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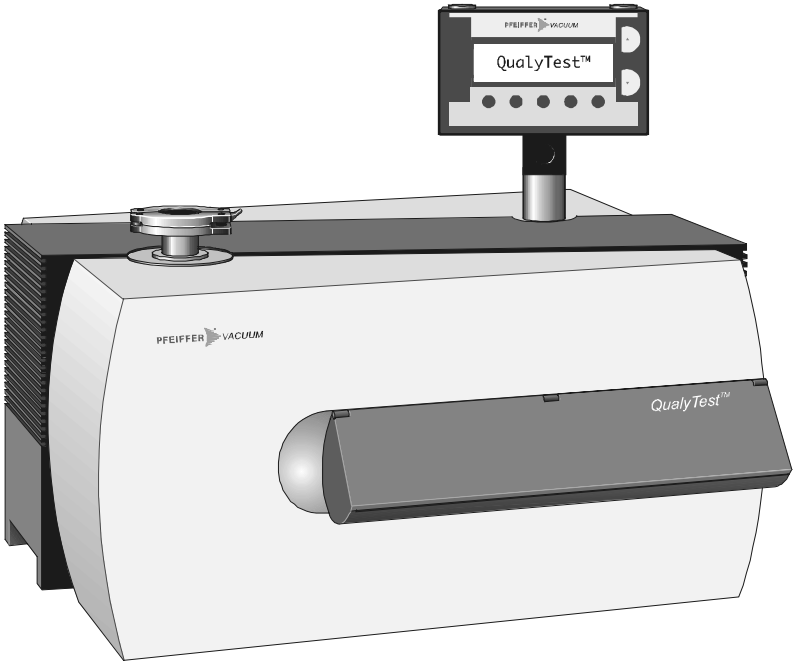
Operating manual
incl. Declaration of conformity

PFEIFFER VACUUM

QualyTest™
QualyTest™ Select
QualyTest™ Dry
QualyTest™ Dry+

Helium leak detector

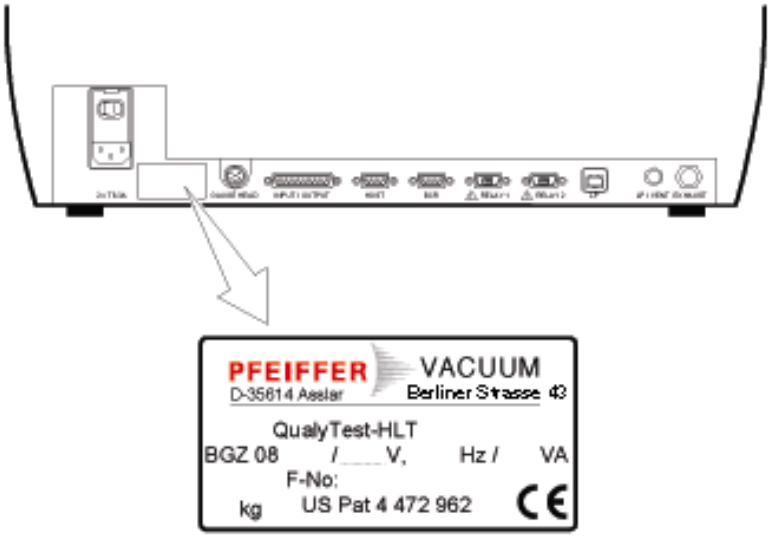
HLT 260
HLT 265
HLT 270
HLT 275



CE

Product identification

In all communications with Pfeiffer Vacuum please specify the information given on the product nameplate. For convenient reference copy that information into the replica below.



Validity

This document applies to products with part number

QualyTest™

BG Z08 000	(HLT 260, 230 VAC, with rotary vane pump UNO 005 A)
BG Z08 001	(HLT 260, 120 VAC, with rotary vane pump UNO 005 A)
BG Z08 002	(HLT 260, 100 VAC, with rotary vane pump UNO 005 A)
BG Z08 050	(HLT 260, 230 VAC, OEM-Version, with rotary vane pump UNO 005 A); without RC
BG Z08 060	(HLT 260, 120 VAC, OEM-Version, with rotary vane pump UNO 005 A); without RC

QualyTest™Select

BG Z08 020	(HLT 265, 100 … 230 VAC, with roughing pump supplied by end-user)

QualyTest™Dry

BG Z08 010	(HLT 270, 230 VAC, with diaphragm pump MVP 035)
BG Z08 011	(HLT 270, 120 VAC, with diaphragm pump MVP 035)
BG Z08 012	(HLT 270, 100 VAC, with diaphragm pump MVP 035)

QualyTest™Dry+

BG Z08 015	(HLT 275, 230 VAC, with Cart for QualyTest™ and scroll pump TS 600)
BG Z08 016	(HLT 275, 100 … 120 VAC, with Cart for QualyTest™ and scroll pump TS 600)

The part numbers can be taken from the product nameplate.

This document is based on the following firmware versions

3.0	Basic unit (MC 68)
3.0	Removable control display (RC 260)

If the unit does not work as described check that your unit is equipped with this firmware version (→ 🗎 38).

We reserve the right to make engineering changes without notice. The illustrations are not to scale.

Trademarks

QualyTest™	INFICON AG Liechtenstein
Twin-Flow™	INFICON AG Liechtenstein

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For references to pages within this document the symbol (→ 🗎 XY) is used, for references to other documents the symbol (→ 🕮 [Z]).

1 Safety

1.1 Introduction

This chapter describes the safety requirements that must be respected in the utilization of the QualyTest™ helium leak detector.

All persons who work on or with the leak detector must read and understand the chapters that are relevant to their work. This applies in particular to this chapter which is binding for all persons and all activities.

1.2 Conforming utilization

The QualyTest™ helium leak detectors are intended for measuring and locating small and very small leaks on components and assemblies as well as apparatus and systems. They are suitable for negative pressure leak detection (vacuum method with or without split flow mode) as well as positive pressure leak detection (sniffing mode).

