BeetLog

Martin Lishman

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 0 Number of Impacts: 24. Max: 123.3 g. Average: 65.7 g TuberLog_015 - Record of Impacts ***Harvester First Web** Select Logger Terr (°C) Impact force (g) ature Timest 06/06/2012 15:15:02:915 06/06/2012 15:15:03:914 06/06/2012 15:15:03:914 06/06/2012 15:15:03:914 06/06/2012 15:15:07:071 06/06/2012 15:15:10:707 91/2006/2012 15:15:15:12:729 91/2006/2012 15:15:14:702 06/06/2012 15:15:14:702 06/06/2012 15:15:16:10:97 62/7 Start wnload Open Data 3 06/06/2012 06/06/2012 06/06/2012 06/06/2012 06/06/2012 06/06/2012 Settings TuberLog_015 -
 06:06/2012
 15:15:41.367
 123.3

 06:06/2012
 15:15:41.471
 47.6

 05:06:2012
 15:15:42.267
 84.7

 05:06:2012
 15:15:42.333
 41

 06:06:2012
 15:15:42.333
 41

 06:06:2012
 15:15:43.077
 48.5

 06:06:2012
 15:15:43.077
 48.5
 367 TuberLog_015 100 % 0 Number of Impacts: 24. Max: 123.3 g. Average: 65.7 g 05 **PC Software** Select Logger Setting TuberLog_016 -R Start Download -Data View Open Data Setings



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:

BeetLog list	
Name	
TuberLog_509	
🔁 Update	Select

- 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:

Beetlog - Tuberlog 500	A DESCRIPTION OF A DESC		- (1) X
TuberLog_509	Battery level checked.	100 %	0%
Select Logger			

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

🕺 Settings - BeetLog 1.0.0	0.7099		
Set-up Language Bluetooth Set-up BeetLog Communication device	Set-up Language:	en	

Bluetooth

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

🗼 Settings - BeetLog 1.0.	0.7099	No. The second	
Set-up Language Bluetooth Set-up BeetLog Communication device	Bluetooth Vibration sensor mode:	Activation By Shake	•

BeetLog

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

Set-up	Communicat	ion device	
Language Bluetooth Set-up BeetLog Communication device - BeetLog Data Settings -	Communication:	 ✓ Bluetooth ✓ USB Pluetooth (Wrap) Serial Port 	

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**.

Set-up	Impact Level Range (g).	
Language Bluetooth —— Set-up Communication device BeetLog Data Settings Impact Levels Stored Data Measurement Settings	▼ 30-50 ▼ 50-75 ♥ 75-100 ♥ 100-125 ♥ 125-150 ♥ 150-175 ♥ 175-500 Name: Min (2): Max (x): Colour:	Add

- 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.

Impact Leve	el Range (g).		
 \$0.75 75-100 100-125 125-150 150-175 175-500 New 		<	Add Delete
Name: Min (≥): Max (∠): Colour:			

Impact Level	Range (g).		
50-75		^	Add
75-100			Delete
100-125			Delete
 ✓ 125-150 ✓ 150-175 			
175-500			
New			
		~	
Name:	New		
Min (১):	0		
Max (≤):	0		
Colour:			

• 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.

Impact Level	Range (g).		Impact Level	Range (g).	
 ✓ 50.75 ✓ 75100 ✓ 100.125 ✓ 125150 ✓ 150.173 ✓ 175-500 №и 	-	Add Delete	50-75 75-100 100-125 125-150 150-175 125-600 ✓ Bruise 1	-	Add Dølete
Nemec	Bruise 1		Name	Bruise 1]
Min 2 :	40		Min (2)	40]
Max (≤):	60		Max (≤):	60]
Colour	<u> </u>		Colour:		
Data accuracy.			Data accuracy:		
	OK Apply	Cancel		ОК Арру	Cancel

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

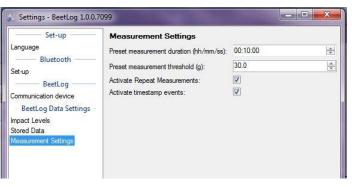
Stored Data

 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.

