

# VacuScope easy

Milking Machine Test Device



Users Manual

Version V1.1 April 2022

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## 1. NOTES ON THE INSTRUCTIONS MANUAL

In the interest of proper functionality and your own safety, please familiarize yourself with the contents of this operating manual before use. It contains important information that will enable you to use the device properly.

The manufacturer reserves the right to make technical changes in the interest of further development.

These instructions are part of the scope of delivery.

## 2. SAFETY INSTRUCTIONS

For your personal safety and to protect your warranty claims, please read the operating manual and follow the safety instructions before starting up the equipment.



Only persons who have been instructed in the intended use of the **VacuScope** easy and who are familiar with the operating instructions are authorized to commission the device. Knowledge of the accident prevention regulations and the generally recognized safety rules is required to perform measurements.

The manufacturer is not liable for damage caused by improper use or unauthorized tampering, especially with the electronic assemblies.

### 3. DESCRIPTION

#### 3.1 INTRODUCTION

**VacuScope easy** is a handy device for checking pulsators and measuring the vacuum curve in milking systems with outstanding product features:

- Visualization of the vacuum courses by a graphic display during testing
- Clear operation with fixed and adjustable keys
- Several interface connections for devices and sensors
- Large memory for storing measurement data and settings

Based on a wide range of programmes the device is used in development, maintenance and servicing of milking units.

#### 3.2 TECHNICAL DATA

Graphic display	LCD-Modul with 128 x 128 Pixel and und LED-backlight
Number of keys	10
Measuring range	Vacuum 0...60 kPa
Measuring accuracy	0,6 kPa; 0,3 kPa (typ.)
Measuring solution	0,1 kPa
Overload vac. sensors	max. 200 kPa
Interfaces	RS 232 for printer, computer and air flow meter 0-5V-interface for external temperature sensor and pressure sensor
Data memory	200 series in programme Pulsation 200 series in programme Fluctuation
Power supply	4 x AA, NiCd, NiMH
Protection	IP 65
Operating temperature	+5 bis +40 °C
Storage temperature	-20 bis +60 °C
Dimensioning	195 x 100 x 50 mm
Weight	420 g (w.o. batteries)
Tests	EN 61000-6-3, EN 61000-6-1

External Sensors (optional)

	Measuring range	Measuring accuracy	Measuring solution
<b>Vacuum sensor/ Pressure sensor</b>	0...-50,0 kPa	<0,6 kPa, <0,3 (typ)	0,1 kPa
	0... 20,0 kPa	<0,6 kPa, <0,3 (typ)	0,1 kPa
<b>Temp. sensor</b>	-20,0....140,0 °C	1,5%	0,1 K
<b>AFM 600I</b>	50-600 l/min	50...100l/min 5l/min	1 l/min
	at 50 kPa	100...600l/min 5%	
<b>AFM 3000I</b>	100-3000l/min at 50 kPa	5%	1 l/min

## 4. FIRST START

### 4.1 PREPARATION

The battery compartment is on the back of the device. The instrument operates with 4 1,5V- batteries (AA) or 4 accumulators (NiMH, NiCd).



**Attention !**

Check the polarity when inserting the batteries.

Incorrect polarity can destroy the electronics of the unit.



**Attention !**


**VacuScope easy** is designed for the measuring of atmospheric pressure. Avoid measuring of other media. This could falsify the measurement results or destroy the electronics. Clean and dry hoses are required to ensure proper functioning of the pressure sensors.



**Attention !**

Before commissioning, all hose connections must be checked for leaks.

## 4.2 SWITCH DEVICE ON

The **VacuScope easy** is started by pressing the  button.

While starting the instrument, the measuring systems zero calibration is checked.

