1. WELCOME
Thank you for using VaDia Suite; BioControl’s fully integrated VaDia software for Milking Time Testing and Pulsator Testing.
BioControl (www.biocontrol.no) provides technology for biology with focus on hi-tech products for the livestock industry. We already do this for more than 20 years now and have gained great competence and skills in this specialized area.
The name VaDia is short for ‘Vacuum Diagnostics’ and illustrates the value of this hi-tech instrument for technicians, advisors and other professionals in the dairy industry that want to understand and manage udder health and milk quality problems.
VADia and the VaDia software have been developed by BioControl in close cooperation with the International Dairy Federation (www.fil-idf.org) and Tine, the Norwegian dairy farmers cooperative (www.tine.no).
We hope that VaDia and its software will enable you to get better understanding of the basic milking, give better milking advice and achieve better udder health and milk quality results.

Latest versions of these documents can be found on our website www.biocontrol.no

Manual to start-up and use VaDia
This manual explains how to work with the VaDia hardware and software which is designed for viewing, analyzing and report making of the data collected by VaDia.
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! This manual is for VaDia Suite version 1.9 and higher
Due to continuous improvements, screenshots in this manual may differ from the screens that are displayed on your PC. Visit the section ‘Community’ on www.biocontrol.no for the latest documentation.
2. PRODUCT DESCRIPTION

2.1. Hardware
VaDia logs vacuum and pulsation at four points in the milking cluster. It is battery operated, small and lightweight enough to be taped to a teat cup during milking. VaDia works completely ‘standalone’ which enables the advisor to forget about the actual measurement and concentrate on observing milking routines. The logged data can be analyzed after milking with VaDia Suite, an easy-to-use PC-tool, to view vacuum details and generate summary reports.
A Bluetooth streaming mode is used for online in-parlor testing and diagnostics.
VaDia can be used on all brands and types of milking equipment, including milking robots.

VaDia is a multi-purpose instrument.

2.2. Software
VaDia Suite is a complete PC-software package designed for viewing, analyzing and report making of the VaDia logs for Milking Time Testing and for Pulsator Testing acc. to ISO 6690 (‘dry test’).
Testing can be done both online (Bluetooth streaming for immediate result during the test) and offline (analyzing all data after the test).
VaDia Suite also offers Falloff and Attachment testing acc. to ISO 6690.

2.3. User license
VaDia Suite is copy protected by a license key.
We can provide you a free of charge 14 days trial license. Please follow the instructions from chapter “INSTALL AND SETUP VADIA SUITE”

To activate VaDia Suite your PC must be connected to the Internet.
Part of the activation procedure is that your contact details are registered. This is necessary for BioControl to inform you about important updates and relevant upgrades.
BioControl will use this email address to send information related to VaDia and will not share this information with others.
Your user license and password are printed on the invoice with your VaDia. This is a personal user license for runtime use of VaDia Suite on one PC only. Make sure you store this license information somewhere safe so that you can find it again, also make a copy of this license data and store it in a safe place. You need this license key and password again when re-installing VaDia Suite onto another PC (e.g. in case you get a new PC).
Please contact support@biocontrol.pl if the activation doesn’t work or to enquire about getting a LicenseID if you have downloaded the VaDia Suite software for evaluation from our website.

2.4. Modules
VaDia Suite’s functionality is divided into modules. Currently the following modules are available:
- MTT: Milking Time Test & Milking Registration – Wet Test
- PT & FT: Pulsator Test acc. to ISO 6690 & Falloff and attachment Test acc. to ISO 6690 – Dry Test
- ST: Slug Module & Milk Resistance Test – Clean Test

All modules come with new user interface.
BioControl license server contains the modules assigned to your license. Modules can be purchased and enabled separately. When the evaluation period has expired you can decide if you want to purchase (other) modules.
2.5. **Updater License**

When you purchase VaDia Suite you gain access to new VaDia Suite version **updates for 1 year**. Every time you open VaDia Suite, the program will check for new version and inform you about available downloads. A year after the first activation, your license will no longer have the updater activated, unless you purchase the updater for your license. Contact orders@biocontrol.pl for more information on how to update your license. You will always have access to bug fixes for your latest version. Moreover, a valid “Updater” license is required for changing the device on which VaDia is installed.

3. **PACKAGE CONTENTS**

Check your package for the following items. Please contact your reseller if anything is missing or different.

1. VaDia with rechargeable battery
2. Battery charger with mains plugs
3. USB cable
4. Startup Guide
5. VaDia USB Stick
6. Needle tool
7. Silicone tube on roll
8. Box with accessories*:
   - 2x T-piece
   - 2x Milk filter holder
   - 10x Milk-filter
   - 10x Stainless Steel tube

* accessory quantities are doubled for VaDia-kit with 2 VaDia devices
4. **IMPORTANT!**

VaDia is taped to the milking cluster for use during milking. Note the ‘splash proof’ housing specification!
This means that special attention is required to protect it from water ingestion!

⚠️ The USB-port and the battery cover *must* be sealed with tape before taping VaDia to a milking cluster.

In applications where water contact is very likely (e.g. robots) VaDia should also be put in a plastic bag.
Failing to take these preventive actions will allow water and moist to enter and this is not covered by the warranty!

⚠️ VaDia measures vacuum in reference to the air pressure in its enclosure. Therefore, do not seal VaDia with tape until the moment of using it.

⚠️ Always use the supplied Milk Filter when connecting to the Short Milk Tube or other tubes with liquids and foams.

⚠️ Robotic Milking: switch-off steam cleaning
5. HARDWARE OVERVIEW

1. Vacuum sensors
2. USB connector
3. Status LED
4. USB cover
5. Rechargeable battery
6. Battery cover
7. Overheating sensor
8. Battery type selector
6. WORK WITH THE VADIA
VaDia Suite uses the VaDia Manager to communicate with VaDia. Read the VaDia Manager chapter in VaDia Suite manual before using VaDia.

6.1. Power up
VaDia is supplied with a charged NiMH rechargeable battery. A plastic tab between battery+ and compartment prevents battery draining during transport and storage. **Remove this plastic tab.**
VaDia will startup and the LED on the device will blink. This LED is the status indication. After startup, VaDia communicates its status according to the table listed in the end of this document.

**After battery replacement data and time is reset to default value 01-01-2001 00:00, so you must initialize VaDia to synchronize date and time with your computer.**

6.2. USB connector

![USB connector image]

*The USB connector is used for both connection to the PC and for battery charging.*

*Close the USB connector with the cover before use!!*

6.3. Battery management
VaDia is equipped with a replaceable battery and is designed to work with both rechargeable (NiMH) and 1.5V AA Alkaline batteries.

**Make sure that the NiMH switch is in the correct position! (red circle).**
VaDia is supplied with a NiMH battery, the Alkaline-option is for ‘emergency’ in case the user forgets to charge the battery, or in case of battery defect. VaDia Manager gives an indication of the NiMH battery percentage with following steps: 0, 10, 30, 60, 90 and 100%.

Desktop
New user interface

The most robust battery management is to:

- Always charge VaDia overnight (min. 12 hours), or
- Replace the battery with a new (Alkaline) battery before milking, but then you have to initialize VaDia to have current date and time.

Take note of the following instructions and information:

- **With NiMH battery**
  - The battery switch must point at NiMH
  - The battery is charging when USB is connected to a PC or charger
  - The NiMH battery must NOT be (re)placed when VaDia is connected to charger/PC; this leads to an invalid battery percentage indication
  - Charge VaDia with the charger supplied in the VaDia kit. (When charging from the PC-USB, the current is often limited; also, the power on the PC-USB is switched-off when the PC switches off or goes to sleep/hibernate)
  - Any 5V ‘iPhone USB charger’ or similar can be used for VaDia charging
  - Replacement: use the same battery type/capacity (Duracell 2.400 mAh)

- **With Alkaline or other AA battery**
  - The battery switch must NOT point at NiMH
  - The battery will NOT charge when USB is connected
  - Battery-percentage indication in VaDia Manager is NOT valid

- **Tips:**
  - Make a habit of charging VaDia after a job and leaving it on the charger so that it is always ready when preparing for the next job. VaDia cannot be ‘overcharged’.
  - If VaDia is not used often, make a habit of removing the battery when the job is finished, and the data is saved to the PC. This avoids draining the battery too low, which can destroy the battery.
  - Typically, VaDia will be full (100%) after 12 hours or less of charging. It charges slower in LOG BT mode.
  - To extend the battery-capacity and life, ensure that VaDia is fully charged within 2 weeks after the last use, or disconnect the battery. Do this to avoid the battery from becoming ‘lazy’. Excessive battery discharging leads to battery defect.
  - It is always handy to have a pack of 1.5V alkaline batteries with you while on the job to deal with unexpected battery-empty situations.