Language	Stored Data Settings Save BeetLog data:	s V
Bluetooth Set-up BeetLog Communication device	Data saved to: Automatic data deletion: Max. storage limit (%):	\\dc2012\folder redirections\mattswinn\Do ♥ 90
BeetLog Data Settings - Impact Levels Stored Data Measurement Settings	Max. measurement names:	20

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.

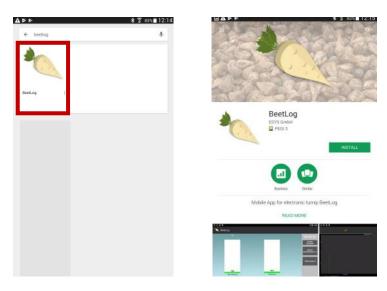
- In *Bluetooth*, ensure that Bluetooth is enabled. To avoid communication interruption during measurement, select a long *Visible time-out period* (or *Never time out*) for the Android device.
- In Security, select Screen Lock and choose None. Select Device Administration Unknown Sources and choose 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

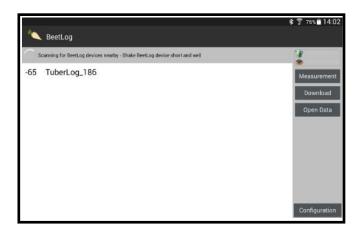


- Download the file BeetLog.apk from the USB memory stick supplied *(located in the folder PTR600 – App for Android)* onto the Android device

1.7. Communication between the data logger and Android device



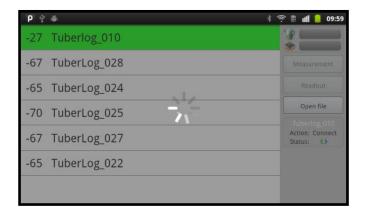
If the data logger is set to Activation by Shake and within Bluetooth range of the Android device, firmly knock the logger on a hard surface. It will be detected and its Serial Number will appear on the screen. Select the data logger by touching the Serial Number on the screen.



 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.

-64 TuberLog_509 Downloa	\$ 🚏 95%∎ 12:52		•	4
-55 TuberLog_186 -64 TuberLog_509 Downloa Open Da Configurat Yellow alert (g) Red alert (g) Show Max. Impact			BeetLog	1
-64 TuberLog_509 Downloa Open Da Configurat Yellow alert (g) 70 1 Red alert (g) 100 2	<u> </u>		nected	Co
Configurat Yellow alert (g) 70 1 Red alert (g) 100 2	Measurement		TuberLog_186	-55
Configurat Configurat Yellow alert (g) Red alert (g) Show Max. Impact	Download		TuberLog_509	-64
Yellow alert (g) Red alert (g) Show Max. Impact	Open Data			
A A SAME T Yellow alert (g) Red alert (g) Show Max. Impact Yellow Alert (g) Yellow Alert (g) Yell				
Yellow alert (g) Red alert (g) Show Max. Impact				
A A SAME T Yellow alert (g) Red alert (g) Show Max. Impact Yellow Alert (g) Yellow Alert (g) Yell				
Yellow alert (g) Red alert (g) Show Max. Impact				
Yellow alert (g) Red alert (g) Show Max. Impact	Configuration			
Yellow alert (g) 70 1 Red alert (g) 100 2	Configuration			
Yellow alert (g) 70 1 Red alert (g) 100 2	* 😨 🔏 53% 🚰 15:3		1	6
Red alert (g) 100 Show Max. Impact 2				
Show Max. Impact 2		1		
\sim 2		-	alert (g) 100	Red
			v Max. Impact 🛛 🖌	Show
		2	v Temperature 🛛 🗸	Show
Acoustic signal		o	ıstic signal 🛛 📝	Acou
Save 3		3		
PRAE			Save	-

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.