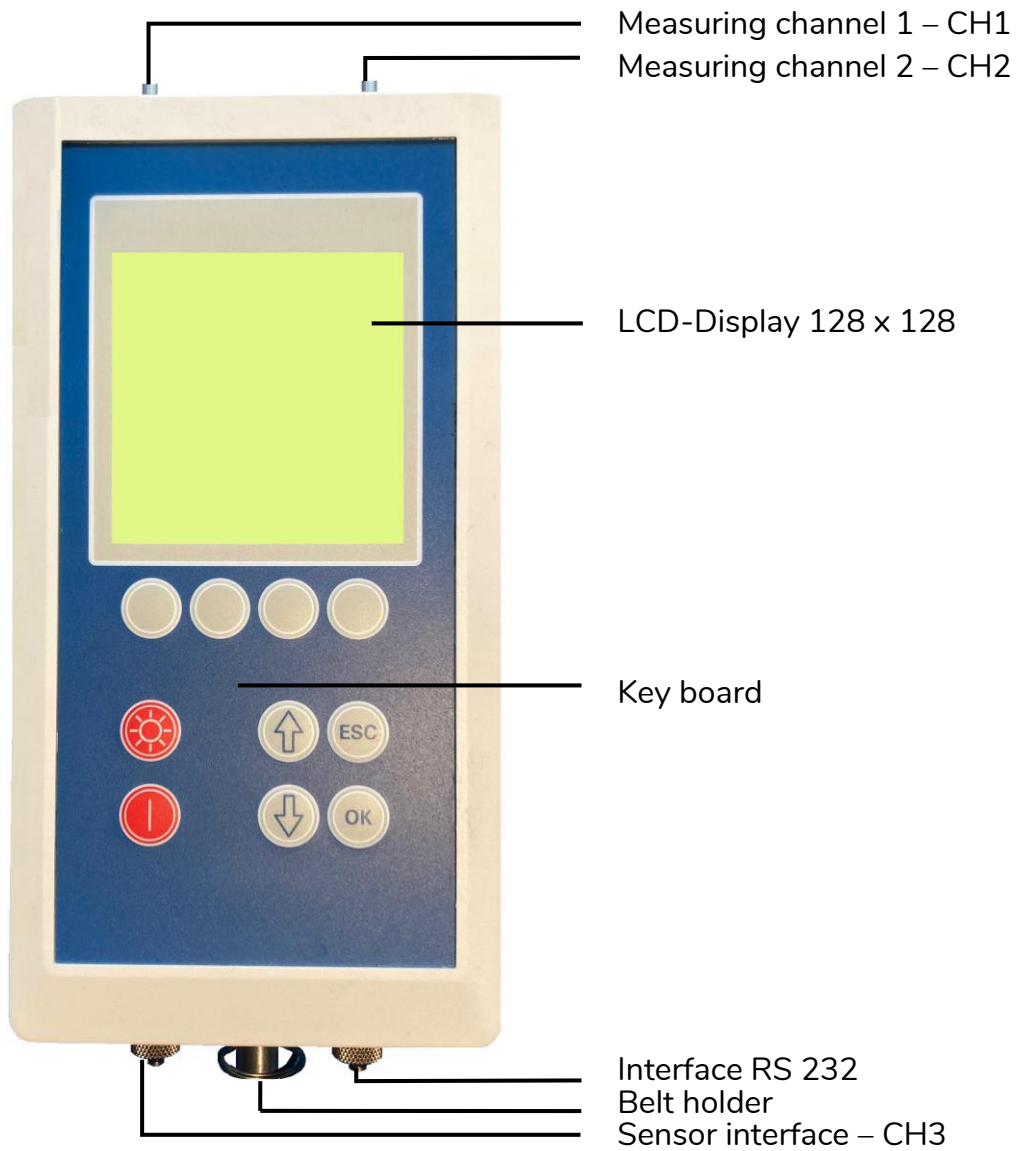
This defines the predominant air-pressure as zero level of the device.