VaDia continuously measures the battery voltage during operation (logging, Bluetooth, etc.). When the battery voltage becomes too low to provide stable functioning and storing, VaDia will stop the log-mode to avoid recording invalid data.
6.4. Logging
Logging can begin when the following is done and verified:

- VaDia is in LOG or LOG BT mode
- The LED blinks according to the correct status (see table below)
- The battery is charged
- Sufficient water protection is ensured (chapter 4)

Now attach VaDia to the test object and connect the vacuum sensors (next chapters)

- After attachment: verify that VaDia is logging (LED blinks according to the correct status)

**Autostart:** Every 15 seconds (when the LED blinks), VaDia will shortly wake up and measure vacuum to determine if milking vacuum is present on one of the sensors. If not, the device will return to sleep mode to save battery. When vacuum raises above 2,5 kPa, the device will at the next 15 second interval leave sleep status and log all channels for at least 10 minutes. VaDia will stay in this ‘awake’ status if vacuum on any of these channels stays above 2,5 kPa.

**Autostop:** If vacuum disappears for more than 10 minutes on all channels, VaDia will stop logging, it will go into sleep mode again and will check for vacuum only once per 15 seconds.

**Feel safe:** The logged data is stored in VaDia memory and is not erased when the battery is empty or disconnected.

7. MILKING TIME TEST WITH VADIA

7.1. Attaching VaDia to the milking cluster
VaDia can be connected to any vacuum source in the milking equipment. Note however that VaDia Suite uses the following test points for the analysis and reports:

Use PVC or duct tape to attach VaDia to the teat cup. Duct tape is often selected for fast working and to prevent water ingress.

Note: do not be afraid to install VaDia ‘upside-down’.
7.2. **Connect VaDia to the test points**
When VaDia is connected to the teat cup, the vacuum sensors (4-1) can be connected to vacuum sources by means of the supplied silicon tube (4-7) and stainless-steel tube (4-8).

Slide the stainless-steel tube (4-8) over the needle tool (4-6).

Find the test point and gently pierce the needle with the stainless-steel tube through the material until you feel it has gone through.

Slowly retract the needle; the stainless-steel tube is now in place. In case of mouthpiece: feel with your finger that it does not stick through too deep. If it does, retract it a bit to avoid teat-irritation.

Now attach the silicon tube to the stainless-steel tube. Cut it to length and connect the other end to the corresponding VaDia channel.

**Always use the supplied Milk Filter (4-8) when connecting to the Short Milk Tube or other tubes with liquids and foams.**

Use of the milk filter is necessary to prevent milk foam from reaching the VaDia sensor.

Check the milk filter for contamination or residues after milking. Replace the milk filter if necessary.

It doesn’t matter which VaDia channel is connected to what vacuum source, but make sure to note it somewhere! Default settings in VaDia Suite:

- CH1 = Short Pulsation Tube (SPT)
- CH2 = Short Milk Tube (SMT)
- CH3 = MouthPiece Chamber rear teat (MPC)
- CH4 = MouthPiece Chamber front teat (MPC2)
8. PULSATOR TEST WITH VADIA (ISO 6690)

The milking equipment must be working and in the ‘dry’ position (so not milking cows).
A possible connection of VaDia for the Pulsator test is shown below:

Milking parlour ready for dry-test

T-pieces (4-8) prepared for the pulsator test
(Short Pulsator Tube not supplied in VaDia kit)

VaDia ready for pulsator testing
9. FALLOFF TEST WITH VADIA (ISO 6690)
The milking equipment must be working and in the ‘dry’ position (so not milking cows).
Connect VaDia to the appropriate test point at the receiver.
A possible connection of VaDia for the Falloff test is shown below:
**Close-up of Vm**  
(exact test point may vary due to local legislation)

**VaDia prepared for Falloff recording**  
(measurement tube closed on one end)

**VaDia connected to Vm**
10. CALIBRATION

10.1. How does it work

VaDia is equipped with 4 separate vacuum sensors. Each vacuum sensor is individually calibrated in the factory. To indicate this, a calibration sticker is added under the battery:

VaDia is designed so that the user can easily (re)calibrate the VaDia. The calibration uses 2 points: 0 kPa (atmospheric pressure) and 40 kPa (typical milking vacuum); VaDia uses linear calculation in between these calibration points.

The advantage of this easy calibration is that VaDia doesn’t need to be sent to a complex and expensive lab for (re)calibration. The downside is that users sometimes (accidentally) press the ‘0 kPa’ or ‘40 kPa’ button in the ‘Advanced’ mode, which can have a large effect on the calibration and therefore on the recording.

The user is warned by messages, but still can (re)calibrate incorrectly. This chapter gives (re)calibration instructions.

10.2. Common mistake 1: user clicks ‘0 kPa’ to compensate for altitude

Users sometimes think that VaDia should be ‘zeroed’ or ‘tarred’ to adjust it to sea level or mountain level before starting a recording; users then press the ‘0 kPa’ key in the ‘Advanced’ mode. THIS IS NOT THE CASE.

There is no need for recalibrating VaDia for different heights or barometric variations as the built-in sensors are not measuring an absolute pressure. The pressure is measured relatively to the ambient pressure.
In fact, if the ‘0’ key is pressed, one point of the 2-point calibration is likely changed, meaning that the slope of the linear line will be different. So, when the ‘0 kPa’ key is pressed, always recalibrate the ‘40 kPa’ point as well!

10.3. **Common mistake 2: user clicks ‘40 kPa’ when there is no vacuum**

If this happens, the difference between the ‘0 kPa’ calibration point and the ‘40 kPa’ calibration point is very small, sometimes can even be negative. This of course leads to unrealistic recordings from VaDia.

It can easily be checked if this has happened by clicking ‘status’ in the ‘Advanced’ mode:

![Image](image.jpg)

If the difference between the sensor ‘tara’ and ‘calib’ value is in the magnitude of approx. 600 it is ok. If the ‘calib’ value is close to the ‘tara’ value, it is likely that the ‘40 kPa’ button was pressed, meaning that it should be recalibrated.

10.4. **Preventing these mistakes**

VaDia Manager gives a warning when ‘0 kPa’ or ‘40 kPa’ is clicked. This will prevent many accidental recalibrations.

10.5. **How to calibrate**

It is of course possible to return VaDia for factory calibration, but that is complex, expensive and not always necessary. Some users have access to milking equipment calibration devices, but it is also easy to ‘do it yourself’.

A ‘VaDia gauge-kit’ is available for this purpose, see pictures below.

![Image](image.jpg)

BioControl VaDia gauge kit consists of manometer, professional syringe, tubes and junctions

It is important that all 4 channels are connected, so the same pressure is on all four sensors.
10.6. **Calibrating for 0 kPa**

When calibrating for ‘0 kPa’, make sure there is no obstruction or vacuum on 4 sensor nipples. Disconnect the syringe from the tubes and set the vacuum manometer to ‘0’ (refer to manometer user manual).

Now click ‘*’ button at the ‘0 kPa’ line.

10.7. **Calibrating for 40 kPa**

Calibrating for ‘40 kPa’ will need the 40 kPa vacuum applied to all sensors when you click the ‘*’ button at the ‘40 kPa’ line.

Connect the tube to the syringe and create vacuum with the syringe until the manometer displays 40 kPa.

Now click ‘*’ button at the ‘40 kPa’ line
11. INSTALL AND SETUP VADIA SUITE

11.1. Install
To install VaDia Suite your PC must be connected to the internet.

Run VaDiaSuiteUpdater.exe from the USB stick. This program can also be downloaded from the BioControl website www.biocontrol.no/vadia. VaDiaSuiteUpdater automatically connects to the BioControl server.

The License registration form will popup.

If you already have a license, please fill in the form and click “Register”.
If you are interested to test the software, please fill in your personal data and send request by clicking “Request trial” button. You will receive license details by email.

```
License registration
Please fill registration information

<table>
<thead>
<tr>
<th>License information</th>
<th>Contact details</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Company</td>
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<tr>
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Register  Request trial
```

Installation of VaDia Suite is done by clicking ‘Install Application’.

When VaDiaSuiteUpdater runs for the first time, it will install USB drivers, create necessary VaDia Suite directories and files and place a ‘VaDia Suite’ shortcut on the desktop.

Click ‘OK’, VaDia Suite will start.
Next time double-click the VaDia Suite icon on the desktop to run VaDia Suite.

VaDiaSuiteUpdater will automatically start and connect to the BioControl server to look for updates and bugfixes. When update or bug fix is available, this will be indicated:
Click ‘Update bug fix’ to install a bug fix to your already installed version. Bug fixes for your VaDia Suite version are always available for download with your VaDia Suite license and normally have small bug fix changes compared to your old version.

Click ‘Update new version’ to install a new version of the VaDia Suite program. New VaDia Suite versions can have bigger changes and new functionality to your VaDia Suite program.

The new VaDia Suite versions are only available if your license is up to date (you have the updater license). When you install VaDia Suite you have free access to new VaDia Suite versions for 12 months. After this time, you must pay a yearly fee if you want to continue to download new VaDia Suite versions from the BioControl server. Contact orders@biocontrol.pl for more information.

If no updates are available or if the PC is not connected to the internet, VaDia Suite will start in the last version used.

Vadia Suite by default will open in the Vadia Suite New user interface/New Interface mode. If the application has been recently used it will resume in the last opened version.

It is possible to use ‘New user interface‘ version on your PC, and ‘Desktop‘ version on a new user interface.