The QualyTest™ helium leak detectors may only be used for leak detection in conjunction with the gases specified in the "Technical data".

The QualyTest™ helium leak detectors are specifically designed for industrial applications and are used for

- quality control in manufacturing processes
- quality control of production systems
- service applications.

Confirming utilization also comprises

- adherence to the "Technical data"
- utilization of standard and original accessories
- compliance with this document and adherence to the instructions and rules contained therein.



DANGER

Caution: mechanical destruction

If liquid penetrates into the vacuum system there is risk of mechanical destruction.

Make sure that no liquids penetrate into the system.



DANGER

Caution: danger of injury

Although this unit is characterized by high quality and safety standards and has been built and tested in accordance with state-of-the-art engineering principles, bodily injury and property damage cannot be precluded if the unit is used in a non-conforming manner or in violation of the instructions in this document.

Carefully read this document and pay particular attention to the chapter "Safety". Keep this document within easy reach of the equipment.

1.3 Personnel

Operating personnel

The operating personnel may use the QualyTest™ helium leak detector in normal operation. Normal operation is ***explicitly limited*** to the following activities:

- operation
- maintenance and care as described in this document

Maintenance personnel

The maintenance personnel may operate the QualyTest™ leak detector in normal mode and in addition perform maintenance work to keep the equipment in proper operating condition (→ 🕮 [2]).

Only persons who have been instructed by an employee of Pfeiffer Vacuum or by an experienced, responsible employee of the end-user may perform maintenance work on the QualyTest™ leak detector.

Service personnel

The service personnel may operate the QualyTest™ leak detector in normal mode, and perform maintenance as well as service work (→ 🕮 [2]).

Service work on the QualyTest™ leak detector may be performed ***only*** by trained employees of Pfeiffer Vacuum or employees of the end-user with equivalent training.

For work on electrical components formal training as a master electrician or comparable vocational training is required.

1.4 Symbols used

The following header bars followed by explanatory text are used to alert to residual hazards in conforming utilization of the equipment and to emphasize important technical requirements.



DANGER

Information on preventing any kind of physical injury



WARNING

Information on preventing extensive equipment and environmental damage



Note

Information on correct handling or use. Failure to follow the instructions can lead to malfunctions or minor equipment damage.



Skilled personnel

Work marked with this symbol may only be performed by persons who have completed suitable technical training and possess the necessary experience.

1.5 Liability and warranty

Pfeiffer Vacuum assumes no liability and the warranty becomes null and void if the end-user or third parties

- use the product in a non-conforming manner
- disregard the technical specifications
- make any kind of interventions on the product (conversion, modifications etc.)
- use the product with accessories that are not listed in the corresponding product documentation.

1.6 General safety rules

Statutory regulations

In addition to this document the generally applicable statutory rules and other binding regulations on accident prevention and environmental protection shall be followed.

These regulations may govern aspects such as handling of toxic substances or provision/wearing of personnel protection gear, etc.

Assumed risk

If there are reasons to believe that safe operation of the equipment is no longer possible, the unit must be shut off and protected against being inadvertently turned on again.

This may, for example, be the case

- if the unit is visibly damaged
- if liquids have penetrated into the equipment
- if the unit does not function correctly
- after prolonged storage under unfavorable conditions
- after serious transportation stress.

Power connections, protective ground

Before the equipment is connected, make sure that its electrical rating conforms to the local line voltage.

The power plug may only be inserted into an AC outlet with protective ground.



DANGER

Caution: line voltage

Improperly grounded products can be extremely hazardous in case of malfunction.

Connect and correctly ground the product in accordance with local regulations. Interruption of the protective ground inside or outside the unit is inadmissible.

Installation of protective devices

Under certain circumstances an exhaust gas line must be installed (→ 🗎 20).

Misuse of protective devices

Only fuses of the correct type and rating may be used as replacements.

Opening the unit

DANGER

Caution: dangerous voltages, hot parts and rotating components

After removal of the housing shell there is risk of fatal or serious injury.

For the purpose of the work described in this document the housing shell must not be removed.

Return for repair

A completed and signed "Declaration of contamination" (→ 🗎 65) must be submitted with each product returned for repair.

If the unit is not clearly declared as "free from harmful substances" it will be decontaminated at the expense of the customer.

Spare parts

Only the original spare parts may be used for repairs (→ 🕮 [2]).

1.7 Supplied Equipment

The following equipment is supplied:

- leak detector HLT2xx
- remote control RC260
- extension for the RC260 (see compartment for accessories)
- power-subcon; relay-connector
- hoodfor power-subcon; relay-connector
- connector: vent line; sniffer probe
- filter mat ventilator; 500µm
- main cord
- set socket wrench
- 2x fuse T 0,315 A; I/O-board/wiring-board
- 2x fuse T 10 A; main fuse
- 2x fuse T 0,8 A; I/O-board
- 1x fuse T 0,032A; MSV-board
- 1x fuse T 1,0 A; MSV-board
- 1x fuse T 2,0 A; MSV-board
- 1x fuse T 3,15 A; MSV-board
- 1x fuse T 4,0 A; wiring-board
- documentation

2 Technical data

2.1 General

Dimensions	
with removable control display	548×420×457 mm (L×W×H)
without removable control display	548×420×360 mm (L×W×H)
Weight	44 kg HLT 260, HLT 270 34 kg HLT 265 150 kg HLT 275 with cart and pump
Max. permissible acceleration in operation	1 G (horizontal)
Test port	DN 25 ISO-KF
Cooling air	
inlet	on the underside with dust filter
outlet	on the side
Exhaust port	for hose ø8/6 mm
Connection for external roughing pump	DN 16 ISO-KF
Vent port (N_2)	sniffer line connection for hose ø6/4 mm
Standards and guidelines	"Declaration of conformity" → 🗎 66
Protection	IP 40
Pollution degree	2 (EN 61010)