### **Achtung !**

Measuring failures may appear when the device is started under pressure, vacuum or pulsation








5. OPERATING ELEMENTS













## 5.1 KEY BOARD

The keys of the key board have the following meaning:

	Switch on the device
	Turn on / turn off the backlight of the display
	Moving in the menu up, setting parameters
	Moving in the menu down, setting parameters
	Close programme, cancel action
	Start programme, confirm of action
	Function key, function is displayed on screen

The function keys have the following meaning:

	System setting (language, user, calibration values)
	Delete Data
	Print out Data
<b>PC</b>	Transfer Data to computer
	Display measured data
	Save settings or measurement results
 12	Ruler, graphic tool
	Next readings (data sheet)
	Back to the first readings (first data sheet)

## 5.2 SCREEN

The instrument **VacuScope easy** has a backlit screen with a resolution of 128 x 128 pixels.

In the upper area of the menu windows, the current programme and the battery charge status are displayed.

In the middle area are the menu items with the setting options for the respective programmes.

The available functions are assigned to the function keys and displayed in the lower part of the menu window.

## 5.3 INTERFACES

The VacuScope easy measuring device has a sensor interface (0-5V) for connecting a temperature sensor or an external vacuum/pressure sensor.

The RS232 interface is used both to connect the air flow meter and to connect the instrument to the computer.

**The sensors, the air flow meter and the PC software are not included in the scope of delivery of the meter and must be ordered separately.**






### **Attention!**

To ensure proper functioning of the external devices and sensors, screw them tightly together with the meter.

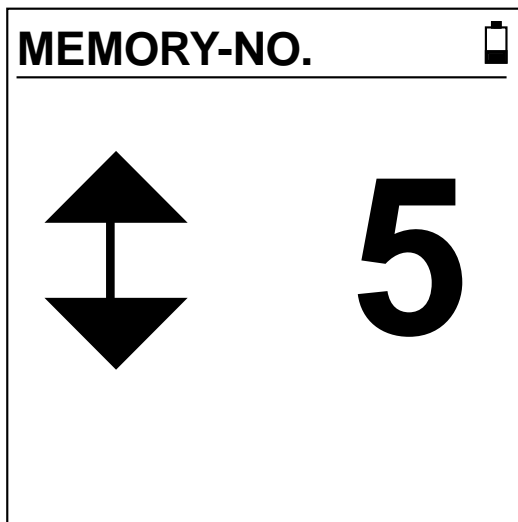
## 6. PROGRAMMES





### 6.1 OPERATION


In the menu navigation, the programme items or the associated parameters are selected with the  and  buttons (the current item is displayed inversely).

The selected program item is started with the  button.

An input window opens for setting parameters (e.g. memory space).

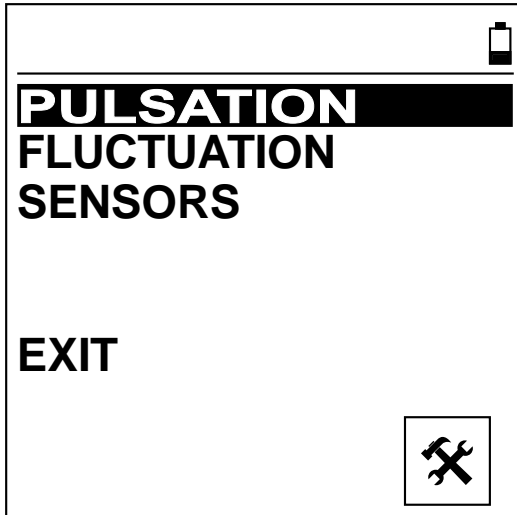


The parameter can be changed with the keys  and . To accept the set value press the key  to discard it press .


To exit the menu and return to the higher-level menu press the button .

**6.2 MAIN MENU**

After switching on the device and zeroing the measuring system, the display shows the main menu.