In case of using both versions (desktop and new user interface) on one computer it is possible to switch between them by launching Vadia Suite Updater or from desktop version:

**From desktop to new user interface**
1. Click “New user interface” under Main menu

**11.2. Activate**
When you run the program for the first time, the following screen will show. The ‘Register’ button will become active when fields License ID, Password, Email, First and Last Name are filled.
In case you don’t have license and password please fill in at least Email, First Name and Last Name fields and click Request Trial button. Then we will send you the trial license with all modules activated for 14 days.
You can contact orders@biocontrol.pl to purchase a license ID and password for VaDia Suite.

11.3. Settings

**Desktop**

1- Navigation keys
2 – VaDia devices that are currently connected via Bluetooth (explained further in this manual)
New user interface

1- Navigation menu
2- Home menu

11.3.1. Personal details

Click ‘Settings’ > ‘Personal details’
Enter your personal details (and logo!) that will be shown on all reports.
Click ‘Save’ to store.
11.3.2. Graph settings

Click ‘Settings’ > ‘Graph settings’

You can customize the graph scale, the minimum and maximum values, to better meet your needs. This menu also allows you to change default channel settings for analysis window.

Note: You need to restart application for the changes to take effect.
New user interface version of the application allows to use ‘Autoscale’, so the vacuum axis min/max are based around the data range. On top of that, you can disable all markers or CVF marker from your reports. Please note, markers will disappear only after the test is done.

![User interface of VaDia](image)

11.3.3 License info

This screen lists license details and modules that are enabled within your license. VaDia Suite functionality is divided into modules. The following modules are available:

- **MTT**: Milking Time Test & Milking Registration – Wet Test
- **PT & FT**: Pulsator Test acc. to ISO 6690 & Falloff and attachment Test acc. to ISO 6690 – Dry Test
- **ST**: Slug Test Module & Milk Resistance Test – Clean Test
New user interface version
‘Home’ button > ‘License info’

You can click your license ID to show registration form.
You can update your license personal data here. For changes to take place, you need to insert your password. You can also deactivate current license and provide a new one by changing license ID and new user personal data. Software will ask you to confirm the changes.

11.3.4. Import / Export

You can click Import or Export to transfer all data from and to Vadia Suite installed on different computers. This function makes a backup of all your customers data.

Desktop
‘Settings’ > ‘Import/Export’ tab > ‘Export’ or ‘Import’
11.3.5. **Language**
Set the language displayed in the Vadia Suite application. This screen also allows to change the font used in Reports. Make sure selected font is supported by your operating system and language. What is more, in the new user interface version of the software, you can select which decimal separator you want to use in the application: a comma or a dot.

‘Settings’ > ‘Language’

**Note:** You need to restart application for the changes to take effect.
11.3.6. Default Pulsator Test Conditions
The screen ‘Pulsator conditions’ lists the default targets and deviation tolerances for Pulsator Testing. Values that deviate from these targets will be automatically highlighted in the Pulsator Testing reports. Highlighting can be customized by the user (default background is red, and font is black).

Click ‘Use Conditions’ to enable this function.
In New user interface mode click Save to enable.
11.3.7. Milking Registration settings

This option is available for New user interface module only! You can choose what kind of teat parameters you want to have. You can provide up to 5 parameters. Tap on parameter circle then provide its name and set values describing your parameter. Click “Save”. You will see these values at ‘Milking Registration’ and ‘Animals’ menus.
12. CUSTOMER MANAGEMENT

12.1. Desktop

Click ‘Customer’ to enter and manage customer data. Create a new customer by clicking ‘Add Customer’.

The customer database contains general customer data and details of the milking equipment, both for conventional and milking robot customers. Fill in the information about your customer and click ‘Save’.

Select a customer by clicking on the customer’s name, or search for the customer in the search field. This customer is now ‘active’. The active customer is also displayed in the left column of the screen. All data and reports that are made will be added to this active customer until another customer is selected.

Select a customer and click ‘Delete’ to delete a customer.

**Careful:** all reports and historic data of this customer will be deleted!
12.2. New user interface

![New user interface screenshot](image)

![New user interface screenshot](image)
12.3. Customer Pulsator Test Conditions
Clicking on a customer and “Pulsator test condition” tab will open the customer specific pulsator test conditions. The default values can be set to values that are specific for this customer/installation. Clicking ‘Apply Conditions’ makes that these conditions will be used to highlight deviations from the target values in the Pulsator Test Reports.

13. VADIA MANAGER
VaDia Suite uses ‘VaDia Manager’ to put VaDia in logging mode and to retrieve logs from the device.

13.1. Connect your VaDia

VaDia Suite:

- Connect VaDia to the PC with the USB cable. The following message should be displayed when a new VaDia is connected to the PC for the first time:

- Wait for a while, after approximately 1 minute, the drivers should be installed, the following message should be displayed:

- After this click ‘VaDia Manager’ in VaDia Suite to connect to your VaDia.

The VaDia status information will show:
The following functions and information are relevant, the other menus in ‘VaDia Manager’ should be ignored:

1. To start logging (explanation below)
2. Select this for streaming data via Bluetooth (explanation below)
3. Retrieve logs from VaDia, save data to PC (explanation below)
4. Data format ‘Vadim vd5’
5. To refresh the displayed status information, click ‘Status’. If VaDia Manager displays information: ‘USB not found’, click ‘Status’ button until status information is displayed. When status information is not displayed within a minute, please refer to troubleshooting chapter at the end of this document.
6. Select this checkbox for device calibration. Be careful!! (explained further in VaDia Startup Guide)
7. VaDia unique serial number.
8. VaDia clock (is set to PC-clock when ‘Start’ is pressed)
9. Battery capacity (explained further in VaDia Startup Guide)
10. VaDia mode (explanation below)
11. Current vacuum on the sensor
12. A log is one second of recorded data

**VaDia New user interface:**

- Connect VaDia to the PC with the USB cable. The following message should be displayed when a new VaDia is connected to the PC for the first time:

- Wait for a while, after approximately 1 minute, the drivers should be installed, the following message should be displayed:

- After this click ‘VaDia Manager’ icon in VaDia New user interface main menu to connect to your VaDia.

- The VaDia status information will show:
1. To start logging (explanation below)
2. To refresh the displayed status information, click ‘Status’. If VaDia Manager displays information: ‘USB not found’, click ‘Status’ button until status information is displayed. When status information is not displayed within a minute, please refer to troubleshooting chapter at the end of this document.
3. Retrieve logs from VaDia, save data to PC (explanation below)
4. Calibrate Vadia (explained further in VaDia Startup Guide)
5. Battery capacity (explained further in VaDia Startup Guide)
6. Current Vadia operation mode
7. Program version – current firmware version of the device
8. Current vacuum on the sensor
9. Number of logs in VaDia memory (one log is one second of recorded data)
10. Vadia clock (is set using PC-clock when Initialize button is pressed)
11. Vadia unique serial number
12. VaDia user alias – displayed device name can be changed here.

13.2. Start logging

It is strongly recommended to initialize VaDia before collecting data. After battery replacement date and time is reset to default value 01-01-2001 00:00, so you must initialize VaDia to synchronize date and time with your computer.

Vadia Suite:

Click ‘Start’ (1) to begin a new logging session. By doing so, VaDia memory will be erased and VaDia clock will synchronize with your PC.

To use the Bluetooth streaming function: select ‘Bluetooth’ checkbox (2), then click ‘Start’. Click ‘Status’ (5) to verify if:

- VaDia is in logging mode (10)
  - LOG = ‘normal’ log mode. All data is stored in VaDia memory.
  - LOG BT = Bluetooth log mode. All data is stored in VaDia memory AND sent streaming via Bluetooth.
- The battery is full (chapter below)
- The clock is set to the PC-clock

Note that the Bluetooth streaming mode consumes more power than the normal mode. So VaDia operational time in Bluetooth mode will be significantly lower.
Note this message when you click ‘Start’: previous logs will be erased when you start logging!

Now disconnect VaDia from the PC and follow the instructions in the chapter ‘Logging’.

Vadia New user interface:

Click ‘Initialize’ (1) to start a new logging session. By doing so, VaDia memory will be erased and VaDia clock will synchronize with your PC. To use Bluetooth streaming function, select ‘Initialize Bluetooth’ button in new window. To log data only on VaDia device (without Bluetooth) select ‘Initialize’ button.

Click ‘Refresh’ (2) to verify if:
- VaDia is in logging mode (6)
  LOG = ‘normal’ log mode. All data is stored in the VaDia memory.
  LOG BT = Bluetooth log mode. All data is stored in VaDia memory AND sent streaming via Bluetooth.
- The battery is full (chapter below)
- The clock is set to the PC-clock

Note that the Bluetooth streaming mode consumes more power than the normal mode. So VaDia operational time in Bluetooth mode will be significantly lower.

Note this message when you click ‘Start’: previous logs will be erased when you start logging!

Now disconnect VaDia from the PC and follow the instructions in chapter ‘Logging’ in VaDia Startup Guide.
13.3. Save logs

Vadia Suite:

- Connect the VaDia-USB to the PC, wait for the driver to be ready (PC makes a sound)
- Click ‘VaDia Manager’ in VaDia Suite, VaDia status information is displayed showing the number of recorded logs (i.e. recorded seconds)
- Verify that file-format vd5 is selected (4)
- Click ‘Get logs’ (3), give it a filename.