4 =												\$ 7 9	12:53
		tLog		Or	iline tra	cking							
-55	Tub	erLog	186	Measu	rement	name	Harv	ester]				1	
-64		erlog					^	*					
-04		iert.og_		Dura	ition(hh	:mm)	01	00		Start			
							•	•					ownloati nfiguration
		1st		1			î.				18	:h	>
1		2 @		3 #	4 /	5	74	6	Т	7 *	8	9 (0
q	Т	w	e	r		t	у	u		i	0	р	•
	a	s	Ι	d	f	g	Ι	h	j	k			Next
Û	•	z	×	с	,	/	b	n		m	. 1	.?	仓
Sy	m	\$	8				English	цик) 1				Ē	1

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*

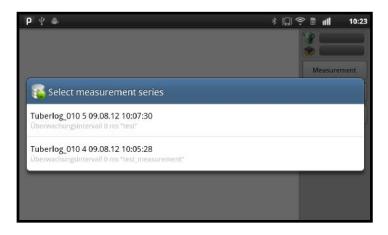
Touch this button to mark a new beginning of a run through a machine without having to re-start the logger. This can be useful when investigating a specific part of a machine. For example, repeating the drop from one conveyor to another can be used to check if a large impact occurs on every drop or only 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.

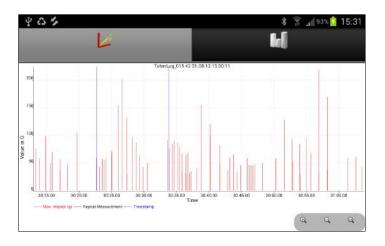
2.6 Displaying data logger data

 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.

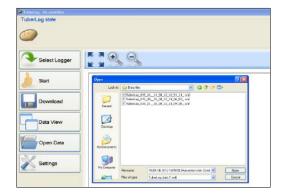
Graph of impacts during a measurement

Graph of the percentage distribution of impacts

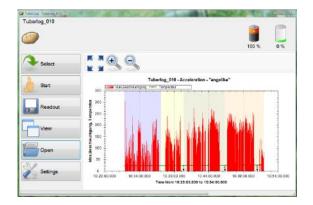
2.8 Exporting data to the PC

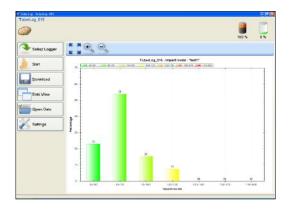
 Downloaded measurement files from the data logger are automatically stored in XML format in the BeetLog directory on the Android device SD card. This is accessed via My Files/BeetLog (folder names may differ on some devices). The data can be copied to the computer and processed using the *BeetLog* PC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

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ess 🗀 Orlaarvan/Potatoes)	Electro	nic Potatol/PTR 400/Data files			
and the second		Name -	Skot	Type	Date Modified
He and Public Tasks Heles a two folder Publishins folder to the Web New previous versions	(A)	Hubertog_015_16_14_00_1 Hubertog_015_20_15_08_1 Hubertog_015_21_15_08_1	11 KB	XML Document XML Document XML Document	14(08)2012 16/62 15(08)2012 12:20 15(08)2012 12:20
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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

S <mark>tart measurement</mark>		
Measurement Name:	Harvester 2	
Measurement duration (hh:mm:ss):	00:10:00	<u>A</u>
Impact Threshold (g):	30	
Delete data:		
		b Start

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

Beerlog - Tuberlog 509 TuberLog_509			
*	Measurement started. Runtime: 00:09:41	98 %	0%
Select Logger			
Abort			

- 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.

Telefog, Telefog, 015 TuberLog_015 - Activation8	ByShake .	TuberLog_015 - ActivatonByShake	
0	Measurement started. Runtime: 00:09:47	Me	asurement stopped.
SelactLoggar		Select Logger	
Abort		Start	

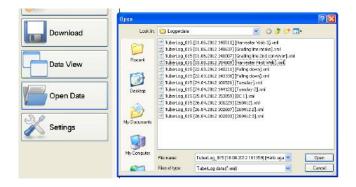
 Click **Download.** A new window shows the measurement runs and their recording date that are stored in the data logger. Click on the measurement you wish to view and then click **Select**.