2.2 Power connection

Voltage / frequency	230 V ±10% / 50 Hz 120 V ±10% / 60 Hz 100 V ±10% / 50/60 Hz
Protection class	1
Overvoltage category	II
Current	<10 A
Power consumption	<400 VA (HLT 260) <150 VA (HLT 265) <300 VA (HLT 270) <800 VA (HLT 275)
Fuses	2 pieces 10.0 AT (slow), 250 V, ø5×20 mm

2.3 Environmental data

Temperature	
storage	–10 °C … +70 °C
operation	+10 °C … +35 °C (HLT 260) +10 °C … +35 °C (HLT 265) +10 °C … +35 °C (HLT 270, HLT 275)
Relative humidity	max. 80% up to +31 °C, decreasing to 50% at +40 °C
Utilization	indoors only altitude up to 2000 m NN
Noise level	<70 dB/A (according to IEC standard)

2.4 Measurement

	Operating modes	vacuum / sniffing
	Ready for operation	≤3 minutes (pump acceleration time)
	Inlet pressure	≤18 mbar (short time up to 25 mbar)
	Filaments	2 (iridium yttriated)
	Filter stages	none, high, ultra median low, median high
	Measurement rate	20 Hz
	Display refresh rate	3 Hz
	Alarm acoustic / volume setpoint / warn limit relay output	} adjustable
	Screen display	leak rate vs. time, analog / digital, statistics
Vacuum method		
	Lowest detectable leak rate	according to AVS 2.1
	^4He, ^3He	$<5\times10^{-12}$ mbar l/s
	H_2	$<5\times10^{-8}$ mbar l/s
	Highest detectable leak rate	
	^4He, ^3He	1 mbar l/s
	H_2	1×10^{-2} mbar l/s
	Measurement range	10^{-12} … 1 mbar l/s
	Displayable units of measurement	mbar l/s, Pa m³/s, sccm, sccs
	Detectable gases	^4He, ^3He, H_2
	Response time (63% of signal)	<0.3 s
	Pumping speed for helium	>2.1 l/s at p_{Inlet} < 0.5 mbar
	Pumping speed at inlet with large roughing pump (with HLT 265)	depending on external pump
	Pumping time for high sensitivity	
	with volume of 0.5 l	2 s (HLT 260, HLT 270)
	with volume of 10 l	70 s (HLT 260) 200 s (HLT 270)
	with volume of 100 l	700 s (HLT 260) 2100 s (HLT 270)
	Pumping time to first measurement	
	with volume of 0.5 l	2 s (HLT 260, HLT 270)
	with volume of 10 l	45 s (HLT 260) 135 s (HLT 270)
	with volume of 100 l	500 s (HLT 260) 1300 s (HLT 270)
	Internal calibrated leak	→ inside of cover of compartment for accessories
Sniffing method		
	Lowest detectable leak rate	according to AVS 2.1
	^4He, ^3He, H_2	$<5\times10^{-8}$ mbar l/s
	Highest detectable leak rate	
	^4He, ^3He	1 mbar l/s
	H_2	1×10^{-2} mbar l/s
	Measurement range	5×10^{-8} … 1 mbar l/s
	Displayable units of measurement	mbar l/s, Pa m³/s, ppm, sccm, sccs, g/a, oz/y
	Detectable gases	^4He, ^3He, H_2
	Response time	<1 s with 3 m sniffer line

2.5 Interfaces

Pin assignments and details → 🗎 58.

2.6 Removable control display RC 260

Dimensions	180×46×140 mm (L×W×H)
Action radius with extension cable	6 m (standard cable) up to 100 m (accessories → 🗎 57)
Display	LCD with backlight
Headphones connection	jack plug ø 3.5 mm
Keylock switch	disables calibration and saving of parameters

2.7 Roughing pumps

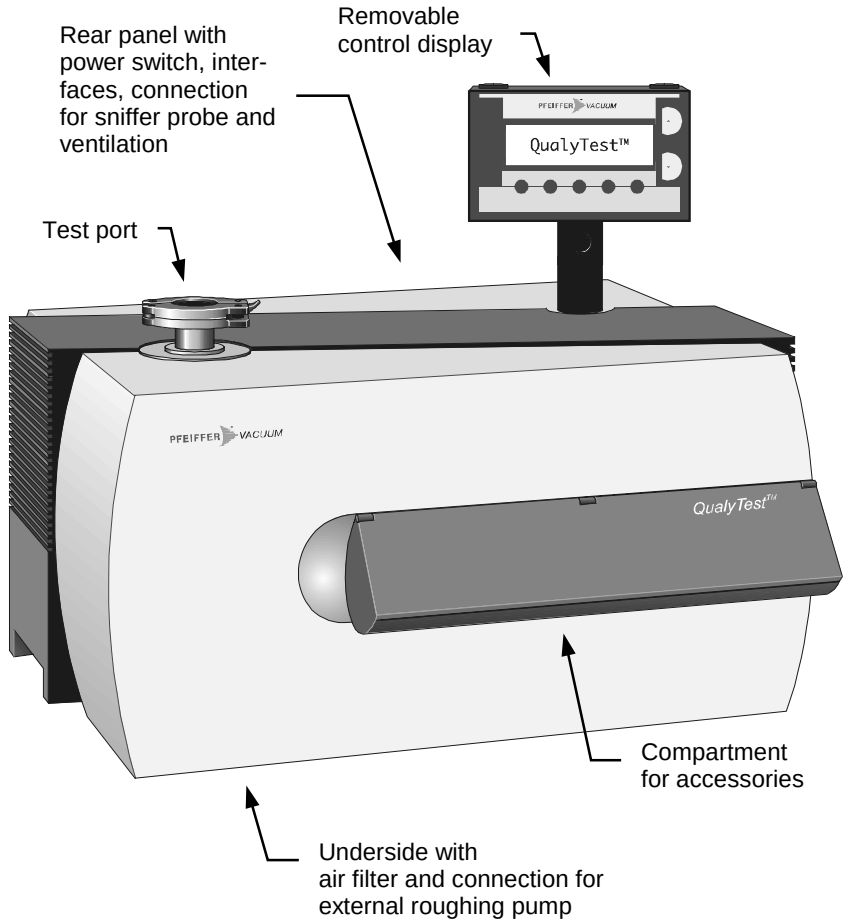
HLT 260	Pfeiffer Vacuum UNO 005 A	single-stage rotary vane pump, oil-immersed
	Pumping speed	4 m³/h at 50 Hz, 5 m³/h at 60 Hz
HLT 265	To be supplied by the end-user	
HLT 270	Pfeiffer Vacuum MVP 035	two-stage diaphragm pump, oil-free
	Pumping speed	1.3 m³/h at 50 Hz, 1.5 m³/h at 60 Hz
HLT 275	Varian Triscroll TS 600	two-stage scroll pump, oil-free
	Pumping speed	25 m³/h at 50 Hz, 30 m³/h at 60 Hz

