DairyTest Lite

Dairy Vacuum & Pulsation Tester

USER MANUAL

Part No. DR51-0060-14
For software v2.5.0

innovAg

Contents

FCC Compliance Statement

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Declaration of Conformity

Standards to which Conformity is Declared:

- EN 61000-4-2
- EN 61000-4-3
- EN 61000-6-1
- EN 61000-6-2
- EN 61000-6-4
- IEC 61326:2013 (IEC 61326-1:2012 Ed2)
- EU Directive 2011/65/EU
- EU Directive 2014/30/EU
- 47 CFR Part 15B
- FCC 15.109
- ANSI c63.4:2014
- China RoHS (See following page)

Manufacturer's Name: innovAg Pty. Ltd.

Manufacturer's Address: 37/328 Reserve Road, Cheltenham Victoria 3192, Australia

Type of Equipment: Pulsation Tester/ Vacuum Gauge

Brand Name: DairyTest Lite

Model Number: DR40-0177

零件项目(名称) (Component Name)	有毒有害物质或元素(Hazardous Substances or Elements)					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Chromium VI Compounds (Cr6+)	多溴联苯 Poly-brominated Biphenyls (PBB)	多溴二苯醚 Poly-brominated Diphenyl Ethers (PBDE)
印制电路主要配件 (Main Printed Circuit Assembly)	O	O	O	O	O	O
Enclosure	O	O	O	O	O	O
LCD	O	O	O	O	O	O
Silicone tubing	O	O	O	O	O	O
Metal fittings	O	O	O	O	O	O
Front panel label	O	O	O	O	O	O
Rating labels	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006标准规定的限量要求以下.
O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求.
X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directives and Standards.

Braham Basser
Director
InnovAg Pty. Ltd

Date: 18 March 2018

1. What is DairyTest Lite?

DairyTest Lite is an easy-to-use update of the industry-standard DairyTest Professional. New features include:

- Colour TFT touch screen.
- Built-in report, viewed and printed via PC / Mac / tablet without software installation.
- Lightweight, rubberised, IP53 enclosure.
- Non-volatile data storage.
- Valve purge system to protect the sensors from fluid ingress.
- Designed, built and serviced in Australia.

Within Australia we have a Freecall help line: 1800 061 167. International users should call their local distributor or contact us via email at info@innovAg.com.

2. Safety Precautions

DairyTest Lite is intended to be used in the milking stall – always allow for the unpredictable nature of animals. During the measurements, sharp needles may be used – take care they do not hurt people or animals. Always ask the dairy farmer about the behaviour of the animals and milking method used.

If using DairyTest Lite in wet tests, always keep the unit above the test point to prevent fluid entry. Damage to the unit from fluid entering the sensors is not covered under the warranty. Note that the use of external filters in DairyTest Lite measurement tubes is **NOT RECOMMENDED**. See the **External Filters** section.

3. Maintenance

Clean DairyTest Lite with a moist cloth. Do not use cleaning agents.

DairyTest Lite performs self-tests when turned on and during use. If an error message is displayed or you suspect the unit is damaged, contact innovAg or the local distributor for further information.

4. Calibration & Vacuum System Check

DairyTest Lite automatically performs a zero calibration when turned on. Do not turn on your DairyTest Lite with vacuum connected. If the unit reads other than zero on start-up, make sure vacuum is disconnected and turn off and on again. If it still does not read zero a manual 'Force-zero' can be used. Refer to the section '**Troubleshooting your DairyTest Lite**'.

A complete calibration should be performed with an approved and certified calibration test instrument every 12 months which can be organised by innovAg or the local distributor. When calibration is due a 'Needs calibration' warning will appear on the startup screen.

The warning can be temporarily overridden by performing a **Vacuum System Check** which requires a successful **Response Test** and **Leak Test** to be performed on both ports.

Enter the Factory Settings screen and the Vacuum System Check button will show the status of Leak Tests (L1 & L2) and Response Tests (R1 & R2). The labels are grey if the test has not been performed or not passed.

If all labels are green the tests have passed and pressing the button will disable the 'Needs calibration' warning.

5. The Basics

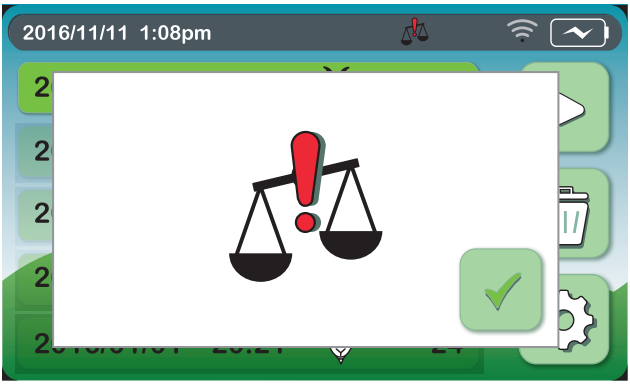
The Button

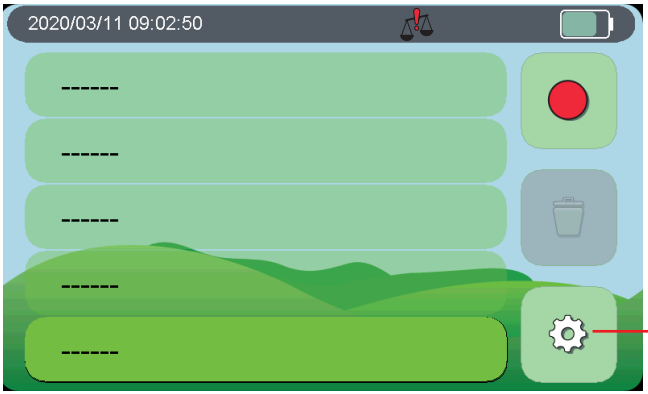
There is only one button on the DairyTest Lite and it has three functions.

1. Press to turn the unit on.
2. From the sessions screen press and hold to turn off.
3. Press to exit the current screen.