The transfer between PC and VaDia will now start, a counter increment to indicate that data is transferred. The end value of the counter depends on the size of the logged data. When data transfer is finished, the message ‘Transfer stopped normally’ will show. Then the logs will be written to the file, the message ‘Writing logs to file, please wait’ will show. This may take a while, be patient!

When all data is saved to file, the number of written logs is shown.

Vadia New user interface:

- Connect the VaDia-USB to the PC, wait for the driver to be ready (PC makes a sound)
- Click ‘VaDia Manager’ in VaDia Suite, VaDia status information is displayed (9) showing the number of recorded logs (i.e. recorded seconds)
- Click on ‘Get Logs’ button (3)
- In new window select file localization (where you want to save log file) and click ‘Save’

The transfer between PC and VaDia will now start, a counter (percentage value) increments to indicate that data is transferred. When data transfer is finished, the message ‘Downloaded’ will show at the top of window.
14. DEMO-FILES FOR ONLINE AND OFFLINE TESTING
VaDia Suite offers both offline and online data viewing modes.

- Offline means that an existing vd5-file is loaded into VaDia Suite
- Online means that VaDia is connected to the PC via Bluetooth and that data is continuously streamed to VaDia Suite for real time presentation and online analysis.

To explain the working of VaDia Suite, the following vd5 demo files are used in this manual:

- Milking Time Test: ‘Leppink 4A MTT demo’ and ‘Leppink 5A MTT demo’
- Pulsator test: ‘VPT demo’
- Falloff Test: ‘VPT fall-off demo’

These files can be downloaded from the Community Section on our website http://www.biocontrol.no/support/software-and-documentation/#vadia

The explanations in the following chapters are valid for both online and offline mode; the only difference is the data entry method (vd5-file or Bluetooth streaming).

To fully understand the functionality and potential of VaDia Suite software we recommend following this manual step by step (and not read loose chunks) and work with the demo files as explained in this manual.

15. Analysis in New user interface mode

Description of primary path from customer to analysis. First from customer view:

Select customer and click button ‘Select Customer’.
Select From file.

If you want to receive and analyze data directly from VaDia choose ‘Analyze live data’. Remember that you need to have VaDia device connected to your computer / new user interface via Bluetooth. If you already have a vd5 file saved on your device, choose file location and the rest of the path is described here. You can also analyze the vd5 file directly from the device by selecting From VaDia.
Select From file and choose. vd5 file from any type of test that you want.
In this view, you can create a new visit. If you already have a visit, click ‘Select Visit’ and choose a visit from the list. ‘View Only’ option does not provide a possibility to test a file. It is used just to overview a file.

Visit view:

Fill in the information about your visit. Default contact person is a selected customer and Person Visiting is taken from your ‘Settings’. Upload file shows a path to the chosen file, ‘Visits’ button will take you to visits list if you change your mind and want to select previously created visit.

After filling up all data tap ‘Save’ button.

Choose what type of test you would like to create. Remember, if you chose a wrong one at the beginning, you can always change it in the analysis view.
16. PULSATOR TEST (OFFLINE)

**Desktop**
Click ‘Customer’ and create a new customer (or select an existing one from the list). Click ‘Load vd5 file’ and select the file ‘VPT demo’. All data is now loaded and displayed in the active window, notice the content of ‘Source’ on the left side of the screen. The right side of the screen lists the channel selection, definition boxes and various testing/registration modules (MTT, PT, FT, Milking Registration). Testing/registration modules that are not assigned to your license are indicated in grey.

When data is loaded, the program status in the right navigation panel indicates ‘Paused’. Note that the data can only be analyzed in the ‘Paused’ mode. Activate the channel selectors to only display the relevant channels. The average/minimum/maximum value of each channel is displayed in the top of the frame. These values are calculated from the data displayed in the current window.

**New user interface module**
Click ‘Customer’ and create a new customer (or select an existing one from the list). Click ‘Select Customer’ and ‘Analyze file’. Select the file ‘VPT demo’. Create new visit (or select existing from the list). Select PT test type. All data is now loaded and displayed in the active window.
Set active channels to SPT type. Minimum time to create a test is 7 seconds. Tap PT button to create test.

16.1. Automatic Pulsator Test

Since the release of version 1.10.xxx – Automatic Pulsator Test is available. To perform this type of test, simply load your vd5 file with pulsators, select appropriate channel settings and click on “PT auto”. After a moment, you should see a pop-up message saying that the tests are now saved in visits view. You can browse through the tests in “Visits” view. The test works on the selected range of data and up to 30 selected tests at the same time.
16.2. Graph navigation

VaDia Suite has two graph windows: a smaller ‘navigation’ window (top) and a larger ‘detail’ window (bottom). The navigation window shows which part of the data is currently zoomed and displayed in the detail window. This helps to keep the overview of your logs.

**Desktop**

Zoom in the navigation window with mouse ‘left click, hold and drag’.

Click on the ‘detail’ window to activate it; a blue frame around the window indicates that it is active, and that zoom/navigation is possible.

**Hot-keys:**

- ‘+’ and ‘-’, mouse-wheel: zoom time in and out
- ‘Ctrl’ with mouse drag: zoom-in on section (x and y)
- ‘Shift’ with mouse drag: set time marker line, mouse drag shows second marker line with delta
- ‘Alt’ with mouse drag: set vacuum marker line, mouse drag shows second marker line and delta

Pan the graph with left mouse click, hold and then drag.

Right mouse click brings-up settings and other navigation possibilities.
Take some time to familiarize yourself with the available options. ‘Save Image’ is an easy and fast method to create images of a recording for your reports.

ALT, CTRL and SHIFT are listed here to enable VaDia Suite to work on a new user interface device without a keyboard.

**New user interface**

1 – Navigation window
2 – Toolbox: opens menu bar with graph settings.
3 – Split MTT markers – button shows up at Milk Time test only. Used to set MTT markers or to remove them when they are already set.
4 – MTT – Test button to create test. Depends on selected test type.
5 – Test type – used to change graph test type to: Milk Time Test, Pulsator Test or Fall of Test
6 – New Note – used to add note to visit if chosen
7 – Detail Window
8 – Half transparent rectangle shows in navigation window what part of file is presented in detail window. Can be slide by holding finger on it and moving in either side
9 – Channel description: Shows the number of channel, Type (SMT, SPT, MPC, MPC2, OFF), average value, minimum value and maximum value of channel from detail window. If delta markers are set, then it shows values between V1 and V2 markers.
10 – Chosen file name
16.3. **TOOLBOX in New user interface mode**

1 – Delta markers – show delta value under the file name. User can set Time markers, Pressure markers or both at the same time. If markers are set, user can delete them from Delta menu. Also, if markers are set, channel values are calculated not from the detail graph, but from the space between markers.

2 – Reset – deletes MTT markers, Delta markers and restores graph to default view.

3 - Pan – Enables panning in the detail graph. Panning by navigation window is enabled all the time.

4 – Zoom – disables panning and enables zooming to the selected part of view from navigation graph.

5 – Save image – User can choose to save actual view from detail graph to file either to a specified directory on their PC or to attach it to a visit.

6 – Scale – opens a menu, where user can switch between auto scale and manual scale to indicate data range.
16.3.1. ZOOM

Besides number 3 all zoom options are enabled all the time.
1 – Grab the border of rectangle at navigation window and stretch it to zoom out.
2 – Zoom pressure or time by moving time and pressure axis.
3 – Enabled ONLY in zoom mode. Hold your finger on a chart in detail window and mark the area you want to zoom in.
4 – Special design for Milk Time Test. Hold your finger for about 1 second at milking that you want to zoom, and it will fit milking to detail window.
5 – Pinch fingers to zoom
16.4. CHANNEL DESCRIPTION
To open this view, simply tap at channels description between navigation graph and detail graph.

1 – Actual channel status. Tap to switch on or off. Channel that is switched off is not shown at navigation and detail graph but is taken to test calculations.
2 -Tap to select channel type. Null channel is shown in detail and navigation window but is not taken to test calculation.
To completely switch off channel at view and calculation set channel to null and then switch it off.

16.5. Switch scale

Desktop
Right mouse click, select ‘Switch to inHg’. From now all graphs and reports are in inHg. The application has to restart for the changes to take place.

New user interface
Settings > Graph settings
16.6. Analyzing the pulsation data

Desktop
1. Select a representative part of the pulsator data that you want to analyze (approx. 10-20 pulsation cycles in the detail window).
2. Press ‘Start Test’ in the right navigation column to analyze the pulsation data according to ISO 6690.

Data Summary lists the values of the analysis according to ISO 6690. The top graph displays the analyzed cycles, the lower graph only a few to make the details visible.

Data that is entered in the field ‘disclaimer’ is displayed in the pulsator detail report.

3. Enter the pulsator nr. and press ‘Save’. The data is now stored in the customer database and can be found in ‘History’. A pdf report can be made from this menu also.
4. From the top navigation window, you can now select the next pulsation data, press ‘Start test’, etc. The pulsator number is automatically incremented for fast recording.
5. Fast-keys: F2 = Start Test, Enter = Save, TAB = jump to the middle of next pulsator data,
Space = toggle Paused/Running.
6. So, with consecutive TAB, F2 and Enter, your pulsator test report can be finished in no time.
New user interface
Select a representative part of the pulsator data that you want to analyze (approx. 10-20 pulsation cycles in the detail window).
Press ‘Start Test’ in the right navigation column to analyze the pulsation data according to ISO 6690.