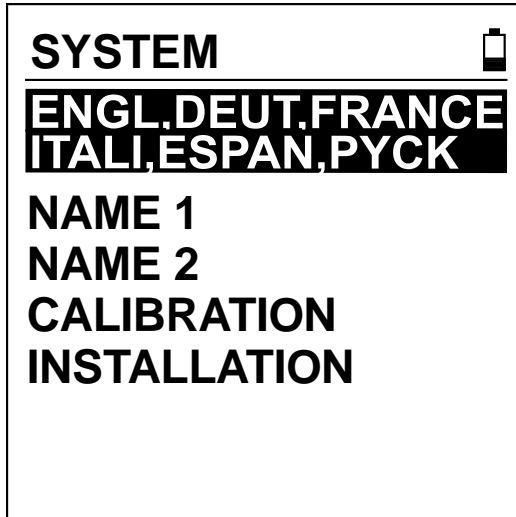


The programmes and functions in the main menu:

<b>PULSATION</b>	Testing of clusters according to milking system standards ISO 5705 and ISO 6690
<b>FLUCTUATION</b>	Measurement and display of vacuum curves with freely selectable measurement settings
<b>SENSORS</b>	Measurement with the external sensors and devices, numerical display of the measured values
<b>EXIT</b>	Turn off the instrument
	System settings (language and user data), service programmes

## 6.3 SETTINGS AND SERVICE

In this programme, the operator can make settings and service activities.



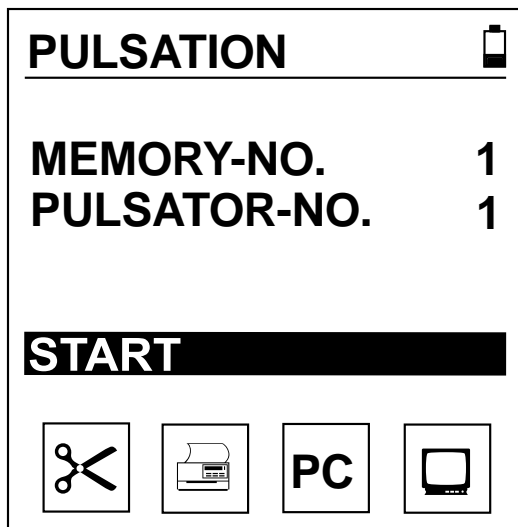
Settings and functions in the SYSTEM programme:

<b>ENGL,DEUT,FRANCE ITALI,ESPA,PYCK</b>	Selection of language
<b>NAME1 NAME2</b>	Setting of user data (e.g. name, company, location) This data will be used in the documentation
<b>CALIBRIERUNG</b>	Checking the sensors with suitable measuring devices
<b>INSTALLATION</b>	Configuration of the system, adjustment of the sensors This programme is password protected and only accessible to trained personnel.




## 6.4 PROGRAMME PULSATION

### 6.4.1 MENU PULSATION

For the qualitative assessment of milking machines and systems, operators, service personnel and control bodies may carry out an audit in accordance with ISO 5707/6690.



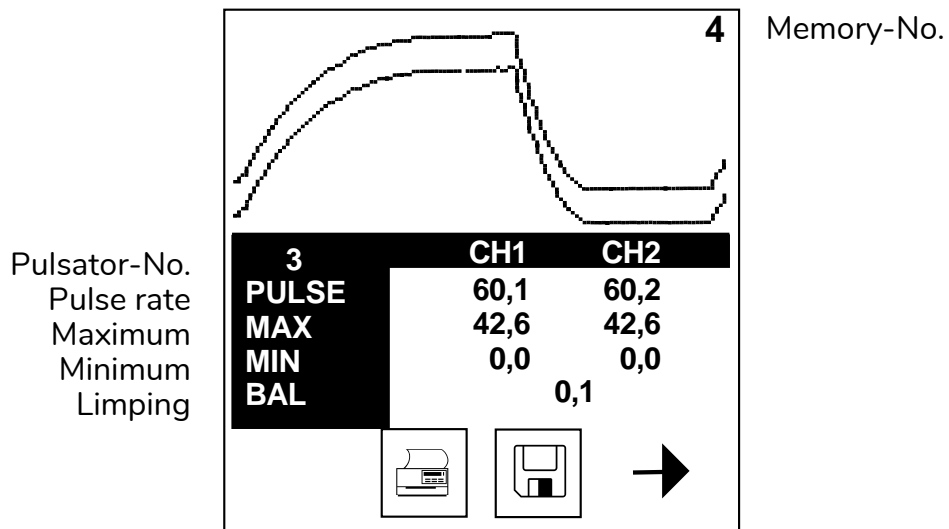
Settings and functions in the PULSATION programme:

<b>MEMORY-NO.</b>	Selection of the storage location for the pulsation measurement, after saving, this value increases (+1) Setting range: 1...200
<b>PULSATOR-NO.</b>	Selection of the pulsator number or the milking station in the milking facility, after saving, this value increases (+1) Setting range: 1...100
<b>START</b>	Start of the PULSATION measurement
	Delete of stored pulsation measurements
	Print out of stored pulsation measurements
<b>PC</b>	Data transfer of stored pulsation measurements to the PC
	Display of stored pulsation measurements

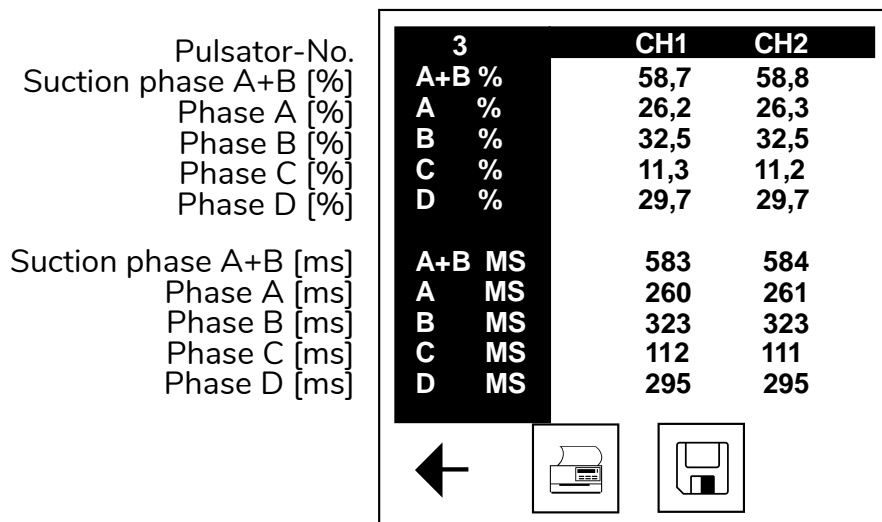
### 6.4.2 MEASUREMENT OF PULSATION

After starting the measurement, the pulsation is analyzed according to the specifications of ISO 6690.

After completion of the pulse analysis, the measurement results are displayed graphically and numerically in the 1st window.



The determined pulse phase values are displayed in the 2nd window.



The graphics and all measured values can be saved or printed out from both the first and second window.

Deviations from the specifications of ISO 5707:2010 are determined and displayed flashing.

The target values for the pulse analysis according to ISO 5707:2010.

Limping [%]	< 5,0 %
Phase B [%]	>=30,0 %
Phase D [%]	> =150ms



The measuring window is closed with .

### 6.4.3 DATA MEMORY OF PROGRAMME PULSATION

One or more saved measurements can be sent to the PC for documentation or to an external log printer. The first and last memory location to be transferred must be entered beforehand.

**TRANSFER DATA**

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**SEND FROM: 12**  
**SEND TO: 48**

**START**

**PRINT**

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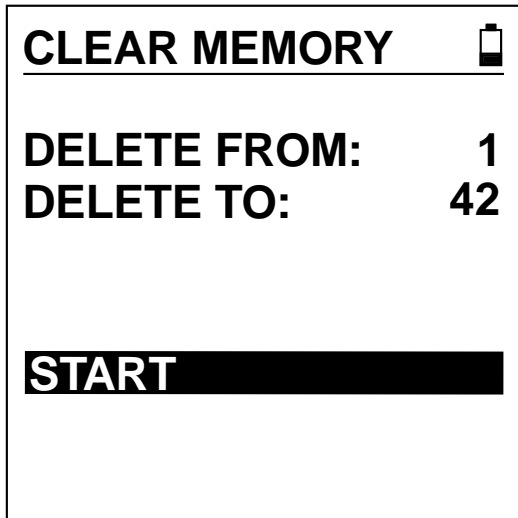
**PRINT FROM: 1**  
**PRINT TO: 4**


**START**

PC software and printer are not included in the scope of delivery of the VacuScope easy measuring device.