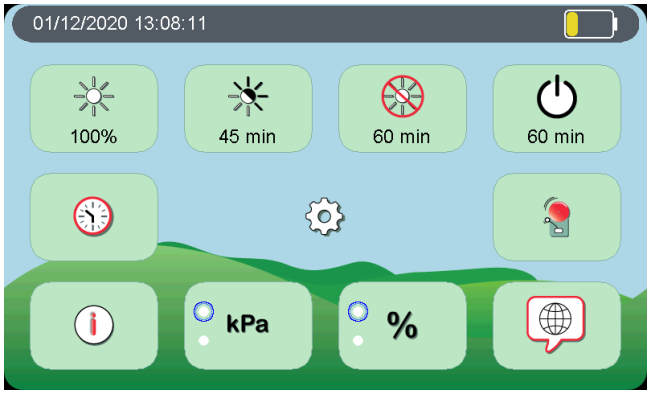
First start up

When you first turn on the DairyTest Lite the ‘needs calibration’ icon may be shown indicating the date/time have not been set. Continue to the Setup section to set the clock.





Setting up



Backlight brightness

Time to half brightness

Time to sleep

Time to auto power off

Set date/format

Parlour Presets *

System information *

kPa Vacuum units (kPa or inHg)

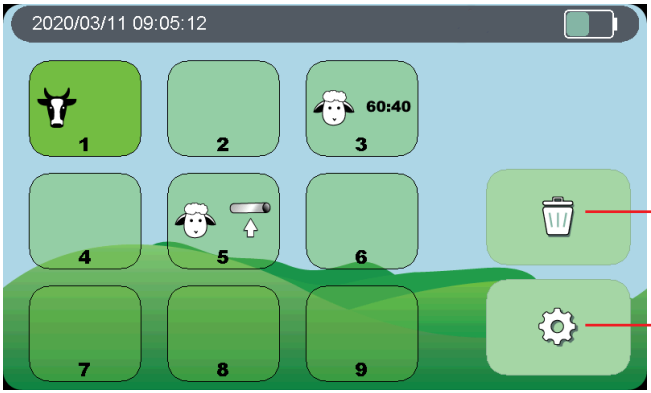
% Pulsation units (% or ms)

Language

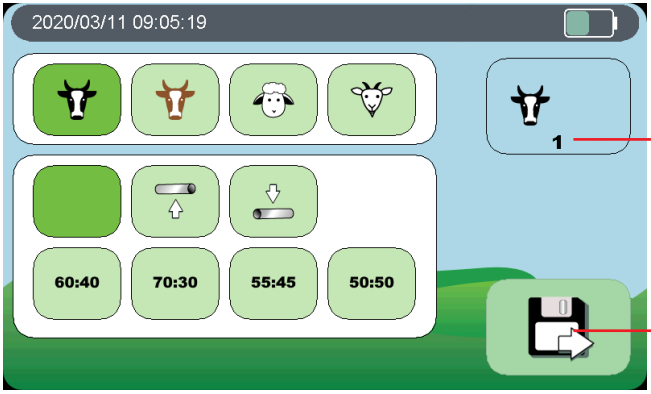
* refer to following section

Parlour Presets

There are 9 parlour/alarm presets. Each can be customised with pictures and pulsation alarm limits. To edit select one and press setup.

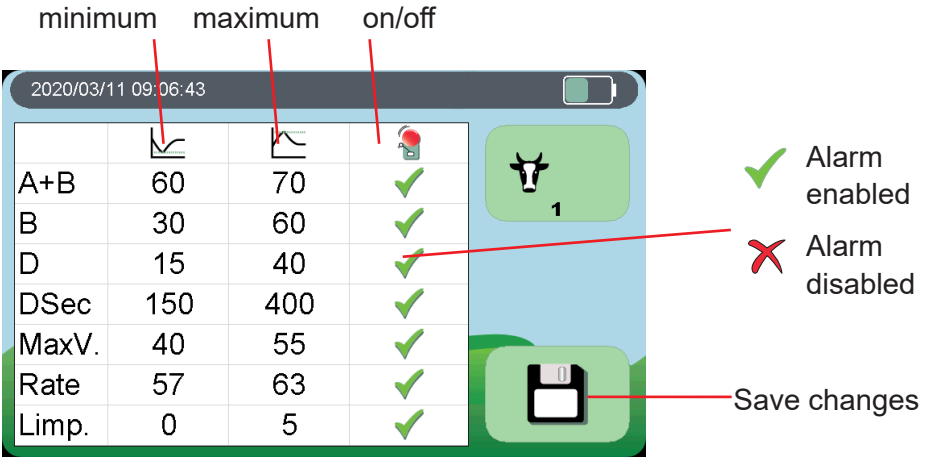


Select appropriate icons related to the preset's use.

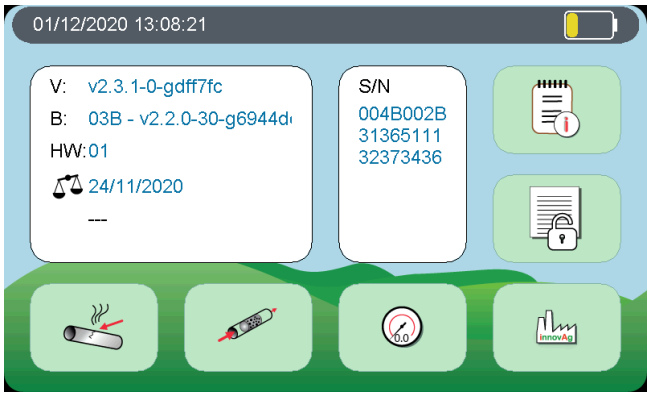


Pulsation alarm limits

Press each setting to edit.
During measurement the value will be highlighted if it is outside these limits.



System Information



V: v1.2.0-372-g749e4f
B: 03B - v1.1.1-0-gbd2972
HW:01
24/07/2018

Software and hardware version information. Calibration date, setting values.