Data Summary lists the values of the analysis according to ISO 6690. The bottom graph displays the analyzed cycles, the top graph only a few to make details visible. Data that is entered in the field ‘disclaimer’ is displayed in the pulsator detail report. Enter the pulsator nr. and press ‘Save’. The data is now stored in the customer database and can be found in ‘Visits. Pulsator number is automatically incremented for fast recording.
16.7. Overview of pulsation analysis

History lists all saved test results of this customer, so you can also compare this test with previous tests.
An individual analysis is displayed by clicking on the recording in the list. An analysis can also be removed by selecting and pressing ‘Del’ key on your keyboard.
Be careful with ‘Remove’ since it will remove the entire recording.
Use ‘Open’ to add more data to the list of this analysis, e.g. pulsator data from another VaDia, or to create a report.

16.8. PDF-report of pulsation analysis

‘Report’ generates a pdf-report of the active analysis. Page 1 of the report lists a total overview of all pulsators, the following pages list details of each pulsator.
Most information in the report is self-explanatory. ‘Limping’ and ‘dip’ are calculated as defined in ISO 3918.
- Limping is the difference in pulsator ratio between the two halves of a milking cluster with alternating pulsation. Limping checks if the two sides of the pulsator are equal. ISO 5707 recommends that limping shall be < 5%. Limping can also be intentionally when the rear half of the udder is milked with a different pulsator ratio than the front half.
- Dip is about the shape of the vacuum curve. A dip is when, during the B-phase, the vacuum for a short period drops more than 4 kPa below the maximum B-phase vacuum.

The VPT-demo dataset with customer Versace individual pulsator settings highlights in red the values that deviate from the Versace targets.
### Pulsator Test Report

**Customer**  
**Family Version**  
**Telephone**  
**Test date:** 2013-05-30

<table>
<thead>
<tr>
<th>Pulsator No.</th>
<th>Chain</th>
<th>Rate (Hz)</th>
<th>Ratio</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Ymax</th>
<th>Ling</th>
<th>Dlg</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>58.8</td>
<td>0.54</td>
<td>55.1</td>
<td>0.94</td>
<td>50.5</td>
<td>0.95</td>
<td>28.0</td>
<td>5101</td>
<td>45.7</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>59.9</td>
<td>0.38</td>
<td>55.1</td>
<td>0.94</td>
<td>50.5</td>
<td>0.95</td>
<td>28.0</td>
<td>5101</td>
<td>45.7</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>59.8</td>
<td>0.38</td>
<td>55.1</td>
<td>0.94</td>
<td>50.5</td>
<td>0.95</td>
<td>28.0</td>
<td>5101</td>
<td>45.7</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>58.8</td>
<td>0.38</td>
<td>55.1</td>
<td>0.94</td>
<td>50.5</td>
<td>0.95</td>
<td>28.0</td>
<td>5101</td>
<td>45.7</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>58.8</td>
<td>0.38</td>
<td>55.1</td>
<td>0.94</td>
<td>50.5</td>
<td>0.95</td>
<td>28.0</td>
<td>5101</td>
<td>45.7</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>58.8</td>
<td>0.38</td>
<td>55.1</td>
<td>0.94</td>
<td>50.5</td>
<td>0.95</td>
<td>28.0</td>
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</tr>
<tr>
<td>7</td>
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<td>28.0</td>
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<tr>
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<tr>
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<td>0.95</td>
<td>28.0</td>
<td>5101</td>
<td>45.7</td>
</tr>
</tbody>
</table>

**Diagram:**

- Chart 1 shows the Pulsator's response to different frequencies.
- Chart 2 displays the Ymax, Ling, and Dlg values for various test conditions.

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**Reference:**

- VaDia User Manual v3.7
- www.biocontrol.no/vadia
17. MILKING REGISTRATION

Milking Registration is only available if you have Milking Time Test and Milking Registration module active (Wet Test).

Milking registration can be made during milking to register information about the milking, to record preparation time, teat analysis, and notes to the milking. While VaDia is registering, go to “Analysis” and click on “Milking Registration”:

Click on “Start Preparation” and “Finish Preparation” buttons to record the preparation time before milking. Then click on “Unit Attachment” when the unit with VaDia is attached to the teat.

Insert animal number, select “Teat Stand” and click “Add teat” to register teat information. You can add notes to the milking, and then add Milk Yield before clicking “Save”.

When you want to analyze the data recorded during milking, select the milking area, place markers, and click “Start Test” (see chapter 21 for more information on how to perform Milking Time Test). When the analysis window appears for the Milking Time Test, you can click on the “+” next to the animal number to see a list of registered animals (milking registrations) and then choose the animal that you already did a milking registration for, which corresponds to the milking data you have chosen:
After you choose an animal, data will automatically be filled in from the milking registration with:

- Animal Number
- Milk yield
- Preparation time

For more information about the other Milking Time Test data, see chapter 21.

Information recorded under “Milking Registration” can be found in “Customer” menu and “Animals” tab:

Click on “AnimalRegistrations” to see detailed information of milking registration(s) registered to the animal:
New user interface

To add an animal, click ‘Add’ and provide animal number. To provide date and time of ‘Start Preparation’, ‘Finish Preparation’ and ‘Unit Attachment’ just click on clock icon. To add teat, click which teat you want to set and choose it parameters. After that click save teat. To set all teats with same parameters click ‘All’ and then choose parameters and click save nearby teat configuration. To cancel teat configuration, choose teat and click cancel.
18. ANIMALS

At new user interface version go to customer menu and click Animals. You will see this view:

View looks like ‘Add milking’ view. Here we see list of all registered animals. We can see all settings from any animal registration, edit it and see all tests done for the animal. With queue at the top we switch between registrations or tests and with list on the left we switch between animals.

You can also delete an animal by selecting the desired animal and then clicking on ‘Delete’ button.

19. SLUG TEST (OFFLINE)

Please follow the steps described in chapter 16 (Analysis in New user interface Mode) up until you reach this moment:

Click on “ST” button which stands for Slug Test. When the graph is loaded, zoom in the section you want to test. (Hold finger on the screen or click on the detailed graph with the right mouse button, the graph will zoom in automatically)
Set your channel settings and click “ST” – Slug when you are ready to perform a test.

You will be asked to fill the following details regarding the test: Work Vacuum, Milk Line Diameter and Distance.
When the details are filled, click “Start test” button and perform a Slug Test.

The results and recommended values taken from ISO documentation are shown on the test results view. You can also add notes to your test. Click “Save” to save the test, click “Close” to discard the results and go back to Analysis view.

19.1. **What is Slug Test and how to make it?**

The cleaning of the milk line is assured through a few different processes. Here we are analyzing the physical aspect of the slug that is being sent through the milk line. To create this slug we will be adjusting the air injection rate and volume of water being sent through the milk line. The desired outcome will be a full column of water for the entirety of the tube. Too much force behind the slug will cause it to become turbulent and fall apart, too little and the column of water will not hold itself together. Both results are inadequate and will end up not properly cleaning the equipment.

To perform the test we will insert 2 test port that will need to be at the beginning of the milk line after the air injector and the next will be again on the milk line before the receiver jar. They ports should be 30 ft. apart at minimum (never drill into stainless steel milk lines – use provided test ports)
Start by testing the system with the specifications the machine equipment dealer has given for air injection as well as water volume and proceed to adjust these factors to produce good results. Then adjust the air injection open time as well as the air injection closed time to get a proper slug velocity and vacuum drop. The velocity of the slug should be 7-10 m/s (23-33 ft/sec).

Recommended range of vacuum drop across the slug:
20. Resistance in Milk Flow (Offline)

Please follow the steps described in chapter 16 (Analysis in New user interface Mode) up until you reach this moment:

Click on “MRT” button which stands for Milk Resistance Test. When the graph is loaded, zoom in the section you want to test. (Hold finger on the screen or click on the detailed graph with the right mouse button, the graph will zoom in automatically)

Set your channel settings and click “MRT” – MRT when you are ready to perform a test.

Channel 1 – SMT – Short Milk Tube
Channel 2 – LMC – Long Milktube at cluster
Channel 3 – LMS – Long Milktube at sensor (detach sensor/milkmeter etc.)
Channel 4 – ML – Milk Line

These are default and recommended channel settings.
The difference between average values of LMC-SMT, LMS-LMC and ML-LMS are calculated. The test can be used to analyze the main resistance in milkflow between teat and milkline. Maximum, Average and Minimum vacuum and the differences (2–1, 3-2 and 4-3) are taken into consideration, so you know in which stage of the milk transport there is the most resistance.
Gathering data for the test

Connect your device to the following test points in the milkline to gather data for the test. The arrows indicate test points. There are two arrows for the milk line, choose one of the two.
21. MILKING TIME TEST (OFFLINE)

This explanation of Milking Time Test analysis assumes that the chapter on Pulsator Test has been read and understood since navigation, history and report functions are identical. Click ‘Load vd5 file’ and select the file ‘Leppink 5A MTT demo’.

