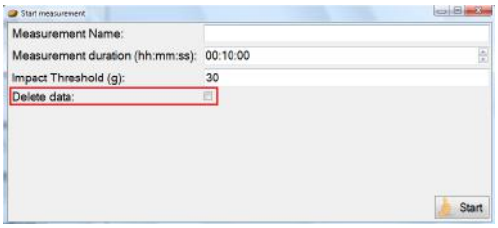
Impact No.	Timestamp	Impact force (g)	Temperature (°C)
1	06/06/2012 15:15:02.916	33.2	20
2	06/06/2012 15:15:03.914	61.3	19.9
3	06/06/2012 15:15:06.222	44.2	20
4	06/06/2012 15:15:07.311	49.6	20
5	06/06/2012 15:15:10.078	73.1	20
6	06/06/2012 15:15:12.729	91.2	20
7	06/06/2012 15:15:14.702	45.3	20
8	06/06/2012 15:15:15.259	53	20
9	06/06/2012 15:15:18.097	62.7	20
10	06/06/2012 15:15:21.274	74	20
11	06/06/2012 15:15:23.936	55.3	20
12	06/06/2012 15:15:28.136	76.1	20
13	06/06/2012 15:15:34.158	62.9	20
14	06/06/2012 15:15:36.748	52.1	20
15	06/06/2012 15:15:37.724	88.3	20
16	06/06/2012 15:15:41.367	123.3	20
17	06/06/2012 15:15:41.471	47.6	20
18	06/06/2012 15:15:42.267	84.7	20
19	06/06/2012 15:15:42.333	41	20
20	06/06/2012 15:15:43.077	48.5	20
21	06/06/2012 15:15:47.318	121	20
22	06/06/2012 15:15:47.350	44.8	20.1
23	06/06/2012 15:15:49.465	63.4	20
24	06/06/2012 15:15:49.783	79.5	20

Transferring Data to Microsoft Excel

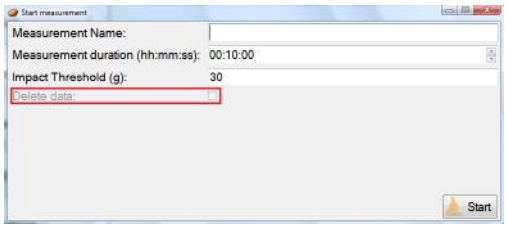
- To select a record in the table left click in the grey column to the left of the impact number. The whole row will be highlighted.
- Hold down **Ctrl** and press **C** on your keyboard, then release **C** first and then **Ctrl**. The record is now copied.
- Open a new Microsoft Excel spreadsheet and left click in to a cell so the curser is flashing in the cell. Hold down **Ctrl** and press **V** on your keyboard to paste the data into the spreadsheet.
- To select a sequence of records or several non-sequential records, hold down **Ctrl** and left click in the empty box parallel to the impact number and copy and paste as instructed above.

5. Data logger memory and data deletion (using the PC software)

- To clear the data logger memory before starting a new measurement, click **Start** at the same time as **CTRL.**
- The *Delete data* option will then be enabled in the *Start Measurement* window
- Tick the **Delete data** option before clicking **Start**. You will always be asked to confirm if you want to delete the data before the measurement run begins.
- If *CTRL+ Start* is not clicked in the main window the *Delete data* option is not enabled and remains greyed out.



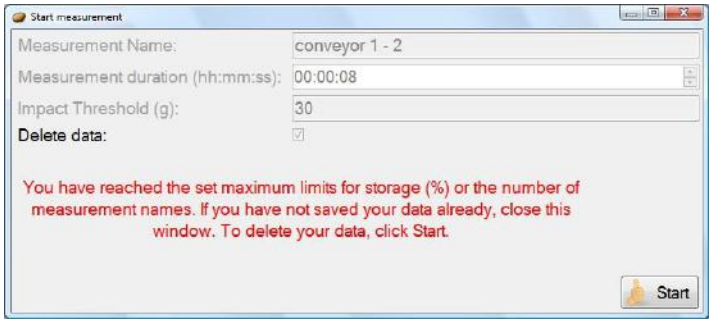
Clicking CTRL+Start enables the option to Delete Data



CTRL+Start was not clicked so there is no option to Delete Data

If the data logger memory is full the newest measurement values will automatically overwrite the oldest entries. Impacts below the set Impact Threshold will not enter the memory, so the time before the memory is filled can be extended by setting a higher threshold. Measurements that must be kept for quality assurance purposes should always be downloaded to a PC before the memory is full. The memory level is indicated at the top of the screen every time the data logger is selected before starting a measurement.