S/N
0025001C
3434510E
32343031

Internal serial number.

System log – debug use only.

Enter Feature Code screen.

Enter Factory Settings screen.

Perform Leak Test

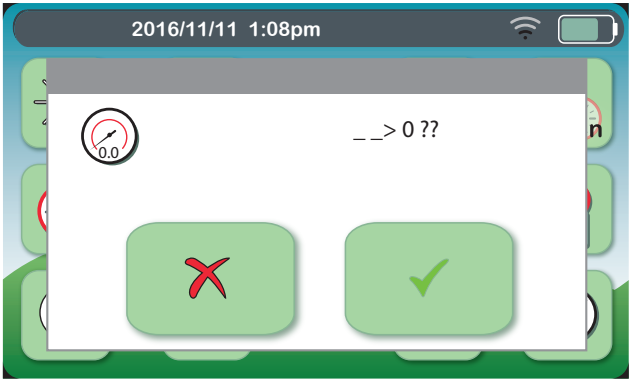
Perform Response Test.

Force Zero

Force Zero

Will force the **current reading** on both ports to be the zero reference.

Remove vacuum from both ports and press ✓ .



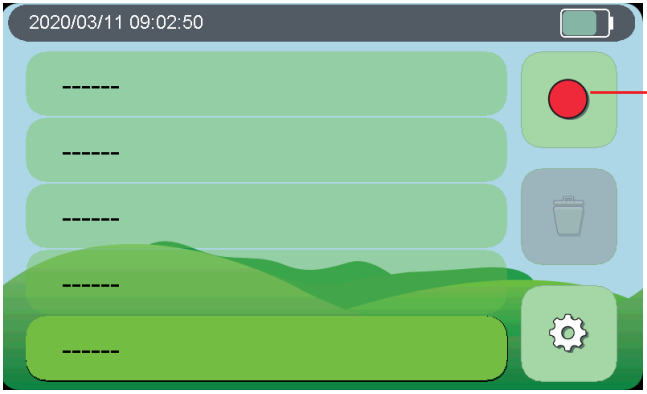
Starting a session

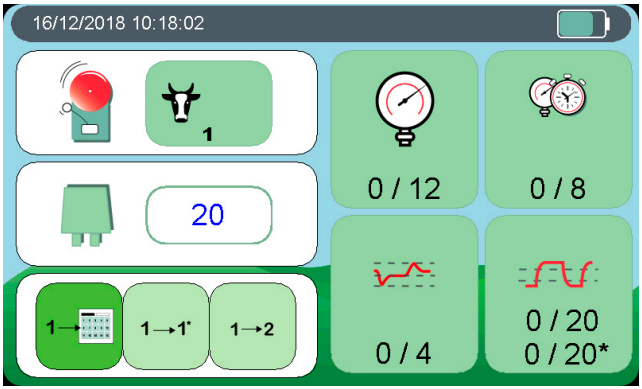
A ‘session’ is a group of measurements taken on a farm on the same day.

DairyTest Lite has 5 sessions automatically labelled with the session start date, parlour icon and number of stalls.

DTL does not store the farm/farmer name with the session on the unit. The farm name can be entered once it is loaded onto the PC.

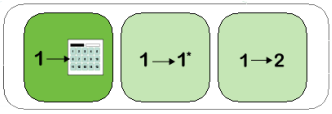
Select an empty session and press record.



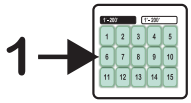


Parlour preset selected. Presets can be edited for each session but changes are not saved to the preset's template.

Number of pulsators/stalls (maximum 200)



Pulsation auto-advance after memory save setting



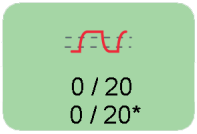
- Return to number screen

- Move to next minor increment

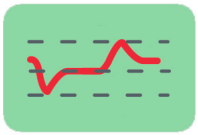
- Move to next major increment

Vacuum measurement

Vacuum recorder



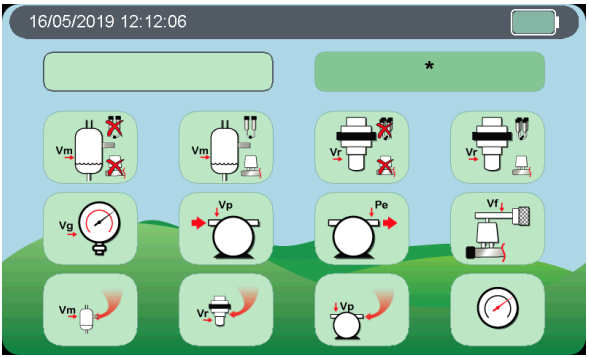
Pulsation measurement



Regulation Characteristics

Vacuum measurement

There are 12 preset vacuum measurement points and two memories per measurement point, eg. Pe and Pe*.



Vm - No milking units

Vm - Milking units operating

Vr - No milking units

Vr - Milking units operating

Vacuum at gauge

Vacuum pump inlet

Vacuum pump exhaust

Filtered air line

Vm with air inlet

Vr with air inlet

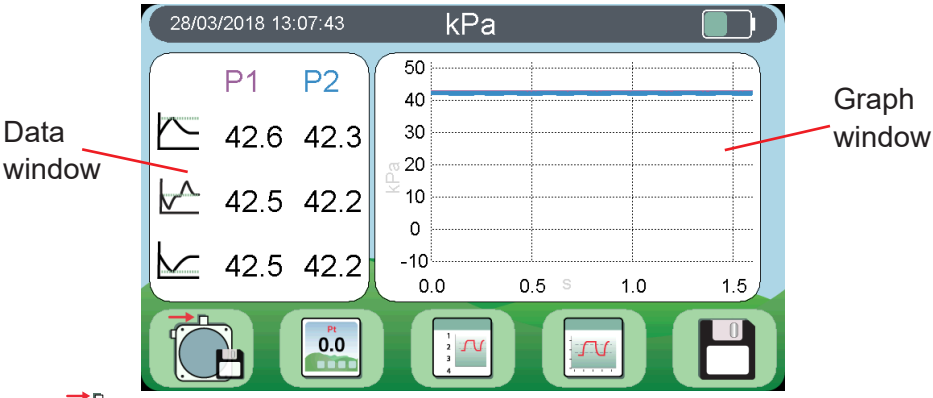
Vp with air inlet

Spare

Displaying vacuum measurement

Select a vacuum measurement point.