! CH1 is the pulsator recording. Define the Channels as follows:

CH1 = SPT (Short Pulsation Tube)
CH2 = SMT (Short Milk Tube)
CH3 = MPC (MouthPiece Chamber rear teat)
CH4 = MPC2 (MouthPiece Chamber front teat)

In this zoom CH1 overlaps the relevant channels, therefore deselect CH1.

Zoom in the navigation window on the first milking, the following will show:
Tick the box ‘Show Marker Lines’. This will display 6 marker lines that split-up the milking into 4 milking phases:

- StartM = Start of Milking
- StartP = Start Peakflow
- StartOM = Start Overmilking MPC
- StartOM2 = Start Overmilking MPC2
- StartT = Start Takeoff
- EndM = End of Milking

Refer to chapter 22 for details about the calculation and milking phases.

Select “Show marker lines” checkbox. The analysis of the individual cow milking is done by clicking ‘Split’. The marker lines are now automatically set, manual correction is done by dragging the marker line to the right position.

Put the marker lines in the following position:

![Graph showing milking phases](image)

Click ‘Start Test’ (in the box Milking Time Test). The following information will show:

![Milking time test report](image)

Enter cow ID (here 2617) and Milk Yield (not necessary), click ‘Save’. If you have advanced module you can select a registered cow by clicking the “+” next to the box for animal number (see chapter 18 for information about milking registration).
Refer to chapter 22 for details about the displayed values and calculation methods. Select the next milking in the navigation window (or use the TAB-key) and use the same method to do the tests. Click ‘History’ to view the saved MTT results:

You can also see saved MTT tests under “Customer” and “Animals” and select the animal you registered the MTT test to:

![Image of a graph showing data with labels and a table of animal information]

- **John Adams**
  - **Farm**: Grimstad Gård (9458781254)
  - **Email**: john@biocontrol.no
  - **Phone/Cell**: +4769225255

- **Country**
- **Farm info**
- **Conventional milking**
- **Robotic milking**
- **Visits**
- **Pulsation test condition**
- **Animals**
  - **Number**: 1010 2015-06-09 13:11 None
  - **Type**: None
  - **Milk Time Tests List**: AnimalRegistration
  - **Other details**
**New user interface Version:**
Click ‘Customer’ and create a new customer (or select an existing one from the list).
Click ‘Select Customer’ and ‘Analyze file’. Select the file ‘Leppink 5A MTT demo’.
Create new visit (or select an existing one from the list).
Select MTT test type.
The data is now loaded and displayed in the active window.

CH1 is the pulsator recording. Define the Channels as follows:
CH1 = SPT (Short Pulsation Tube)
CH2 = SMT (Short Milk Tube)
CH3 = MPC (MouthPiece Chamber rear teat)
CH4 = MPC2 (MouthPiece Chamber front teat)
In this zoom CH1 overlaps the relevant channels, therefore deselect CH1.

Zoom in the navigation window on the first milking, the following will show (recommended method to zoom milking is to hold finger for about 1 second at this milking):
Tap ‘Split’ button. The marker lines are now automatically set, manual correction is done by dragging the marker line to the correct position. You can drag marker by grapping for label or line. This will display 6 marker lines that split-up the milking into 5 milking phases:

- **Start** = Start of Milking
- **StartPF** = Start Peakflow
- **StartCVF** = Automatically set 60 seconds after "Start PF" marker
- **StartOM** = Start Overmilking MPC
- **StartOM2** = Start Overmilking MPC2
- **StartTO** = Start Takeoff
- **End** = End of Milking

If you wish to remove just MTT markers tap ‘Remove’ from menu at the right.
Click ‘MTT’ button. The following information will show:

Choose animal from the list (list of animals registered with ‘Milking Registration’) or provide a new one at the boxes. Milk Yield can be set as decimal value. Tap ‘Next’ to show test result view:

Show / Hide tooltip by tapping the button on the right. Tap individual tables to select which tooltips to show. Write test notes at box at the top. Clicking on Recommended pops up a window with recommended values. After saving the test you will see this view:
After saved test milking which was tested is marked at navigation window by orange rectangle. Select other milking and continue with this method to test.

21.1. **Add another VaDia series**

Another series from another VaDia can be added so that it is included in the same report. This can be convenient for recordings where e.g. different cluster/liner combinations are tested.

Click ‘Load vd5 file’ and select ‘Leppink 4A MTT demo’. Select ‘Series 2’.
Do the tests, after this the results are listed in ‘History’.

Click ‘Report’ to create pdf reports for the MTT tests. See more in chapter 25.

21.2. **Teat-end vacuum during Peak flow (average/min/max)**
The Channel information displays average/minimum/maximum of the data that is displayed in the detail window. This is very convenient for fast recording of teat-end vacuum in the peak flow period (here CH2 SMT = 39,8/34,7/45,9 kPa).
22. MTT CALCULATION METHODS AND ALGORITHMS
This content may change because of new theories and calculations. The latest version of this document can be found on our website.

22.1. General
To analyse the vacuum in the milking unit, individual milking must be split into various phases. For this program four phases are used, see figure 1. The peak-flow period includes the period with gradually decreasing milk flow (if present), contrary to some other systems for analysing milking.

VaDia Suite offers manual selection of the boundaries (marker lines), there is also an automatic function to “split” the milking into phases. The automatic function must be regarded to be of assistance for the manual adjustment. Results from the automatic splitting must always be checked before assessing vacuum conditions.

22.2. Determining boundaries

- **Start Milking**
  This is the moment when the teat cup is attached to the teat.

  **Automatic detection (Split)**
  The moment when SMT vacuum rises above 25 kPa.

- **Start peak flow period**
  This is the end of the period when the teat cup is establishing a stationary position on the teat, and milk flow is established. It is also the start of a period with relatively stable conditions and a relatively stable milk flow.

  **Automatic detection (Split)**
  Is based on the common mechanism that vacuum level declines when milk flow increase. The average SMT vacuum in 10 seconds' periods after attachment is monitored. When the average vacuum from one period to the next declines less than 0,15 kPa, the midpoint of the first (of the two) periods is indicated as start of peak flow period. The first 20 seconds’ period is excluded from the calculations, so there will be a minimum value of 25 seconds.

- **Start overmilking**
  Overmilking of the relevant teat can be detected by means of MPC vacuum. When the teat gets empty, there will ordinarily be a shift in the MPC vacuum level, or a marked change in the MPC vacuum fluctuations, or both. There are two markers for overmilking, one for each MPC channel.

  **Automatic detection (Split)**
  is based on an increase in MPC vacuum variation. When the current variation is equal to or above 1,3 times the preceding running average variation, start of overmilking is denoted. Current and running average variation is calculated every two seconds. Variation is the difference between maximum and minimum per two seconds. New running average is 0,7 times the old running average plus 0,3 times the current variation.
• **Start take-off**
  is the moment when teat cup detachment is initiated. It can be seen on the SMT vacuum as the start of a rapid decline towards zero, or it may be a shift in vacuum in some types of equipment.

**Automatic detection (Split)**
The program loops through all data points after the start of peak flow period and finds maximum vacuum. Then the program loops through backwards from the end of milking until the SMT vacuum is less than 5 kPa below maximum vacuum. This data point denotes the start of take-off.

• **End of milking**
  Is when the SMT vacuum falls below a set value.

**Automatic detection (Split)**
The program loops through all data points after start of peak flow period. The first data point with SMT vacuum below 5 kPa denotes the End milking.

22.3. **General Results**

• **Machine on Time**
  Time in minutes and seconds from Start milking till End milking

• **Overmilking**
  Time in minutes and seconds in the Overmilking period (from Start Overmilking until Start Take-off)

• **SMT vacuum**
  Average vacuum in kPa of all data points of the short milk tube vacuum channel, given for various phases of milking:
  - Total – from Start milking till End milking
  - PFperiod – in the Peak-Flow period
  - Overmilking – in the Overmilking period

• **MPC vacuum**
  Average vacuum in kPa of all data points of the mouthpiece chamber in the Peak-Flow period and overmilking period.

• **Cyclic vacuum fluctuations**
  This value is assessed for ten pulsation cycles 60 seconds after the start of the Peak-Flow period. Average, maximum and minimum vacuum in each of the ten cycles are calculated. Finally, the averages of the ten individual values are formed. Results are presented as fluctuations Above (maximum) or Below (minimum) the average vacuum.

• **Irregular vacuum fluctuations Type 2**
  The irregular vacuum fluctuation is a rapid drop of a certain magnitude in SMT vacuum. A vacuum change of 56 kPa/second and a magnitude of 14 kPa is set as limits to qualify for an event of Irregular vacuum fluctuations type 2. Results are given in events of Irregular fluctuations per milking.
22.4. Advanced Module Results

The following data is only available if you have the "Advanced Module Activated".

- **MPC Favourable**
  This value shows the percentage of recordings during the peak flow period within the range 10-30kPa. The value is shown for the two mouthpiece chamber channels.

- **MPC vacuum in Peak-Flow period**
  With the advanced module MPC vacuum for the second MPC channel is also shown.