	🥔 Measureme	nt series		
Start	No.	Measurement name	Timestamp	^
	16	Harvester First Web	06/06/2012 14:35:34	
Download	15	Harvester First Web	06/06/2012 14:30:54	
Download	14	Harvester First Web	06/06/2012 14:27:18	
	13	Harvester First Web	06/06/2012 14:24:50	
Data View	12	Grading line packing line 2	01/06/2012 14:20:39	_
	11	Grading line packing line	01/06/2012 14:12:14	
Open Data	10	Grading line 3rd conveyor	01/06/2012 14:10:39	
- open sum	9	Grading line 2nd conveyor	01/06/2012 14:10:07	
2	Record of the second se	Grading line 1st conveyor	01/06/2012 14:09:20	~
Settings	🔁 Updat	e	Se Se	lect

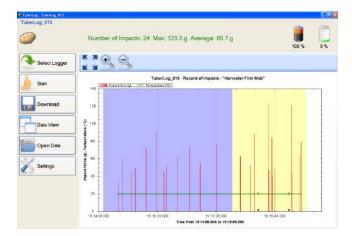
- The data will be displayed more quickly via the USB interface than the wireless Bluetooth interface.
- If the option to Save BeetLog Data has been ticked under Settings/Stored Data, each measurement run will be saved in the data folder set up during the software installation. The filename is formatted 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.

Undo All Zoom/Pan Copy

Save Image As...

Stopwatch time view

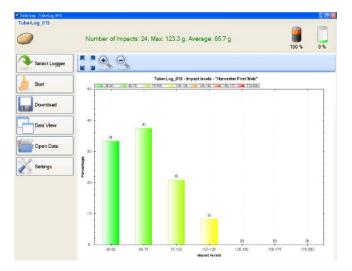
Impact force (g)

Temperature (°C)

Page Setup...

Print... Show Point Values

~



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

		raumber c	of Impacts: 24. Max: 12		
			1	5.5 g. Avei	age. 65.7 g
			TuberLog_015	- Record of	Impacts - "Harve
Select Logger		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
Download		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
Data View		9	06/06/2012 15:15:18.097		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
n Data		13	06/06/2012 15:15:34.158	62.9	20
		14	06/06/2012 15:15:36.748		20
		15	06/06/2012 15:15:37.724	88.3	20
nas		16	06/06/2012 15:15:41.367	123.3	20
ngs		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		20
		22	06/06/2012 15:15:47.350		20.1
		23	06/06/2012 15:15:49.465		20
		24	06/06/2012 15:15:49.783		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.

Measurement Name:		
Measurement duration (hh:mm:ss):	00:10:00	8
Impact Threshold (g):	30	
Delete data:	E	

Measurement Name:		
Measurement duration (hh:mm:ss):	00:10:00	6
Impact Threshold (g):	30	
Delete data:		

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.

conveyor 1 - 2	
00:00:08	4. 14
30	
	00:00:08 30

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



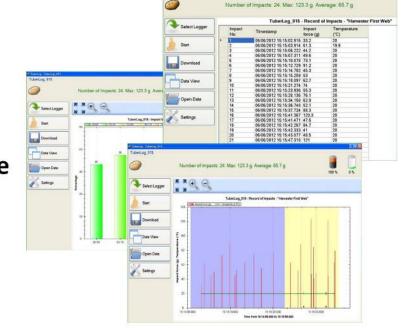
BeetLog





App for Android

PC Software



BeetLog PTR700

App for Android and Samsung Tablet

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

<u>IMPORTANT:</u> 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.

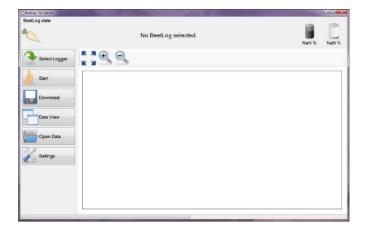
1.3 Charging the data logger battery

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.

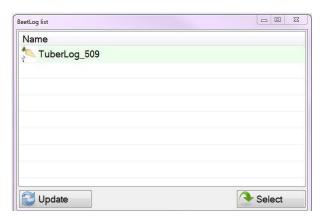
1.4 Data logger settings

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:

BeetLog - TuberLog 509	the second s		- III - X
TuberLog_509	Battery level checked.	1	
		100 %	0 %
Select Logger			

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

Language Language: en	
	1
Set-up	

Bluetooth

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

Settings - BeetLog 1.0.	0.7099	- X
Set-up Language Bluetooth Set-up BeetLog Communication device	Bluetooth Vibration sensor mode: ActivationByShak	KE

BeetLog

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

Set-up	Communicat	ion device	
Language Bluetooth Set-up BeetLog Communication device - BeetLog Data Settings -	Communication:	Bluetooth USB Bluetooth (Wrap) Serial Port	

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**.