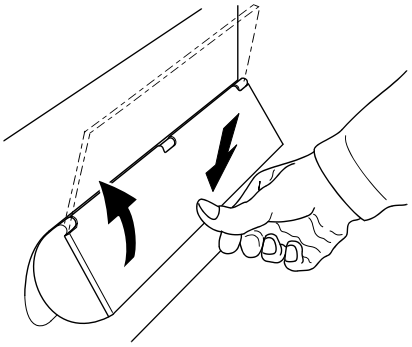
2.8 Turbo pump

Pfeiffer Vacuum TMH 071	turbomolecular pump with intermediate suction
Pumping speed for N_2	60 l/s

3 Description

The QualyTest™ helium leak detectors are microprocessor-controlled units. All internal processes are controlled automatically.





Open the compartment by depressing the center of the cover.

Configuration stages

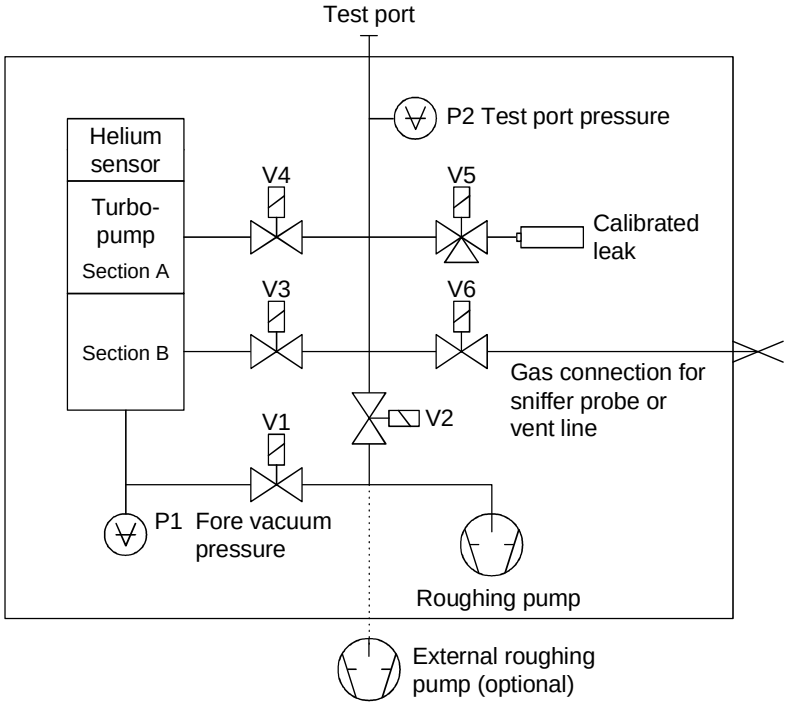
Depending on the application, the basic QualyTest™ unit is extended with

- an external roughing pump
- a transport cart (→ 🕮 [4]).

3.1 Measurement system

The measurement system comprises (simplified)

- a test port
- a roughing pump
- a turbomolecular pump
- a number of valves
- a helium sensor.



The test object is flanged to the test port. V1, V2, V3 and V4 connect the test object to the helium sensor without ever creating an operating state that is not suitable to the helium sensor.

For calibration a calibrated leak can be activated with valve V5.

Valve V6 is used for venting so that the test object can be removed again. This port is also used for connecting the sniffer probe.

All valves open electromagnetically and close with spring force.

Gauge P1 measures the fore vacuum pressure, P2 the test port pressure.

3.2 Detection principles

Counter flow

The test object is connected to the roughing pump via valve V2. At a pressure of $p2 \leq 15$ mbar[*)] valve V1 to the turbo pump opens. Helium flows through the pump sections A and B against the pumping direction to the helium sensor. Due to the mass-dependent compression capability of the two pump sections, heavy gases are kept out. The amount of helium that reaches the helium sensor depends on the pumping speed of the roughing pump and on the compression of the two pump sections.

Twin-Flow™

The gas flow from the test object enters via the test port.

- Twin-Flow™ low: at pressure $p2 < 5$ mbar[*)] V1 and V3 are open
- Twin-Flow™ high: at pressure $p2 < 0.5$ mbar[*)] V1 and V4 are open

The gas flows via pump section B to the roughing pump, and the test port is pumped to high vacuum. The pumping speed of pump section B is approximately 40 l/s. Only pump section A functions according to the counterflow principle. It allows light gases such as hydrogen and helium to reach the helium sensor because of the mass-dependent compression capability.

*) Factory settings. Other valve settings → 🗎 33.

3.3 Leak detection methods

The QualyTest™ detects leaks by measuring the test gas penetrating into or emerging from the test object.

A gas will flow through a leak only if there is a pressure difference between the inner and the outer space of the test object. For this purpose either a positive or a negative pressure is created inside the test object.

Vacuum method

In vacuum mode, test gas is blown from the atmospheric side against the wall of the test object which is evacuated. It enters the test object through leaks and reaches the leak detector.

The test object must sustain vacuum conditions.

The sensitivity stages

Counter Flow $\Rightarrow$ Twin-Flow™ low $\Rightarrow$ Twin-Flow™ high

are passed through.

The detection limit is lower than for the sniffing method. To quantify the leak rate the helium concentration at the leak must be known. In addition the equilibrium state must be awaited.