DairyTest Lite can display the current reading in three formats:
Data only, Graph and Date, or Graph only.
Select the format using the button menu or tap on the data or graph screen areas. The display layout is saved and used for the next measurement.




Current measurement point

Data-only view (changes displayed port if pressed again)


Data and graph view


Graph-only view


Save memory (if not already saved)


Delete memory (if saved)

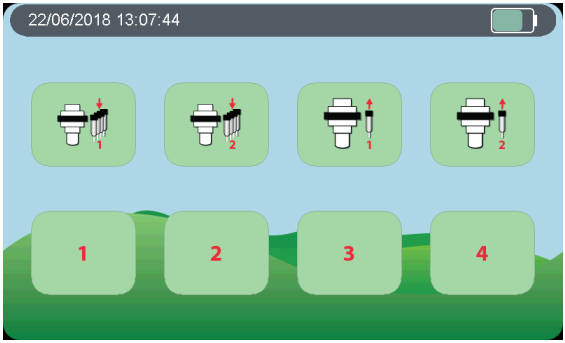

Maximum


Minimum


Average

Vacuum Recorder

There are 8 preset vacuum recorder measurement points.



Fall-off: Single cluster

Fall-off: Two clusters

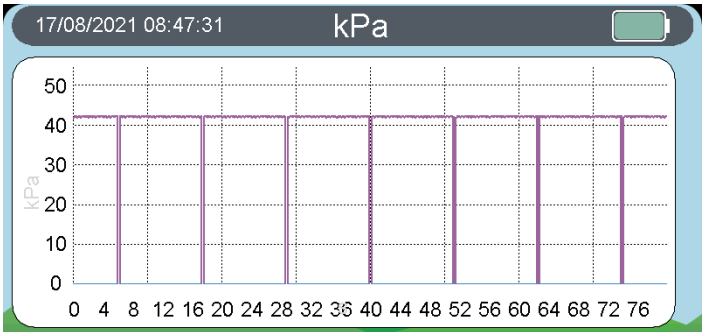
Attachment: Single teat cup

Attachment: Two teat cups

1 to **4** Spare

Flushing

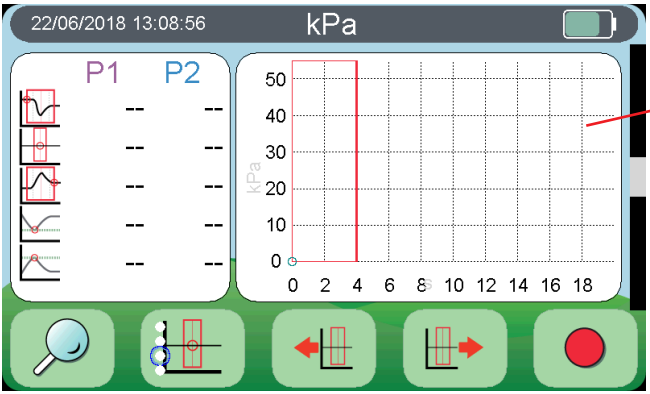
To protect the sensors from fluid ingress when dynamic testing Vacuum Recorder automatically flushes the tubing by opening the internal valves for 0.2s each 12s. Flushing is seen on the graph as short 0kPa drops:



Displaying vacuum recordings

Select a vacuum recorder point.

DairyTest Lite can display a vacuum recording in two formats:
Graph, or Graph and Data.
Select the format using the magnifying glass button. The display layout is saved and used for the next measurement.



Tapping on the graph will move the box to that position.

Change display format

Move box left

Start recording

Stop recording

Save memory (if not already saved)

Select measure size box or hide it

Move box right

Vacuum at left edge of box

Vacuum at right edge of box

Maximum vacuum within box

Delete memory (if saved)

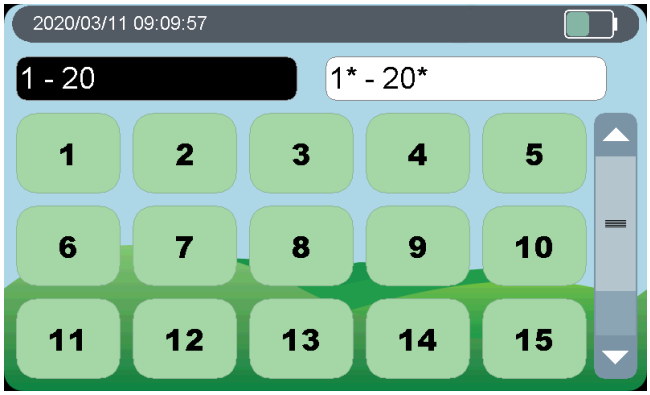
Vacuum at center of box

Minimum vacuum within box

Pulsation Measurement

There are 2 memories per pulsator/stall, 8 and 8*.

Select stall.



The state of each memory is shown by

Memory saved. No alarms.

Memory saved. Alarms.

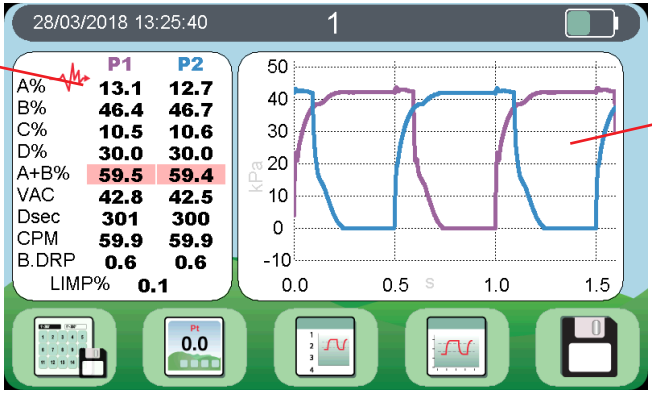
DairyTest Lite will display the current reading as data and graph. Readings outside alarm limits will be highlighted.