Set-up	Impact Level Range (g).	
Language Bluetooth Set-up Communication device BeetLog Data Settings Impact Levels Stored Data Measurement Settings	☑ 30-50 ☑ 50-75 ☑ 75-100 ☑ 100-125 ☑ 125-150 ☑ 150-175 ☑ 175-500	Add Delete

- 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.

Level Range (g).		Impact Leve	l Range (g).		
0-75	Add Delete	 ✓ 50.75 ✓ 75.100 ✓ 100.125 ✓ 125.150 ✓ 150.175 ✓ 175.500 New 		~	
		Name:	New		
£		Min (2):	0		
x (£):		Max (≤):	0		
our:		Colour:			

• 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.

Impact Leve	Range (g).		Impact Level	l Range (g).	
 ✓ 50.75 ✓ 75100 ✓ 100.125 ✓ 125150 ✓ 150.173 ✓ 175500 №м 	-	Add Delete	50-75 75-100 100-125 125-150 150-175 175-500 ⊮ Bruise 1	-	Add Dølete
Names	Bruise 1		Name	Bruise 1]
Min 2 :	40		Min (23	40]
Max ≤ :	60		Max (£):	60]
Dolour	—		Colour:		
Data accuracy			Data accuracy:		
	ОК Арру	Cancel		OK Apply	Cancel

- 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.

Language	Stored Data Settings Save BeetLog data:		
Bluetooth BeetLog Communication device	Data saved to: Automatic data deletion: Max. storage limit (%):	\\dc2012\folder redirections\mattswinn\Do	
Communication device BeetLog Data Settings Impact Levels Stored Data	Max. measurement names:	20	

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.

Set-up	Measurement Settings		
anguage	Preset measurement duration (hh/mm/ss):	00:10:00	A V
Get-up	Preset measurement threshold (g):	30.0	* *
BeetLog	Activate Repeat Measurements:		
Communication device	Activate timestamp events:		
BeetLog Data Settings			
mpact Levels			
Stored Data			
Measurement Settings			

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

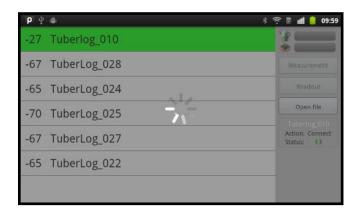
 If the data logger is set to Activation by Shake and within Bluetooth range of the tablet, firmly knock the logger on a hard surface. It will be detected and its Serial Number will appear on the screen. Select the data logger by touching the Serial Number on the screen.

SeetLog	\$ 🚏 76% 🗎 14:02
Scanning for BeetLog devices nearby - Shake BeetLog device short and well	2
-65 TuberLog_186	Measurement Download Open Data

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

P ⊈ ⊕			*	🤋 🖬 📶	10:0
-24 Tuberl Bluet	tooth pairing r	equest			
-67 Tuberl Type PIN	to pair with "Tube	erlog_010".(Try (0000 or 1234.)	Measur	ement
-66 Tuberl				Read	lout
← 123 ←	\$	•		→ ABC →	
q w e	r, t,	у	u i	0	р
a s d The conne	F ection to Tuberlog	or b _010 could not l	e established.	k I	
🚖 z x	С	v b	n	m	×
Ľ ∮ ?				1	1

– 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.

34	* 👔 📶 52% 🤷 15:35
-46 TuberLog_015	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	Measurement
	Download
	Open Data
	TuberLog_015 Action: Connected Status:
Online-Settings	Graph-Settings

Online-Settings

○ ■ ½				* 🚡	d 53% 🛐	15:38
Yellow alert (g)	70] ←	≥ 1			
Red alert (g)	100	+				
Show Max. Impact	 Image: A start of the start of	+				
Show Temperature	 Image: A start of the start of		2			
Acoustic signal	 Image: A start of the start of	←	— 3			
Save						

- 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.