If *Automatic Data Deletion* is ticked in *Stored Data Settings* the software will monitor the data logger's memory in relation to the two set limits (*Max. storage limit (%)* and *Max. measurement names)* and warn you about the possibility of data deletion.



If one of the limits has been reached, **Delete Data** will automatically be ticked in the *Start Measurement* window. You will not be able to untick this option unless space is created in the memory. If you have not been saving your measurements to the computer, simply close the window and download them. To continue without saving any data, click **Start**.

Maintenance , Warranty and Appendix

Maintenance and care of *BeetLog*

The Data Logger

Little ongoing maintenance of the data logger is required. It is a sealed waterproof unit and must not be opened by the user. Any warranty will be invalidated if the data logger has been opened.

When in use, always fit the plug supplied into the hole leading to the charger socket. It is advisable to keep the surface of the data logger clear of accumulated mud. If allowed to harden on the surface mud could affect the response of the unit to impacts.

General Care

BeetLog is a sophisticated electronic instrument that should be treated as if it was a real sugar beet being produced to the highest possible quality. Like a real sugar beet, *BeetLog* will be permanently damaged if it is dropped onto hard surfaces such as concrete. If a badly adjusted sugar beet harvester is seriously damaging sugar beets, for example by squeezing them through the haulm rollers, it must be assumed that *BeetLog* will also be damaged in this way. The examples given are non-exhaustive. The manufacturers cannot be held responsible for this kind of traumatic damage and it is the responsibility of the user to make sure that *BeetLog* is not put into a situation where such damage could occur.

Warranty

BeetLog is guaranteed for 12 months from the date of purchase against any defect or malfunction caused by faulty parts or workmanship. To claim under warranty, the complete set should be returned in its carry case, at the claimant's expense, to the supplier with a written explanation of the problem. Should there prove to be a defect or malfunction caused by faulty parts or workmanship, it will be repaired or replaced and returned to the claimant without charge. If a warranty claim is rejected, the cost of replacement or repair will be notified to the claimant before any work is carried out.

Any warranty claim will automatically be invalidated if the data logger has been opened or internally tampered with in any way. Damage or faults occurring which are deemed by the manufacturers or distributors to have been caused by inappropriate use of the equipment or by use not in accordance with the instruction manual will not be covered under warranty. Under no circumstances will the supplier re-imburse any costs associated with a warranty claim if these costs have been incurred without agreement in advance.

Under the terms of warranty under no circumstances will liability exceed the cost of replacement or repair. The manufacturer ESYS GmbH and the distributor Martin Lishman Ltd will not be liable for any consequential or indirect loss suffered by purchasers or users of *BeetLog*, whether this loss arises from correct or incorrect use of the data logger and software, defect or malfunction caused by faulty parts or workmanship or in any other way. Non-exhaustive illustrations of consequential or indirect loss are loss of profits, loss of contracts and damage to property.

Full Terms and Conditions of Sale can be supplied on request or viewed on our website www.martinlishman.com.

For technical help:

Please send a description of your query to:

Martin Lishman Ltd
E-mail: sales@martinlishman.com; Tel: +44 1778 426600

Appendix

BeetLog Technical data

BeetLog captures all impacts during a selectable measurement period while using a sampling rate of 3000 Hz. When exceeding a preset threshold, the peak values of the 3 acceleration axes (x,y,z) are saved continuously in a millisecond cycle until the impact falls below the threshold again.

Measured variable sensor: Acceleration / Temperature semiconductor sensor
Measurement range acceleration: up to 400g, Resolution 0,1g, Accuracy ±1
Measurement range temperature: -40 to +125°C, Resolution 0,1°C, Accuracy ±1°C
Measurement duration: up to approx. 16 hours
Memory capacity: 425,984 measurement value pairs
Data preservation: >10 years without battery
Power supply: Lithium-ion-battery 3,6V, 850mAh rechargeable in approx. 2 hours
Operating temperature range: - 10°C to +70°C
PC Interfaces: USB, Bluetooth
Dimensions: approx. 14 x 23 x 5 cm
Weight : 700g
Compatible software OS: MS-Windows XP/7
Format of saved data: *.xml
Format of exported data: ASCII-compliant CSV-Format

Proper disposal of the data logger

Please support us with the proper disposal of the data logger, protecting our environment and also take care of local rules and regulations. The proper disposal of electronic broken or disused devices is a legal duty of both the manufacturer and buyer alike. Electronic waste may not be disposed as domestic rubbish.
The disused devices may not be returned into public recycling systems. They have to be returned directly to ESYS GmbH. ESYS GmbH accepts returned disused devices (made by ESYS GmbH) free of charge for proper disposal/recycling.

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