

MiniTest Duo

Dairy Vacuum & Pulsation Meter USER MANUAL

Part No. DR51-0057-05

innovAg



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 61326-1:2005
- EU Directive 2002/95/EC
- EU Directive 2004/108/EC
- 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: MiniTest Duo

Model Number: DR40-0162

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)	○	○	○	○	○	○
Enclosure	○	○	○	○	○	○
LCD	○	○	○	○	○	○
Silicone tubing	○	○	○	○	○	○
Metal fittings	○	○	○	○	○	○
Front panel label	○	○	○	○	○	○
Rating labels	○	○	○	○	○	○

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 Bassor
Director
InnovAg Pty. Ltd

Date: 23 February 2016

Contents

1.	What is MiniTest Duo?	6
2.	Safety Precautions	6
3.	Maintenance and Calibration	6
4.	The Basics	7
5.	Changing Modes	7
6.	Checking Vacuum	9
7.	Checking Pulsation	9
8.	Software Version and Calibration Date	11
9.	Manual Zero	11
10.	Replacing the batteries	12
11.	Repairs	13
12.	Troubleshooting your MiniTest Duo	14
13.	Specifications	14
14.	Warranty	16

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1. What is MiniTest Duo?

MiniTest Duo is a small, light, 2-channel, handheld instrument for testing vacuum supplies and pulsators in dairies. It uses the same high-accuracy analysis of its 'big brother' DairyTest Professional, but in a smaller, lighter, lower-cost format. It is intended for use by personnel with technical knowledge of dairy operation as an accessory to a professional test kit, e.g. for bench-testing of pulsators or to do a quick check on a dairy's performance. It has no memory storage facility and cannot be connected to a PC or printer.

Within Australia we have a Freecall help line which is there if you have problems (1800 061 167). International users should call their local distributor or contact us via email info@innovag.com

2. Safety Precautions

MiniTest Duo 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 MiniTest Duo in wet tests, always keep the unit above the test point to prevent fluid entry. Damage to the unit from fluid entering the sensor is not covered under the warranty.

3. Maintenance and Calibration

Maintenance

Clean the MiniTest Duo with a moist cloth. Do not use cleaning agents.

MiniTest Duo performs a self test when turned on, turning on all segments of the LCD. If an error message is displayed (E-01 for example), or you suspect the unit is damaged, contact InnovAg or the local distributor for further information.

Calibration

MiniTest Duo automatically performs a zero calibration when turned on. Do not turn on your MiniTest Duo with vacuum connected. If the unit reads other than zero on start-up a manual 'force-zero' feature can be used. Refer to Section 12, 'Troubleshooting your MiniTest Duo'.

A complete calibration should be performed with an approved and certified calibration test instrument every 24 months. This can be organised by InnovAg or the local distributor.

4. The Basics

In Pulsation Mode MiniTest Duo can measure eight pulsation parameters: A+B, B, C, D ratios, Limping, Balance, Rate and Max Vacuum, and provide indication of B-phase drop and pulsation stability.

In Vacuum Mode it has three parameters: Minimum, Average and Maximum. The image pictured on the following page shows the front panel indicators and controls.

Low-Battery Indication

If the remaining battery capacity is getting low the battery symbol will flash. Replace/recharge the batteries.

Auto Power Off

The unit will automatically turn OFF after 10 minutes to conserve battery life. The Auto Power Off timer is reset if there is vacuum (>20kPa) on either port or a key has been pressed.

5. Changing modes

Each press of the Mode/Down key will change between Pulsation and Vacuum display. Both modes are always being calculated internally so there is no waiting required for the screen values to update.





6. Checking Vacuum

When set to Vacuum mode MiniTest Duo will display the Minimum (Min), Average (Avg) or Maximum (Max) vacuum level on the digital display.

Press either the Back/Setup or Forward key until the required parameter is selected.



Min Avg Max

Changing units.

Make sure the unit is turned ON and in Vacuum mode (**Min, Avg or Max** displayed).

Press and hold the Mode/Down key for about 2 seconds. The displayed units will change between kPa and inHg.



How is it measuring?

All vacuum measurements are taken over a rolling 1.6s period, sampled 1000 times per second.

7. Checking pulsation

MiniTest Duo can display:

- Ratios **A+B, B, C, D** in % or ms
- Rate in CPM
- **Max Vac** (shown as **B Max**) in kPa or inHg.
- **Balance** ($|B1 - B2|$) in % or ms
- **Limping** ($|A+B1 - A+B2|$) in % or ms

Press either the Back/Setup or Forward key until the required parameter is selected.



A+B B C D BAL LIMP

Notes: Use Vacuum Mode to change Max Vac units.

D ratio in ms is always available regardless of % or ms setting.

Stability Indication

The values MiniTest Duo displays are the average of 5 pulsation cycles in accordance with ISO specifications. The average may take up to 20 seconds to settle.

If the current reading varies from the average by more than 5%, the pulsation being measured is not stable. '**Avg**', '**P1**' and/or '**P2**' will flash to warn the user to wait until the readings settle. If '**Avg**' does not stop flashing after about 20 seconds there is a problem with the pulsation being measured.