Sniffing method

In sniffing mode, the test gas reaching the atmospheric side through leaks in the test object is measured.

The test object must sustain the overpressure applied.

In operation with the sniffer probe a constant gas flow from the atmosphere is sampled. The helium content of air (5.2 ppm) causes a leak rate reading of approx. 1×10^{-6} mbar l/s which can be suppressed by the ZERO function.

For leak detection the sniffer probe is held against suspected leak locations of the test object which is under positive helium pressure. An elevated leak rate value points to a higher He concentration and consequently a leak. The higher the pressure and the He concentration inside the test object, the smaller the detectable leaks.

The sensitivity stages

Counter Flow $\Rightarrow$ Twin-Flow™

are passed through.

The sensitivity and the capacity to quantify the leak rate are less favorable than in vacuum mode.

3.4 Test gases

For reasons of economy and detection sensitivity ^{4}He (Helium with mass 4) is normally used as a test gas in leak detection. Under certain conditions, e.g. where higher ^{4}He concentrations are present at the test object, a different test gas such as ^{3}He (helium with mass 3) or hydrogen (mass 2) can be used. These gases can also be detected by the leak detector.



DANGER

Danger: explosion hazard

In combination with air, hydrogen forms a highly explosive mixture!

Great caution is required when hydrogen is used as test gas. No smoking, no open flames, avoid creation of sparks.

Note

Due to the high water content in typical residual gases the leak rate background in the measurement of hydrogen is rather high (in the range of 10^{-7} mbar l/s).

For leak detection the test gas can easily be diluted with a neutral gas such as nitrogen or argon. Particularly in the case of coarse leaks the contamination of the ambient atmosphere and possible elevation of the signal background can be reduced. The leak rate signal is, of course, lower in accordance with the test gas concentration.

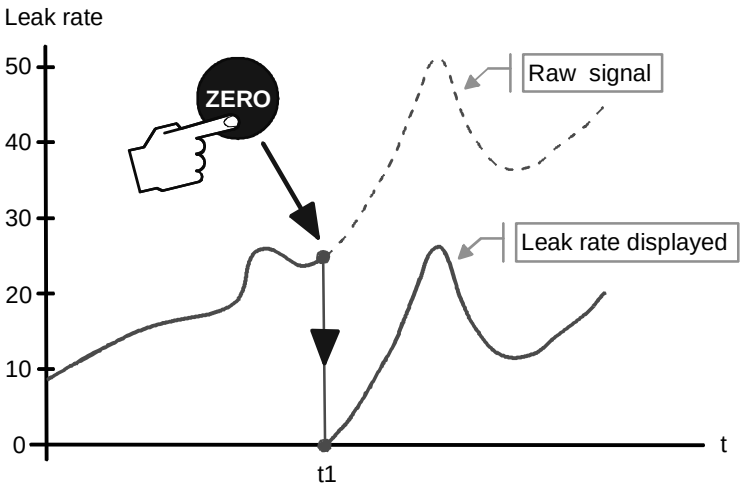
3.5 Background suppression

Depending on the measurement conditions (e.g. high helium concentration in the ambient air) the background signal may rise.

The background signal can be suppressed for easy measurement of small leaks in spite of the high background.

The suppression can be disabled or activated automatically with each START (→ 🗎 31).

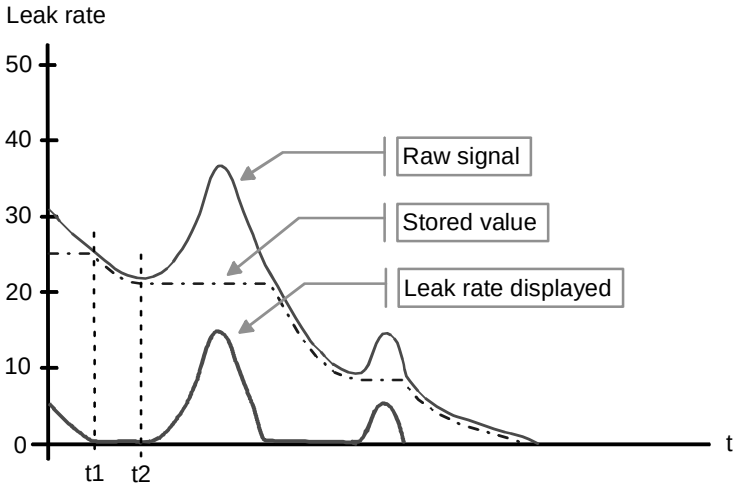
Rising background



By actuating the ZERO key (→ 🗎 17) the momentarily measured signal is stored as background signal (e.g. at time t1) and then subtracted from the succeeding values.

The status message Zero is displayed.

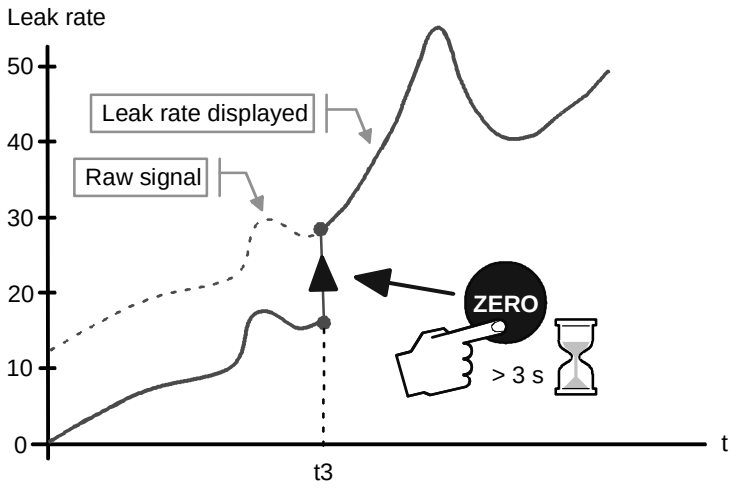
Dropping background



If the raw signal drops below the background value stored the latter is automatically set equal with the raw signal (e.g. at time t1). When the raw signal rises again (e.g. at t2), the stored background value remains constant, and rising signals are clearly indicated as leaks.