DairyTest Lite calculates pulsation data to ISO standards. The ‘unstable’ icon is shown if values have not yet settled when changing between pulsators.

The display layout is saved and used for the next measurement.

The pulsation memory number (stall) can be selected in the table view.

Data window



Graph window

Pulsation memory table view

Data-only view

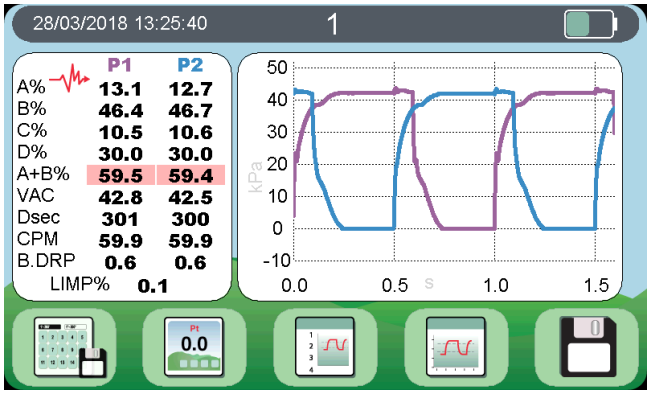
Data and graph view

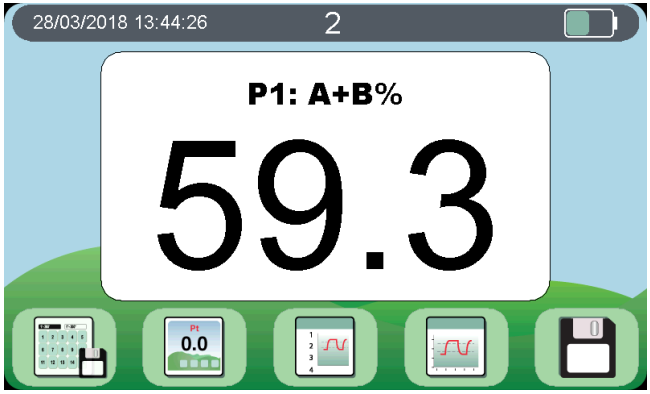
Graph-only view

Save memory (if not already saved)

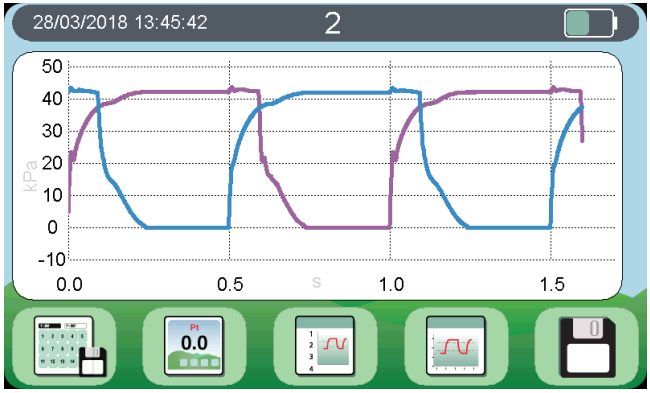
Delete memory (if saved)

In data mode selecting a specific measurement will display it in large digits. Pressing again will return to the data mode screen.



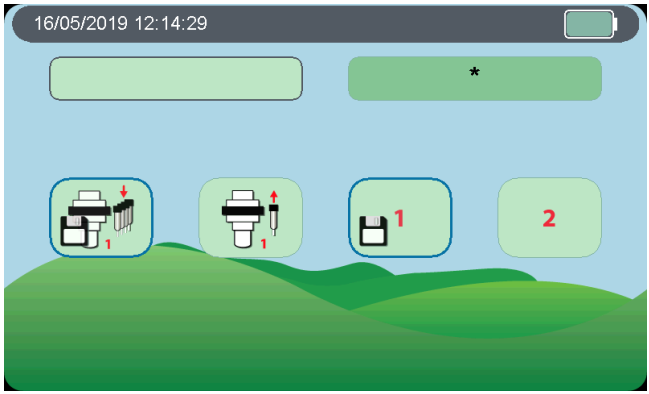


In graph mode, DairyTest Lite will automatically set the time to 1.6 sec or 3.2 sec as required to show an entire pulsation cycle.



Regulation Characteristics

There are 4 preset regulation characteristics measurements and two memories per measurement.



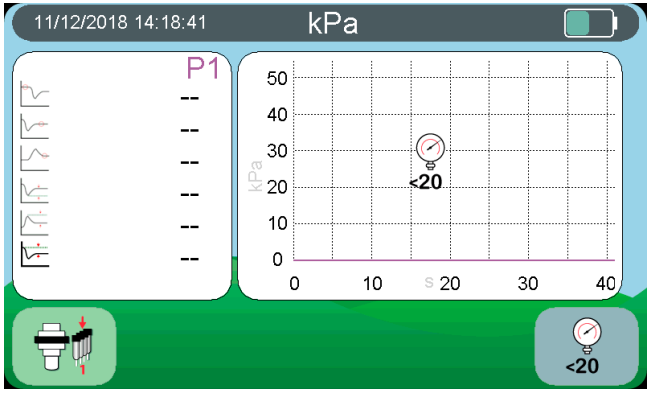
Fall-off: Single cluster

Fall-off: Two clusters

Attachment: Single teat cup

Attachment: Two teat cups

Connect vacuum to Port 1



Current measurement

Start recording

Stop recording

Delete recording

Advisory icons:

<20

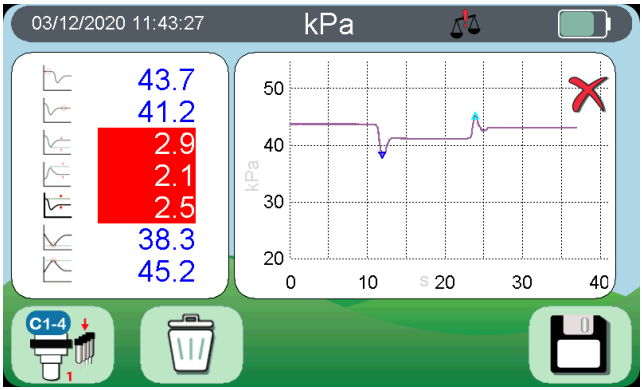
Vacuum is below 20kPa and test cannot start

5→15s

There was not 5s and 15s between each step (open/close of cups/cluster).

1. With vacuum connected tap ‘start recording’.
2. Wait between 5s and 15s then open the cluster or cups.
3. Wait between 5s and 15s then close the cluster or cups.
4. Wait between 5s and 15s then press ‘stop recording’.

Displaying Regulation Characteristics



The following parameters are available:


Start vacuum


Dropped vacuum


End vacuum


Undershoot

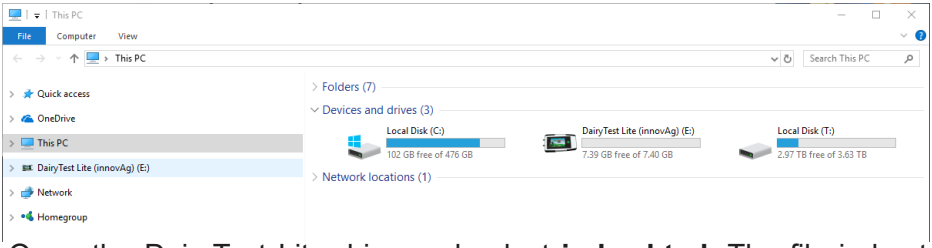

Overshoot


Vacuum drop

If any Undershoot, Vacuum drop or Overshoot value is larger than 2kPa the minimum and maximum vacuum points will be marked on the graph with dark blue (minimum) and light blue (maximum) triangles.

6. Generating a report

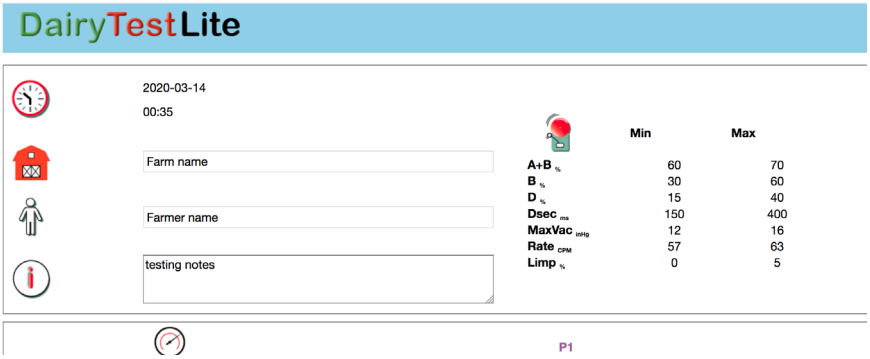
DairyTest Lite behaves like a USB drive when connected to a PC.



Open the DairyTest Lite drive and select **index.html**. The file is best viewed using the Chrome browser.

The opening screen shows the five sessions available.

Clicking on a session will generate the report window where you can add the farm name, farmer name and any testing notes.



The report includes pulsation graphics and vacuum data only and can be downloaded or printed by selecting the appropriate icon.

The report includes three Pulsation tables for the minimum, average and maximum of each parameter for '**Before**' (e.g. Stall 26), '**After**' (e.g. Stall 26*), and '**Most Recent**' calculated from all saved memories. '**Most Recent**' shows the average of the newest-saved Stall memory, e.g. if Stall 26 and Stall 26* are saved Stall 26* will be used in the calculations. If only Stall 26 is saved that will be used. This table effectively shows the range of pulsation values for the entire dairy at completion of testing. If a Stall required maintenance a 'Before' and 'After' memory should be saved, otherwise only a 'Before' will exist.

7. Generating a Logimat file (French version only)

Logimat file generation is only available if DairyTest Lite is in French language mode and the Logimat Feature Code has been entered.

When the report is generated and opened on the PC there will be a icon in the top left-hand corner. Clicking this icon will download a Logimat .xml file in the format 'dtl_YYYYMMDD-hhmm.xml', e.g. 'dtl_20190709-1457-logimat.xml' was collected on 9th July 2019 at 14:57.

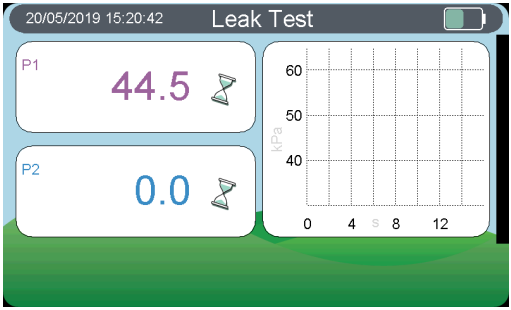
8. Screen capture

A copy of the current screen can be saved to a bitmap (.bmp) image file. Tap and hold anywhere in the date/time display in the top left-hand corner of the screen until a beep is heard. Remove your finger and wait until you hear a second beep which indicates the image has been generated and saved. Some screen items such as pop-ups may not be saved.

When DairyTest Lite is plugged into a PC the file will be visible in the format 'dtl-xxxxx.bmp'.