One or more saved measurements can be deleted in the PULSATION menu. The first and last memory location to be deleted must be entered beforehand.



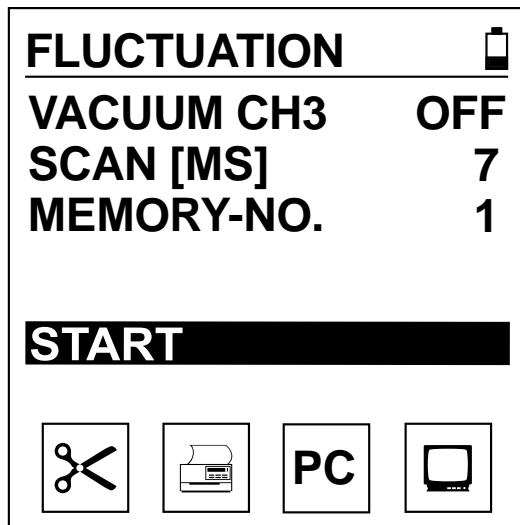
Stored data can also be shown on the display in the PULSATION menu. The set memory location can be called up with the function key .

Use the keys  and  to call up further measurements.




## 6.5 PROGRAMME FLUCTUATION

### 6.5.1 MENU FLUCTUATION

The FLUCTUATION programme is available to the user for the graphic analysis of pulsation and vacuum curves:

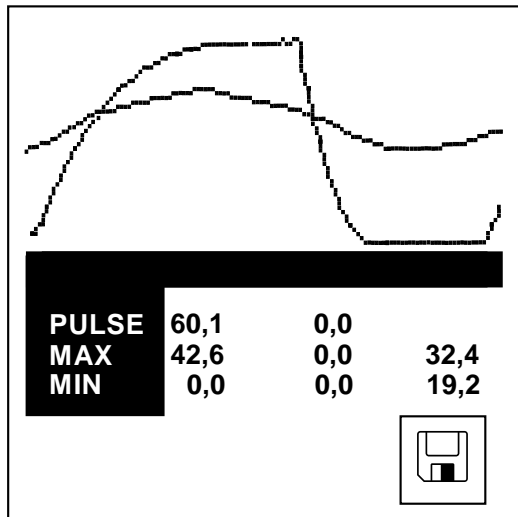


Settings and functions in the FLUCTUATION programme:

<b>VACUUM CH3</b>	Selection of an external vacuum sensor
<b>SCAN [MS]</b>	Selection of the time interval between two measuring points
<b>MEMORY-NO.</b>	Selection of the storage location for the fluctuation measurement, after saving, this value increases (+1) Setting range: 1...200
<b>START</b>	Start of the fluctuation measurement
	Delete of stored fluctuation measurements
	Print out of stored fluctuation measurements
<b>PC</b>	Data transfer of stored fluctuation measurements to the PC
	Display of stored fluctuation measurements


## 6.5.2. MEASUREMENT OF FLUCTUATION

In contrast to the PULSATION programme, the measuring parameters can be freely selected in the FLUCTUATION programme. Fluctuating vacuum conditions in the milking system can be displayed and analyzed here.