This provides for easy measurements of even very small leaks.

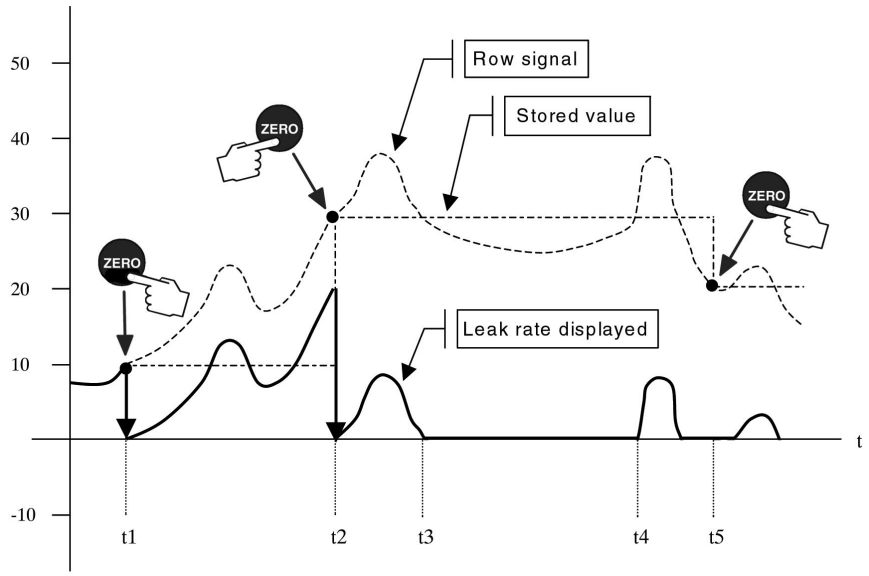
Absolute measurement



If you want to see the raw signal (including background), press the ZERO key for approximately 3 s.

The stored value is cleared (e.g. at time t3), the background signal is not suppressed any more.

Zero-constant-function



By actuating the Zero key (→ 🗎 17) the momentarily signal is stored as background signal (e.g. at time t1, t2, t5) and then subtracted from the succeeding values/Row signals.

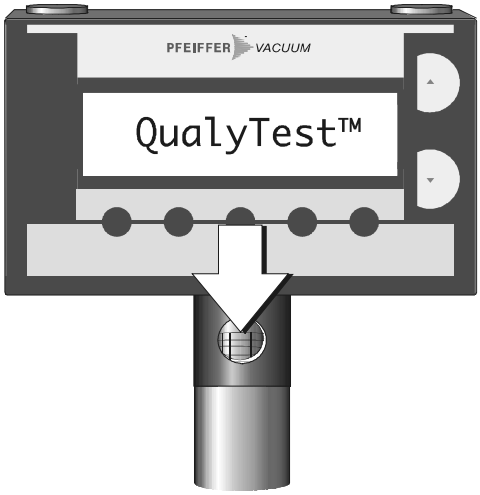
The status message Zero is displayed.

The automatic background suppression is disabled. The Zero value will also be stored after pressing Stop. A new pressing of the “Zero” key overwrites the stored Zero value/background signal. The Zero value will be set to “0” in case of “Power Off” and changing the Zero-Function.

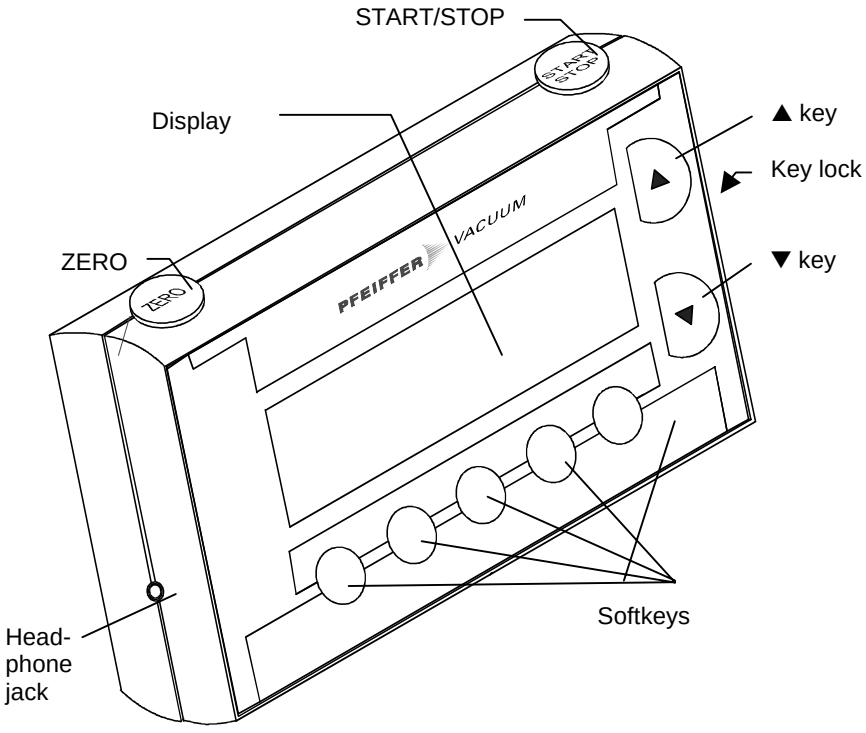
If the row signal is lower then the stored background signal (See time: t3 to t4), it won’t be evaluated only the lowest detectable Leak rate is displayed.

4 Operator controls

The removable control display RC 260 is the display, operating, and control unit of the leak detector. It can be rotated on its stand. For enlarging the action radius it can also be removed.



1. Press down the slide.
2. Detach by pulling upwards.
3. Connect, using the supplied spiral cord or the optional extension cable(s) (→ 🗎 57).



START/STOP key

The measurement is started or stopped by pressing the START/STOP key.

ZERO key

ZERO (or the corresponding key on the sniffer probe) activates the background suppression.