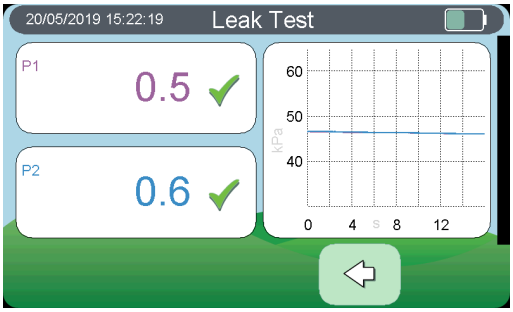
9. Leak Test

The Leak Test checks if there is a leak in the internal tubing. Each port is tested separately. Using an external source produce at least 45kPa on one port then block or pinch the tubing so it is closed.



The screen will show an hourglass if the vacuum is not above 45kPa. When the vacuum is high enough a ‘play’ button will appear. Press the button and the test will start.

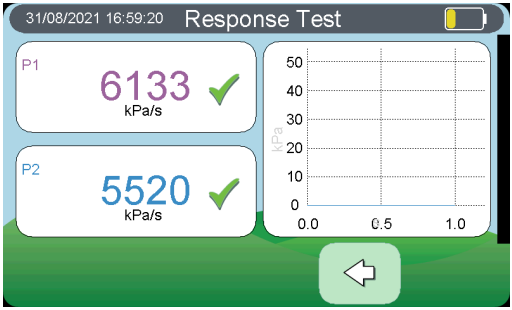
A Leak Test will pass if the vacuum drops <1.0kPa over 15s. If the test fails there may be a split tube or other fault inside the unit.



10. Response Test

The internal filters may be blocked if the Pulsation or Vacuum modes are slow to change. The Response Test checks each port is responding quickly to changes. Test one port at a time by producing >45kPa. Quickly

pull the tubing off the port and the vacuum response will be automatically calculated.



 Reformat the SD card and delete data. Settings are retained

 Flush Port 1 (open valve)

 Flush Port 2 (open valve)

 See **Calibration & Vacuum System Check** section

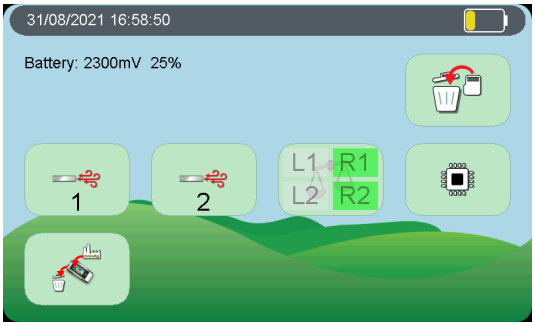
 Bluetooth (for future use)

 Return Settings to Factory Defaults and delete all data

Each port should have >5000kPa/s response time.

11. Factory Settings

The Factory Settings screen contains various functions for testing and resetting DairyTest Lite. The battery voltage and remaining capacity are displayed in the top left corner.



12. Feature Codes

This screen is used to add/delete codes that enable special features. Codes are individual for each DairyTest Lite. At the bottom of the report index screen click the “Contact InnovAg” link. This will open an email with the unique electronic serial number of the DairyTest Lite in the title.

Send the email with your name, the name of your local dealer and the name of the feature you require and we will email back the code to be entered into the unit.

13. Updating software

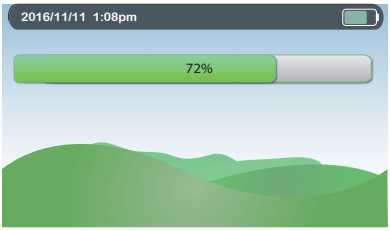
1. Make sure DairyTest Lite has fully charged batteries.
2. Download the update file from DairyTest Lite downloads (www.innovag.com) Generally this file will appear in the Downloads folder on your system.
   The file will be called: “dtl_fw_vX.Y.Z-0-gHHHHHHH.upd” (XYZ representing the version number).
3. Plug DairyTest Lite into a PC using the USB cable.
4. Open your file manager.
5. Copy the update file to the ‘DairyTest Lite’ drive.

6. Safely remove the DairyTest Lite drive on your PC and unplug the USB cable.

7. The upgrade should start automatically and show a progress bar.

8. Wait until DairyTest Lite returns to the main screen.

9. DairyTest Lite will give a series of ascending beeps if the update successfully completed, or it will give a series of ascending beeps followed by two descending tones if it failed.

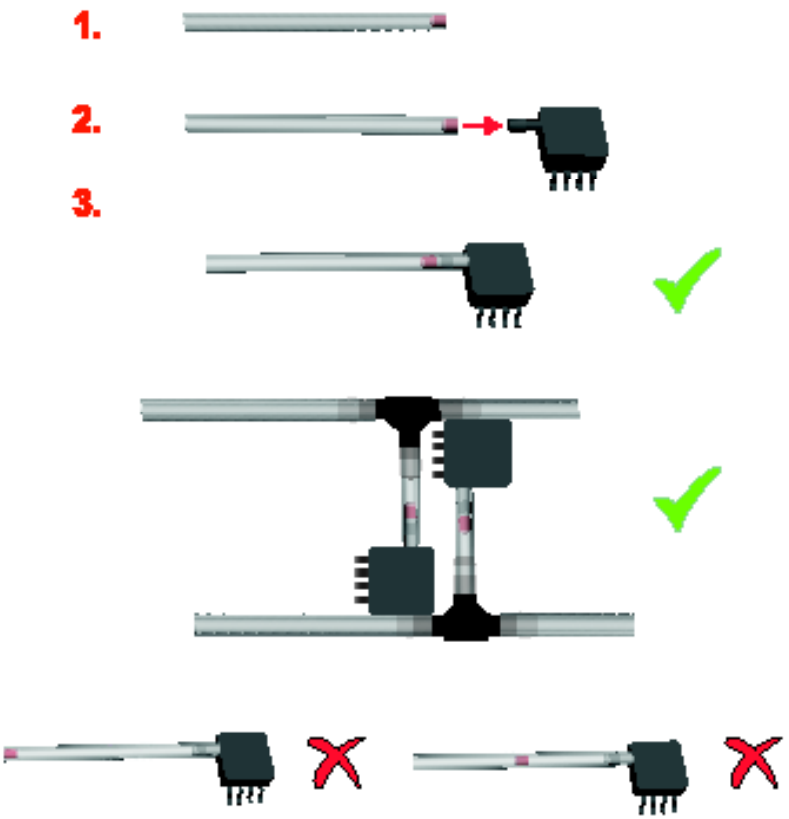


14. Replacing the batteries

When DairyTest Lite's batteries need replacing the battery symbol will flash. We recommend the batteries be replaced as soon as possible once the low battery indicator flashes to prevent unreliable readings or operation.