- **NPG, Negative Pressure Gradient**
  Short milk tube vacuum declines due to vacuum shut-off, while MPC vacuum stays high. "NPG" calculates the area for where the SMT vacuum (pink in image below) is lower than the MPC vacuum (brown in image below). Calculated for both MPC channels.

![Graph showing MPC and NPG data](image)

- **Irregular vacuum fluctuations Type 1**
  The irregular vacuum fluctuation is a rapid drop of a certain magnitude in SMT vacuum. A vacuum change of 100 kPa/second and a magnitude of 21 kPa is set as limits to qualify for an event of Irregular vacuum fluctuations type 1. Results are given in events of Irregular fluctuations per milking.

- **Detachment Time**
  Time from start take-off to end milking (End milking - Start take off).

- **Main Milking Time**
  Time of Peak Flow Period (Start overmilking - Start peak flow).

- **Let Down Time**
  Time from attachment to start Peak Flow Period.

- **Preparation Time**
  Time from start to end preparation. Recorded with "Milking Registration", only available with Advanced Module. See chapter 18 for more information about Milking Registration.

- **Average B-Phase Vacuum**
  Analyzes average vacuum from B-phase during milking.
23. FALLOFF TEST (OFFLINE)
The VaDia Suite module ‘Falloff Test’ tests the vacuum recovery response when a cluster falls-off and is attached, refer to ISO 5707 for details.
To explain the working of this module, data from a vd5-file called ‘VPT Fall-off demo’ is used. This file can be downloaded from our website. For the test to be made, at least 5 seconds before the drop have to be ‘zoomed’ in.

Select Falloff Test from the right column on the screen.
Open the dataset by selecting ‘Load vd5 file’ in the left column. Make sure the program is in ‘Paused’ mode, display only the relevant channel (here channel 1).
Please remember to set the channel as SPT – Short Pulsation Tube.

![New user interface](image_url)

New user interface
Click ‘Customer’ and create a new customer (or select existing from the list).
Click ‘Select Customer’ and ‘Analyze file’. Select the file ‘VPT Fall-off demo’.
Create new visit (or select existing from the list).
Select FoT test type.
All data is now loaded and displayed in the active window.
When file is loaded just tap FoT button from menu at the right menu.

23.1. **Falloff test results and report**
Click ‘Start Test’, the test result is now shown together with the ISO 5707 boundaries.

Press ‘Save’ to store the test result; the report is now listed in ‘History’.

24. **VADIA SUITE ONLINE ANALYSIS**

24.1. **VaDia Suite Bluetooth connection**
Make sure the VaDia devices you want to connect to are in Bluetooth-mode (double check in VaDia Manager that the VaDia mode displays ‘LOG BT’, see VaDia Startup Guide). VaDia Suite will automatically find the VaDia devices that are in Bluetooth-mode. At start-up, the Connection Box in the left column of the screen will show:

The active VaDia devices in range that have been found are listed in the Connection Box:
The first time a new VaDia is connected via Bluetooth it will not display in the Connection Box. Then right mouse click and ‘Refresh VaDia list’. VaDia Suite will now search again and will find it. It will now be displayed automatically next time VaDia Suite starts-up.

New user interface
Make sure the VaDia devices you want to connect to are in Bluetooth-mode (double check in VaDia Manager that the VaDia mode displays ‘LOG BT’, see VaDia Startup Guide). Select customer and in customer menu select ‘Analyze Live Data’.

Go to ‘Customers’ menu, click on ‘Select customer’ and then on ‘Analyze live data’. A message “Searching for Vadias” will be displayed.

If your VaDia device is in Bluetooth mode and in range, then after a while, it will appear in the center of the window:
Click on the name of the device, the device will connect to your PC or new user interface. After the device has successfully connected, the following window will appear:

Choose one of the following options and you will be transferred to the analysis view.
1. Toolbox – opens menu bar with graph settings
2. Stop – stops the data flow to perform an analysis
3. BT Menu – opens a menu with VaDia devices in range
4. PT – performs a pulsator test
5. Type – choose the type of test you want to perform on the current data.
6. New Note – create a note
7. Clear – clears all data from the graph

You can also change your Vadia user alias:

Vadia Name VD1638-33-K
Vadia User Alias BioControl

Vadia User Alias will now replace your Vadia Name, however only in your database. A person with a different database will detect Vadia with its default name (here VD1638-33-K).

24.2. VaDia Suite online analysis
To start online loading and analysis, select in the Connection Box the VaDia that you want to connect to via Bluetooth.

To toggle between mode ‘Paused’ and ‘Running’ click and SPACE bar can also be used to toggle between ‘Paused’ and ‘Running’.
Put VaDia Suite in the mode ‘Running’.
Blow in the vacuum tubes to test if the Bluetooth connection is working, the data will be displayed on the graph in real time.
Note: Milking Time Test and Falloff Test can only be executed in the mode ‘Paused’. So first collect the data in the mode ‘Running’, and then go in mode ‘Paused’. The displayed data can then be analyzed as a vd5-file. Pulsator Test can be made on the running data.
24.3. Go to Streaming Bluetooth mode again after opening file
If the active dataset is the dataset from file, the VaDia is not connected.

Then right mouse click in the VaDia window and ‘Connect’ to make the Bluetooth streaming data the active dataset again:

New user interface:
You can go back to Bluetooth connection menu by clicking at ‘BT Menu’ button.
25. REPORTING

25.1. Basic Reports

With the Basic Report tab, you can write a report summary and recommendations to the report. You can also attach the report to visit (must first be created under customer and “Visits” tab) and choose what should be included in the report.

Click on “Preview report” to see the report or click “save report and open in PDF” to save the report to the customer/visit and open the PDF.

Reports that have been saved to a customer/visit can be found under the “Customer” menu by choosing the customer, then the tab “visits” and by clicking “open file”. Alternatively, you can click on the “visit list” to get a list of all visits and see attached files:
If you have Advanced Module activated you can use the tabs “Milking Time Test Report”, “Fall-Off Test Report” and “Pulsator Test Report” to select which data to include in the report.

If you do not have the “Advanced Module” you can go to “History”, click on the data set of tests you want to add to the report, and then click “Open” to add the analyses in the dataset to the report.
You can choose a different dataset and click “open” to have two datasets in the same report.
To “clear” selection of data sets for report, change the customer.
New user interface

There are two ways to get to “Reports” view:
- Reports button at customer menu
- Visits and then Reports and Advanced reports

Checkboxes: Pulsator test, fall off test, milk time test, slug test, milkflow resistance test and reports summary will be automatically selected if you pick a test from any of these sections. Report summary will be selected when you type something at “Summary” or when you add a default section.

Reports can be now saved in the database and loaded later for editing:
“Report summary” and “Recommendations” fields can be easily erased by pressing ‘Clear’ button.

Select a report that you want to edit and click ‘Open’:
Report summary

TEAT PREPARATION AND STIMULATION; Good
MACHINE ON TIME AND MILK FLOW RATE; Good
OVER/UNDER MILKING; Good
CLAW WORKING VACUUM; Good
VACUUM STABILITY; Good
MOUTHPIECE CHAMBER VACUUM; Good

Recommendations

Recommendations are now editable! Go ahead and try it!
25.2. Milking Time Test Report

! **This tab is only available if you have Advanced Module activated.**

In the Milking Time Test Report tab, you can choose what Milking Time Test analysis to attach to the report by choosing dates and clicking “Search”. Click on the box to the left of the milking time test to attach it to the report.

You can also choose what data to show in the report of average values (of all milk time tests selected) and per animal (right side of screen):

**Average Values Information**

Average values are calculated based on MTT analyses chosen to attach to the report. Tick/untick the box “show summary of all MTT tests on top of MTT report page” if you do not want to show these average values in your report. You can also tick/untick the box “Show recommended values in report” to decide if you want to show the “recommended” values in your report (or only the calculated averages).

Click on “edit recommended values” to be able to write in the boxes under “recommended” to edit values.

Tick/untick boxes next to each calculated value to remove value from the report (for example by unticking box next to “overmilking” you will not show overmilking average value information in report).

! **OBS! The recommended values are only example values! It is the advisor’s responsibility to edit values to give appropriate recommendations.**
New user interface

At new user interface version, main differences are buttons menus:
- **Recommended values**: correspond to menu below test list in Vadia Suite.
- **Parameters** are divided into two sections:
  - **Summary** (only 12 parameters at a time can be displayed)
- Generate Csv: Export selected reports to csv file.

25.3. **Fall Off Test Report**

*This tab is only available if you have Advanced Module activated.*

You can choose what test analyses to attach to the report by choosing dates and clicking “Search”. Click on the box to the left of the milking time test to attach it to the report:
25.4. Pulsator Test Report

This tab is only available if you have Advanced Module activated.

You can choose what test analyses to attach to the report by choosing dates and clicking “Search”. Click on the box to the left of the test to attach it to the report:
New user interface

You can choose what test analyses to attach to the report by choosing dates and clicking “Search”. Click on the box to the left of the test to attach it to the report:

25.5. Slug Test Report

You can choose what test analyses to attach to the report by choosing dates and clicking “Search”. Click on the box to the left of the test to attach it to the report:
25.6. **Milk Resistance Test Report**

You can choose what test analyses to attach to the report by choosing dates and clicking “Search”. Click on the box to the left of the test to attach it to the report:

![Milk Resistance Test Report](image1)

25.7. **Visit Image**

You can add an image to a visit and later attach it to the report. Go to your “Visits” view, select a visit and click “+” next to “Files”. Add your image and then include it in the report.