Softkeys

The function of these keys depends on the current operating state. The current key function is shown in the display.

Display	The display shows the measured values, operating modes, parameters and their settings, and the meaning of the softkeys.
▲ and ▼ keys	Use these keys for stepwise modification of parameters. Prolonged pressing automatically scrolls the values.
Keylock switch	With the laterally mounted keylock switch the storing of parameters, the calibration and clearing of the graphical or statistical display can be inhibited.
Audio alarm	The acoustic alarm informs about the measured leak rate by means of its interval (bargraph; → 🗎 32). This greatly simplifies the leak detection because it is not necessary to continually observe the leak rate display. Moreover, the audio alarm serves as warning and error indication (continuous signal).
Headphones jack	Jack socket for connecting the headphones. For convenient operation in an environment with a high noise level.

5 Putting the product into service

5.1 Set-up, installation

DANGER



>25 kg

Caution: heavy load

Physical injury may result if the product is carried by only one person.

The product must be carried by two persons.

Note

Please refer to section "Technical data" for admissible ambient temperature, protection, voltages, maximum acceleration of the unit in operation, etc.

5.1.1 Unpacking

The leak detector is shipped as fully operational unit in a special packing.

Note

Before you unpack the product inspect the packing for possible damage. If any damage is visible on the packing or on the product itself a damage claim must be made immediately with the responsible shipping company.

It is advisable to save the special packing material. For transport over long distances or for return of the leak detector for service, the original packing material offers the best protection.

Note

Applies only to type HLT 260.

The pump (filled with oil) may be tilted by maximum 90 ° and in operation by maximum 10 °.

5.1.2 Transport fixing parts

If your QualyTest™$_{Dry}$ (HLT 270) carries a sticker "Transport fixing parts" at the underside, please remove the two hexagon socket screws (key 5 mm) near the sticker.

Store them in the compartment for accessories.

Reinstall the screws for transportation.

5.2 Installing an external roughing pump

QualyTest™$_{Select}$

The external roughing pump has to be connected on the underside via the DN 16 ISO-KF flange (→ "Accessories" 🗎 57).

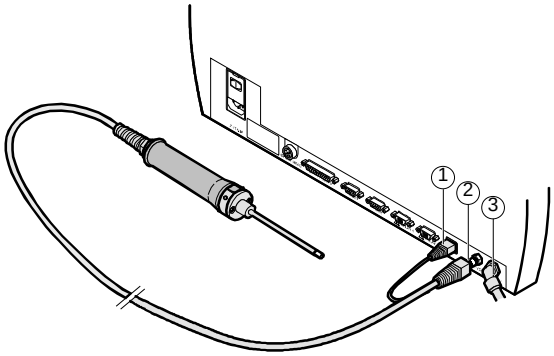
All other QualyTest™ types

If objects with large volumes need to be tested an additional roughing pump can be connected via the DN 16 ISO-KF flange on the underside (→ "Accessories" 🗎 57).

5.3 Installation of the accessories

5.3.1 Sniffer probe

For sniffing mode plug in the sniffer probe as shown.



① Electrical connection for sniffer probe

② Gas connection for sniffer probe or vent line (nipple for hose ø6/4 mm)

③ Exhaust port (¼" quick release coupling for hose ø8/6 mm)

Note

For vacuum mode the sniffer probe must be disconnected, its port is used for venting.

5.3.2 Exhaust line

DANGER

Caution: vapors and exhaust gases

Vapors and exhaust gases emitted by oil immersed pumps can be detrimental to health.

For operation in poorly vented rooms, depending on the application and gases used, an exhaust line may have to be connected at port ③.

As an oil immersed pump is incorporated in the HLT 260, oil vapors may be generated when high pressures are continually pumped.

5.3.3 Vent line

Specific gases for venting the test objects – e.g. argon or dry nitrogen – can be connected to port ②.

The overpressure at the port must not exceed 0.2 bar.

5.4 Power connection

Note



Caution: power ratings

Before connecting the unit make sure that it is rated for the local line voltage. You find the ratings on the nameplate on the back of the unit.

DANGER



Caution: mains voltage

Incorrectly grounded products can be extremely hazardous in the event of a fault.

Use only a 3-conductor power cable with protective ground. The power connector may only be plugged into a socket with a protective ground. The protection must not be nullified by an extension cable without protective ground.

6 Operation

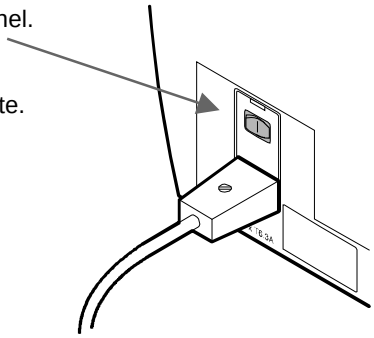
6.1 Power ON and OFF

Check that all cables and accessories are correctly installed and that the "Technical data are respected".

The power switch is located at the rear panel.

Turn the unit on.

It can be turned off anytime and in any state.
The current parameters remain stored.



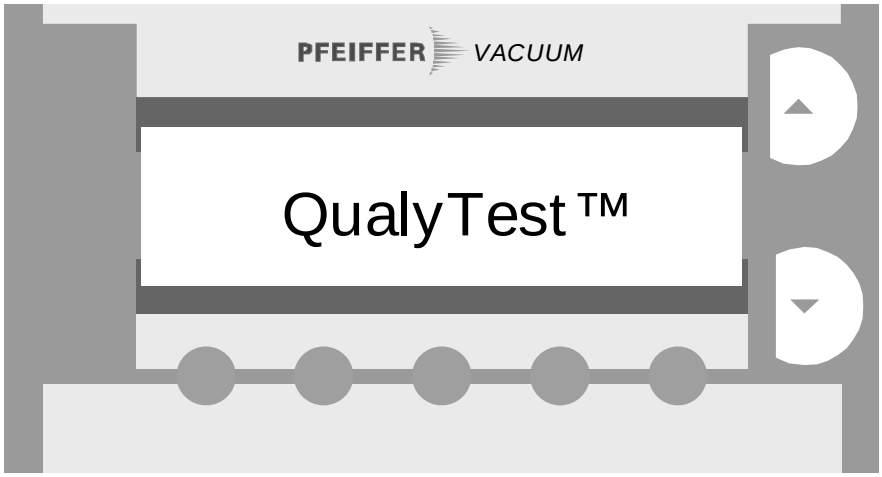
WARNING

Caution: jerks and jolts

Jerks and jolts during operation can damage the turbo pump.