Batteries should not be left in the unit for extended periods in case of leakage. Any quality Alkaline or NiMH 'AA' rechargeable cells are acceptable, however ***we recommend the Sanyo white 'Eneloop' rechargeable batteries supplied with the unit for best performance.***

15. Filter tube assembly



16. External Filters

The use of external filters in DairyTest Lite measurement tubes is **NOT RECOMMENDED**. Filters can significantly slow the speed of air movement through the tubing causing incorrect readings. Correctly-positioned internal filters are close to the sensors where air movement and effect on response time is minimal.

17. Repairs

Defective units should always be sent to innovAg or your nearest distributor.

Smaller repairs that can be performed by your distributor are:

• Changing parts of the housing.

• Replacing hoses

• Calibration (only if a certified original innovAg calibrator is used)

For other defects, please contact the manufacturer for further instructions: **innovAg Pty Ltd**.

Unit 37, 328 Reserve Rd. Cheltenham VIC 3192 Australia

Ph. +613 9583 2832

email: info@innovAg.com

18. Troubleshooting your DairyTest Lite

Before returning your DairyTest Lite for repair, check the following:

- The unit does not turn on or won't stay on – Replace batteries.
- The battery symbol is flashing – Batteries are getting low.
- DairyTest Lite reads vacuum with no vacuum connected – perform a Force Zero.

A damaged DairyTest Lite should be returned for repair. There are no user serviceable parts inside the case, and opening it may void your warranty.

If you have a question or problem you cannot solve, contact innovAg or your local distributor.

19. Specifications

Display:

• Colour TFT LCD

Vacuum values

• Maximum, average or minimum.

Pulsation values

- Ratios – A+B, B, C, D in % or ms
- Rate – CPM
- MaxVac (kPa or inHg)
- Limping ($(A + B)_{P1}$ - $(A + B)_{P2}$)
- Balance (B_{P1} – B_{P2})
- B-Phase drop – (>4kPa)
- Stability

Pulsation:

• Rate Range: 40 to 500 CPM.

• Rate accuracy: ± 0.5%.

• Ratio accuracy: ± 0.5% of calculated value.

• Time (ms) accuracy: ± 0.3%.

Vacuum:

• Range: +10 to -80 kPa (at 1 atmosphere barometric pressure).

• Accuracy: ± 0.5 kPa

• Repeatability: ± 0.3 kPa

• Resolution: 0.1 kPa

General:

- Sample rate: 1000 samples/sec.
- Operating temperature: 5 to 40°C
- Storage temperature: 0 to 60°C
- Automatic turn-off time: Maximum 60 minutes (adjustable) after last key press if no vacuum on port.
- Batteries: two 'AA' Alkaline or NiCd/NiMH rechargeable cells.
- Digital calibration with certificate supplied.
- Re-calibration service available.
- Selectable units: Vacuum – kPa & inHg, Pulsation ratios – % and ms.
- Pulsation measurements conform to ISO standards with stability indication.
- Auto power off and low battery indication
- Automatic vacuum zero (with manual zero if required).

* Specifications are subject to change without notice.

20. Warranty

InnovAg Pty. Ltd. provides the following limited two-year Warranty to the original purchaser of the product. This Warranty cannot be assigned or transferred to subsequent purchasers.

WHAT WE WILL DO

If the product fails under normal use and service because of a manufacturing defect in materials or workmanship within the Warranty period innovAg will, at its option either repair or replace the product with an equivalent product. The repaired or replacement product will be warranted under the terms of this Warranty for the remainder of the applicable Warranty period. Repair may include the replacement of parts or components with functionally equivalent reconditioned parts or components.

WARRANTY PERIOD

The term of this Warranty is two (2) years from the date of purchase.

WHAT IS NOT COVERED

This Warranty does not cover any failures of equipment not supplied by innovAg, nor does it cover any failures of or damage to the product due to:

(i) improper handling, misuse, neglect, accident, improper installation, non-compliance with the directions for use.

(ii) any internal or external alteration or modification of any kind which in the opinion of innovAg will affect the ability to service the product.

(iii) repair by anyone other than an authorised innovAg Service Centre.

RIGHTS UNDER THE TRADE PRACTICES ACT

Under applicable State, Territory and Commonwealth law, certain conditions and warranties may be implied in this contract and rights and remedies conferred upon you as user in relation to the product which cannot be excluded, restricted or modified by agreement ("Non-excludable Rights"). Any rights conferred upon you by this Warranty are in addition to and do not detract from those Non-excludable Rights.

innovAg disclaims all express or implied conditions and warranties in relation to the product other than the express terms of this Warranty and any Non-excludable Rights. With respect to Non-excludable Rights, innovAg's responsibility to the Purchaser, where permitted, is limited to the undertakings as stated in the clause headed 'WHAT WE WILL DO'.

Subject to the above, in no event shall innovAg be liable (whether before or after discharge of the contract for supply of the product or otherwise) for any loss or damage suffered by you as the user arising from or caused or contributed to by the negligence of innovAg, its servants or agents, nor shall innovAg be liable for special, incidental, indirect or consequential loss or damages suffered by you as user as a result of breach by innovAg of this Warranty or otherwise including but not limited to economic or moral loss, loss of profits or revenue or costs arising from the loss of use of the product or the cost of substitute products.

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