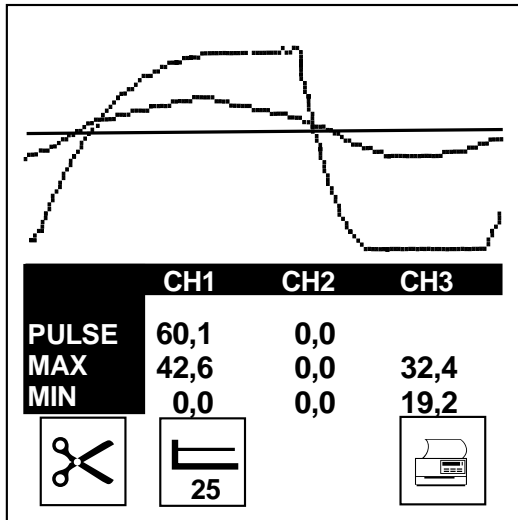
At the end of the vacuum curve, the pulse frequency is determined on channel 1 and the maximum and minimum on all connected measuring channels.

The measurements can be stored in the measurement memory.



The measuring window is closed with  .

### 6.5.3 DATA MEMORY OF PROGRAMME FLUCTUATION

Stored data can also be shown on the display in the FLUCTUATION menu. The set memory location can be called up with the function key . In this window, the graph with its measured values can be printed out and also deleted.

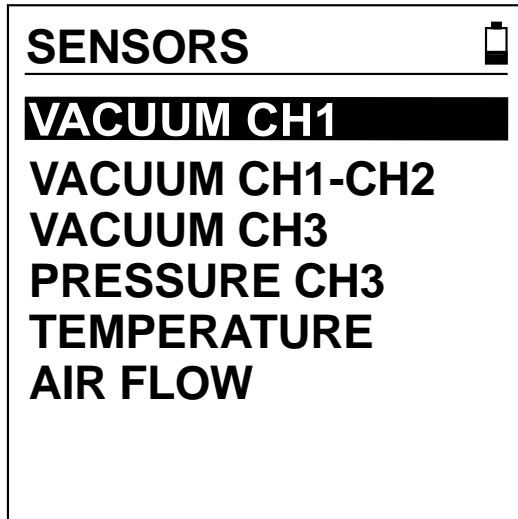


The RULER function can be used to display a selected vacuum level as a comparison.

Further measurements can be called up with the keys  and  from the data memory of the FLUCTUATION programme.

## 6.6 PROGRAMME SENSORS

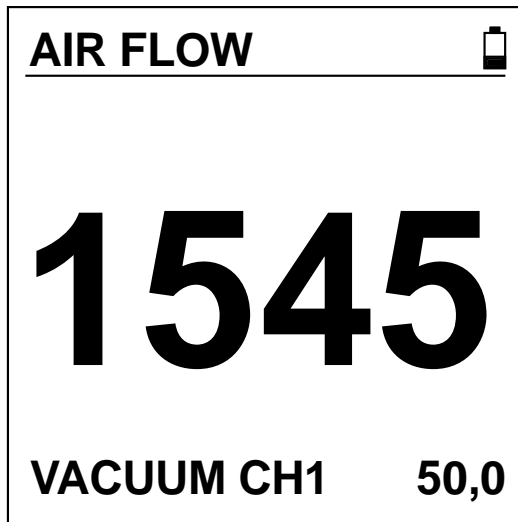
The following programmes are available for the static measurement of physical measurands using external sensors and measuring devices:



Measuring programmes in the SENSORS programme:

<b>VACUUM CH1</b>	Measuring a static vacuum value on channel 1
<b>VACUUM CH1-CH2</b>	Measuring a vacuum difference between channel 1 and 2
<b>VACUUM CH3</b>	Measuring a static vacuum value with the external vacuum sensor on channel 3
<b>PRESSURE CH3</b>	Measuring a static pressure value with the external pressure sensor on channel 3
<b>TEMPERATURE</b>	Measuring a temperature value with the external temperature sensor
<b>AIRFLOW</b>	Measuring of air flow in milking installations with the measuring devices AFM600 and AFM3000

In the SENSORS menu, for example, the airflow measurement is displayed as follows:



Airflow [l/min]

Working vacuum connected to channel 1

Sensors and air flow meters are not included in the scope of delivery of the VacuScope easy measuring device.