![Visit Image](image2)
26. TROUBLE SHOOTING

26.1. Streaming Bluetooth: VaDia Suite doesn’t find my VaDia

In rare cases, it can happen that VaDia is not found automatically. In that case look-up, the virtual COM-Port of this VaDia in the PC’s Configuration tools and connect VaDia Suite manually to this virtual COM-Port by selecting it in the tab ‘COM Ports’:

VaDia Suite will then always use this COM Port when Bluetooth connecting to this VaDia.

Follow these steps to find the COM Port:

- PC: ensure that the PC is equipped with Bluetooth and that the Bluetooth on the PC is switched on.
- VaDia: start a log session in Bluetooth mode, double check that the VaDia mode displays ‘LOG BT’ (see VaDia Startup Guide)
- Go to ‘Start’>‘Control Panel’>‘Hardware and Sound’>‘Devices and Printers’ and select ‘Add a device’.
• The PC will search and find Bluetooth devices that are not connected yet. Click the VaDia you want to connect to (here VD1351-1-H):

![Image of Bluetooth device search]

• Enter pairing code ‘1111’ when requested and wait for the message ‘this device has been successfully added to this computer’.

![Image of pairing code entered and connected device]

• After some time (< 1 minute), this message will display. It is now ready to use.

![Image of device ready to use]

• Go to ‘Start’>'Control Panel’>'Hardware and Sound’>'Devices and Printers’ and right-click on the connected VaDia (here VD1351-1-H).

![Image of device and printers with selected device highlighted]

• Go to Properties>Hardware and note the COM-Port (here COM43). Select this COM-port in VaDia Suite.
26.2. VaDia Manager message: ‘USB not found!

When connecting VaDia to the PC this screen is displayed when the initialization of the PC-USB port is delayed. Follow the instructions displayed in the screen.

Wait for the message:

Note: the USB-connection is refreshed by clicking ‘Status’
26.3. VaDia Suite message ‘Improper or not enough data’

Here CH3 and CH4 are selected but have no data. Unselect CH3 and CH4. The same error message shows in the Falloff Test.
27. TECHNICAL DATA
Measuring frequency: 200 Hz pr. Channel

Accuracy: +/- 0.2 kPa

Measurement range: 0 to -80 kPa

No of channels: 4

Communication: USB for setup and normal functions
Bluetooth Class 1 for Streaming mode.

Battery: Rechargeable or replaceable standard format AA

Weight: <80g with battery

Log transfer speed: Approx. 25 sec. per hour of log

Casing: Splash proof, but care must be taken to minimize risk of malfunction due to moisture inside the unit.

Memory: Approx. 8 hours of logging.

VaDia Suite is designed for PC’s with MS Windows 7 to 10 with .NET Framework 4.5. It is not suited for Windows XP (this is not supported by Microsoft anymore).

Minimum screen resolution for new user interface version is 1200x800.
28. CE DECLARATION OF CONFORMITY
As manufacturer, we declare under our sole responsibility that
Product name: VaDia
Part Nr.: 0800.71001.00
Options: Bluetooth
complies with requirements of the following directives:

EMC:
EN 300 328 (V1.7.1)
EN 301 489-01 (V1.8.1)
EN 301 489-17 (V2.1.1)

Reference:
NEMKO Report No. 174 801/2

Date: 07.06.2011
Signed:

Name: Even Jahren
Position: Managing Director

Name and address of manufacturer:
BioControl AS
Grimstad Gård, 1890 Rakkestad
NORWAY
29. VADIA LIMITED WARRANTY & LIABILITY LIMITATIONS

This product is limited warranted against defects in materials and workmanship for twelve (12) months from the original date of purchase. The battery carries a limited warranty of 6 months from the manufacturing date. The battery must be properly charged according to the instructions in this manual.

If notice is received of such defects during the limited warranty period, the proven defective product(s) will either be repaired or replaced, at the manufacturer’s option. Replacement products may be either new or like new.

The manufacturer does not warrant that the operation of the products will be uninterrupted or error free.

The limited warranty does not apply to defects resulting from (1) improper or inadequate maintenance or calibration, (2) software, interfacing, parts or supplies not supplied by the manufacturer, (3) unauthorized modification or misuse, (4) operation outside of the published environmental specifications, or (5) physical damage due to external causes, including accident, abuse, misuse or problems with electrical power.

The product must be adequately sealed against water or moist ingress since damage to PCB and vacuum sensors due to water, moist or milk is not covered by this limited warranty.

To the extent allowed by local law, the above limited warranties are exclusive and no other warranty or condition, whether written or oral, is expressed or implied, specifically disclaiming and implied warranties or conditions of merchantability, satisfactory quality, and fitness for a particular purpose.

To the extent allowed by local law, the remedies in this limited warranty statement are the customer’s sole and exclusive remedies. Except as indicated above, in no event will the manufacturer or its distributors be liable for loss of data or for direct, special, incidental, consequential (including lost profit or data), or other damage, whether based in contract, tort or otherwise.
NOTICE FOR BIOCONTROL CUSTOMERS IN THE EUROPEAN UNION

To recycle BioControl products WEEE (Waste Electrical and Electronic Equipment products that run on electrical power), please ask for instructions at support@biocontrol.pl
www.biocontrol.no/vadia

References:
support@biocontrol.pl
www.biocontrol.no/vadia
30. STATUS LED INDICATIONS
The LED on the VaDia reports the status to the user. Remember the following basic rules:
1. Green is good
2. Blue is Bluetooth
3. Red is charging or attention
4. 2 sec. message interval is ‘awake’
5. 15 sec. message interval is ‘sleeping’
6. 1x blinking is ‘log’ mode
7. 2x blinking is ‘stop’ mode

Below table lists the LED indication at all possible statuses:

<table>
<thead>
<tr>
<th>Mode</th>
<th>Status</th>
<th>Normal</th>
<th>Low Battery</th>
<th>Charging</th>
<th>Normal</th>
<th>Low Battery</th>
<th>Charging</th>
<th>Undefined</th>
<th>Deep Sleep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop</td>
<td>Awake</td>
<td>2x green blink / 2 sec.</td>
<td>1x red blink after 2x green blink / 2 sec.</td>
<td>1x long red after 2x green blink / 2 sec.</td>
<td>2x green blink / 15 sec.</td>
<td>1x red blink after 2x green blink / 15 sec.</td>
<td>VaDia wakes up, stays awake, light as in awake charging</td>
<td>1x red blink / 1 sec.</td>
<td>No light</td>
</tr>
<tr>
<td></td>
<td>Sleeping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>See note ** below</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Undefined</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>See note *** below</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deep sleep</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VaDia wakes up, stays awake, light as in awake charging</td>
<td></td>
</tr>
<tr>
<td>Log</td>
<td>Awake</td>
<td>1x blue blink / 2 sec.</td>
<td>1x red blink after 1x blue blink / 2 sec.</td>
<td>1x long red after 1x blue blink / 2 sec.</td>
<td>1x blue blink / 15 sec.</td>
<td>1x red blink after 1x blue blink / 15 sec.</td>
<td>VaDia wakes up, stays awake, light as in awake charging</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sleeping</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>VaDia wakes up, stays awake, light as in awake charging</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Undefined</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1x long red after 1x blue blink / 2 sec.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deep sleep</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VaDia wakes up, stays awake, light as in awake charging</td>
<td></td>
</tr>
<tr>
<td>Log BT</td>
<td>Awake</td>
<td>1x blue blink / 2 sec.</td>
<td>1x red blink after 1x blue blink / 2 sec.</td>
<td>1x long red after 1x blue blink / 2 sec.</td>
<td>1x blue blink / 15 sec.</td>
<td>1x red blink after 1x blue blink / 15 sec.</td>
<td>VaDia wakes up, stays awake, light as in awake charging</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sleeping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VaDia wakes up, stays awake, light as in awake charging</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Undefined</td>
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<td></td>
<td></td>
<td>VaDia wakes up, stays awake, light as in awake charging</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deep sleep</td>
<td></td>
<td></td>
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<td></td>
<td>VaDia wakes up, stays awake, light as in awake charging</td>
<td></td>
</tr>
<tr>
<td>Error***</td>
<td></td>
<td>4x red / 2 sec.</td>
<td></td>
<td></td>
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<td></td>
<td>VaDia wakes up, stays awake, light as in awake charging</td>
<td></td>
</tr>
</tbody>
</table>

* VaDia goes to status ‘undefined’ when the battery is so low that the performance cannot be warranted. VaDia will then stop recording and will blink as indicated until it is connected to the charger and the voltage is at a level again that the VaDia is under control. VaDia will then go to status ‘charging’ again.

** When VaDia is not connected to the charger in the ‘undefined’ status, it will go to the status ‘deep sleep’ when the battery reaches a too low level. The light will then switch-off. It can only be brought back to life by connecting it to the charger or by replacing the battery.

*** The Error indication can show a few seconds when a new fresh battery is inserted. This Error indication will then soon disappear. Contact your VaDia vendor if the Error message doesn’t disappear.