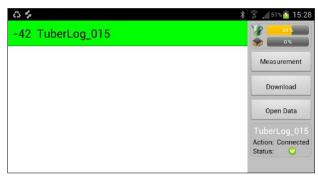
Graph-Settings

 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

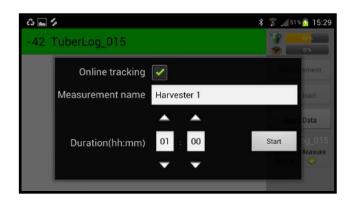
 Touch the Serial Number of the *BeetLog* you wish to use. If it is not shown, but is within range of the tablet, activate it by shaking it or knocking it on a firm surface. The data logger should be connected and the following information will appear on the screen:



- Ensure the data logger battery is adequately charged.

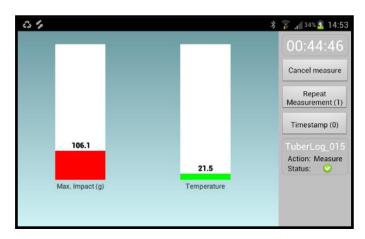
2.5 Start the measurement

- 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.

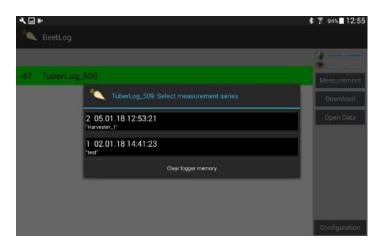
2.8 Displaying data logger data

 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.



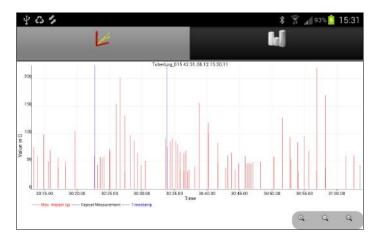
Measurements marked Green are already stored on the tablet. Measurements marked Yellow have no data.

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

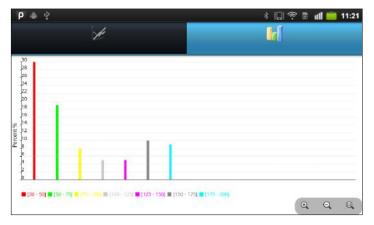


2.9 Change the data display

 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

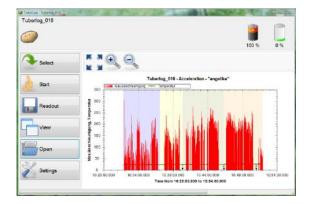
2.10 Exporting data to the PC

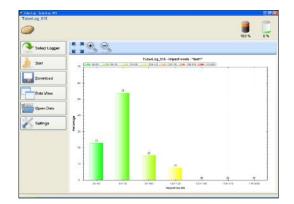
- Downloaded measurement files from the data logger are automatically stored in XML format in the BeetLog directory on the tablet SD card. This is accessed via My Files/BeetLog (folder names may differ on some devices). The data can be copied to the computer and processed using the *BeetLog* PC software.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

beck - 🜍 - 🤧	p	Search 🜔 Polders 💷•			
ess 📴 Orlaansel	Elactro	nic Potato(PTR 400)Oatañles			
lie and Fulder Tasks		Name - ::::[Tubertog_015_16_1+_09_3]	5 KB	Type XML Document	Date Hod fied 14/08/2012 16:52
Hales a rever folder Publish this Folder to the Web Herv previous versions		2 Tuberlog_015_20_15_08_1 2 Tuberlog_015_21_15_08_1		XML Document XML Document	15(08)2012 12:20 15(08)2012 12:20
The Places TR 400 HV Counterts Ny Computer My Nativork Places	*				
Net als	8				
Nata film 'le Tokler					



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

Start	Start measurement		
(P	Measurement Name:	Harvester First Web	
Download	Measurement duration (hh:mm:ss):	00:10:00	0
Download	Impact Threshold (g):	30	
Data View	Delete data:		
Open Data			
Settings) Start

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

TuberLog_509			
<u> </u>	Measurement started. Runtime: 00:09:41	98 %	0%
Select Logger			
Abort			

- 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.

TuberLog_015 - ActivationBy	/Shake	TuberLog_015 - Activator	18yShake
0	Measurement started. Runtime: 00:09:47	<i>(</i>	Measurement stopped.
SelectLogger		Select Logger	
		Select Logger	

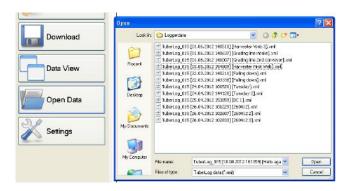
 Click **Download.** A new window shows the measurement runs and their recording date that are stored in the data logger. Click on the measurement you wish to view and then click **Select**.