B-Phase Drop Indication

If a vacuum drop of more than 4kPa is detected within the B Phase, then the pulsation is not within ISO specification and '**B**', '**P1**' and/or '**P2**' will flash to warn the user.

Changing units.

Make sure the unit is turned ON, in Pulsation mode and ms or % is displayed. Press and hold the Mode/Down key for about 2 seconds. The displayed units will change between ms and %.



How is it measuring?

All Pulsation measurements are taken using 4kPa thresholds, sampled 1000 times per second. Readings conform to ISO standards by averaging over 5 cycles.

A 'rolling' system is used where measurements from the current cycle and the four previous ones are averaged together, which means ISO requirements are met while the screen continuously updates.

8. Software Version and Calibration Date

To display MiniTest Duo's software version and last Calibration Date use the following sequence:

1. With MiniTest Duo turned on, press and hold the Back/ Setup key. After 2 seconds the display will show the software version number, e.g. Sof 001 means the installed version is 01.



2. Press either the Power/Up or Mode/Down key to move forward/back through the system information values:



CAL 23- Calibration Day, e.g. 23rd.

CAL 11- Calibration Month, e.g. November.

CAL- 16 Calibration Year, e.g. 2016.

Sof 001 Software version

3. Press and hold the Back/Setup key again for 2 seconds to exit.



9. Manual Zero

At every turn on, MiniTest Duo will automatically zero the ports if there is no vacuum. If required a Manual Zero can be performed. Note: Manual Zero accepts any vacuum on the ports as zero.

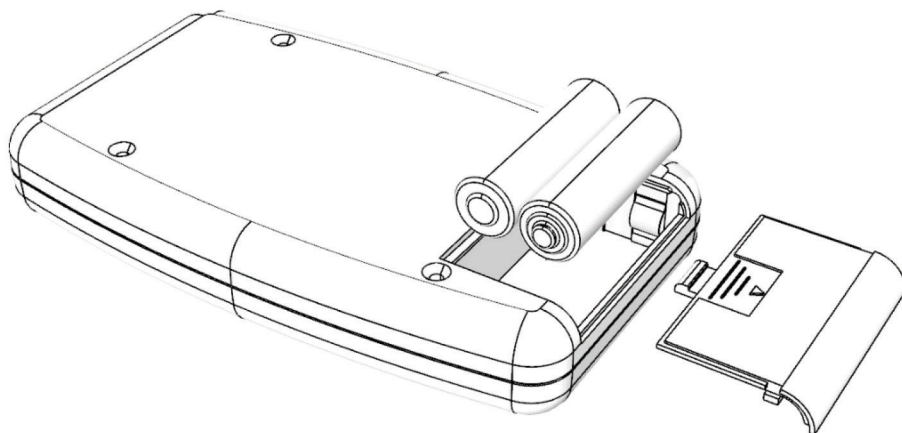
1. Disconnect both ports from any vacuum supply.
2. Turn the unit on and select Vacuum mode. Manual Zero cannot be started in Pulsation mode.

3. Press and hold both the Back/Setup and Forward keys. After a few seconds the vacuum displays will show '-.-' for a few seconds indicating the manual zero has been accepted. Release all keys and check the display shows '0.0'.



10. Replacing the batteries

When it's time to replace MiniTest Duo's batteries, the battery symbol will start to 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 Sanyo Eneloop rechargeable batteries for best performance.

11. Repairs

**DO NOT OPEN THE CASE
THERE ARE NO USER SERVICEABLE PARTS INSIDE
YOU MAY VOID YOUR WARRANTY**

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 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

12. Troubleshooting your MiniTest Duo

Before returning your MiniTest Duo 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.
- MiniTest Duo reads vacuum with no vacuum connected – perform a Manual Zero.

Damaged MiniTest Duos 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.

13. Specifications

Display:

Dual 3 digit x 7 segment LCD

Vacuum

- Maximum, average or minimum.

Pulsation

- Ratios – A+B, B, C, D in % or ms
- Rate – CPM
- MaxVac
- Limping (A+B1 – A+B2)
- Balance (B1 – B2)
- B-Phase drop – B & P1 and/or P2 flash if more than 4kPa drop in B-phase
- Stability – Avg & P1 and/or P2 flash until values settle to ISO requirements

Pulsation:

Rate Range: 40 to 500 CPM.

Rate accuracy: $\pm 0.5\%$.

Ratio accuracy: $\pm 0.5\%$ of calculated value.

Time (ms) accuracy: $\pm 0.3\%$.

Vacuum:

Range: +10 to -80 kPa at 1 atm.

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: 10 minutes after last key press if no vacuum on port.

Batteries: two 'AA' Alkaline or NiCd/NiMH rechargeable cells.

* Specifications are subject to change without notice.

ALL InnovAg testers include:

- Digital calibration with certificate supplied.
- Re-calibration service available.
- Selectable units: Vacuum – kPa & inHg, Pulsation ratios (where included) – % and ms.
- Pulsation measurements (where included) conform to ISO standard with stability indication.
- Auto power off and low battery indication
- Automatic vacuum zero (with manual zero if required).

14. 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. The registration form must be completed and returned to innovAg in order to be able to claim under this Warranty.

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; or
- (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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