	No.	Measurement name	Timestamp
TOTO TO	3	Harvester First Web	05/01/2018 12:58:32
	2	Harvester_1	05/01/2018 12:53:21
	1	test	02/01/2018 14:41:23
	Upda	to	Select

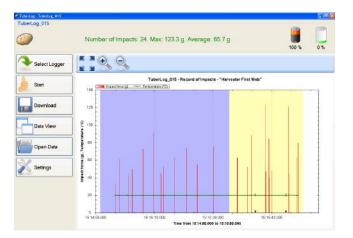
- The data will be displayed more quickly via the USB interface than the wireless Bluetooth interface.
- If the option to Save BeetLog Data has been ticked under Settings/Stored Data, each measurement run will be saved in the data folder set up during the software installation. The filename is formatted 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**.

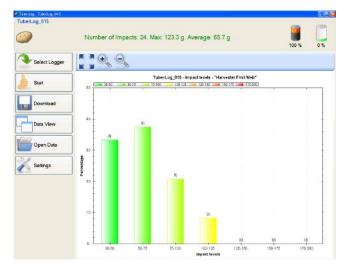


- To change the data display of the measurement run that has been selected, click on **Data View**. There is a choice of 3 ways to view the data. Click **Data View** again to change between them.
- 4.1 Timeline of the impacts during a measurement



- 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

ierLog - TuberLog_015					
erLog_015 - Activatio	nBySh	ake			
		Number	of Impacts: 24. Max: 12	330 440	man: 65 7 a
/		Number c	ninpacis. 24. Max. 12	5.5 g. Ave	lage. 00.7 g
	1		TuberLog 015	- Record of	Impacts - "Harv
Select Logger		Inc. and	a		Temperature
		Impact	Timestamp	Impact	
	í —	No.		force (g)	(°C)
	•	1	06/06/2012 15:15:02.916		20
Start		2	06/06/2012 15:15:03.914		19.9
		3	06/06/2012 15:15:06.222		20
	1	4	06/06/2012 15:15:07.311		20
Download		5	06/06/2012 15:15:10.078	73.1	20
Download		6	06/06/2012 15:15:12.729	91.2	20
	1	7	06/06/2012 15:15:14.702	45.3	20
		8	06/06/2012 15:15:15.259	53	20
Data View		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
Open Data		13	06/06/2012 15:15:34.158	62.9	20
		14	06/06/2012 15:15:36.748	52.1	20
	1	15	06/06/2012 15:15:37.724	88.3	20
Comin and		16	06/06/2012 15:15:41.367	123.3	20
Settings		17	06/06/2012 15:15:41.471	47.6	20
	1	18	06/06/2012 15:15:42.267		20
		19	06/06/2012 15:15:42.333		20
		20	06/06/2012 15:15:43.077		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		20
		24	06/06/2012 15:15:49.783		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.

Measurement Name

Impact Threshold (g):

Measurement duration (hh:mm:ss): 00:10:00

Measurement Name:		
Measurement duration (hh:mm:ss):	00:10:00	
Impact Threshold (g):	30	
Delete data:	1711	
	1.1	
Denete Gata.		
Jeres Gale.		
Center Cetter.		
Univer Gala,		

Clicking CTRL+Start enables the option to Delete Data

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

Start

30

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.

Start measurement		x
Measurement Name:	conveyor 1 - 2	
Measurement duration (hh:mm:ss):	00:00:08	4
Impact Threshold (g):	30	
Delete data:	<u>ज</u>	
You have reached the set maximum	m limits for storage (%) or the number of	
measurement names. If you have	not saved your data already, close this e your data, click Start.	

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 425,984 measurement value pairs Memory capacity: Data preservation: >10 years without battery Lithium-ion-battery 3,6V, 850mAh rechargeable in approx. 2 hours Power supply: - 10°C to +70°C Operating temperature range: PC Interfaces: USB, Bluetooth approx. 14 x 23 x 5 cm Dimensions: Weight : 700q 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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