Avoid shocks and vibrations (e.g. moving over cables, door sills) during operation and up to 4 minutes after power off.

After switching on, the equipment designation is displayed and a self-test is performed.

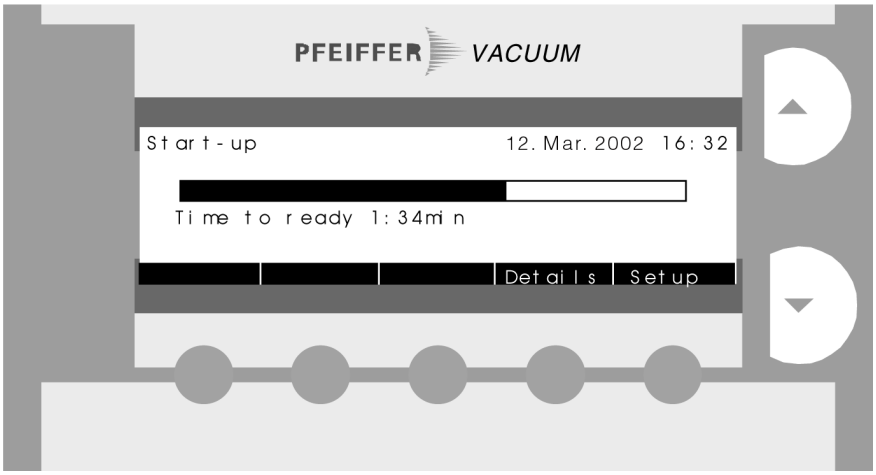


After completion of the self-test, the message "QualyTest ™" is displayed.

Note

For high precision measurement or calibration, the QualyTest™ should be allowed to warm up for at least 30 minutes.

Acceleration of the turbomolecular pump begins. It takes 2 to 3 minutes, and the progress is shown by the bargraph.



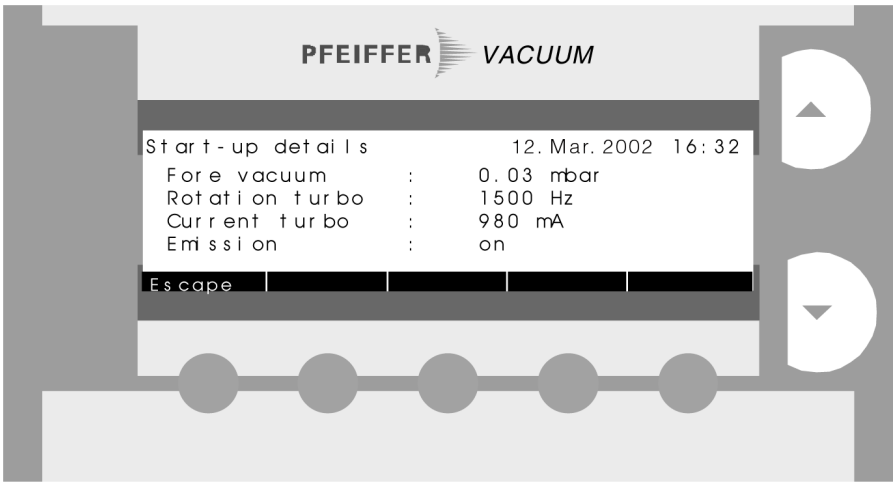
Parameter setup

Press the Setup softkey to display the Setup main menu which allows for parameter setting (→ 🗎 28).

Startup details

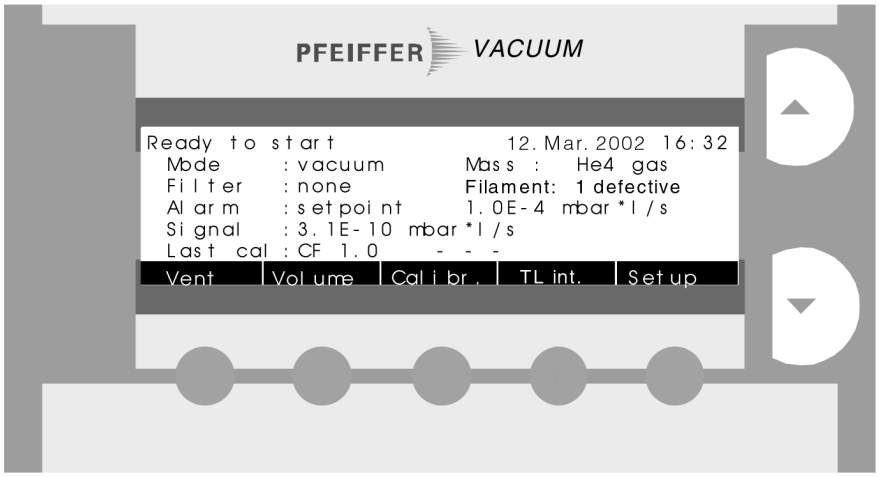
The Details softkey calls the menu Startup details with

- currently attained fore vacuum pressure
- rotational speed of the turbomolecular pump
- current consumption of the turbomolecular pump
- emission status.



Press Escape to return to the Start-up display.

After the acceleration, the display changes automatically to Ready to start , unless you have selected Setup or Details.



The unit now displays the following parameters:

12.Mar.2002	Current date and time
Mode	Operating mode (vacuum or sniff)
Mass	Gas type (He4, He3, H2)
Filter	Filter stage (none, high, ultra, median low, median high)
Alarm	Alarm type (bargraph, setpoint)
Signal	Current background signal
Last cal	Date of the last calibration and calibration factor of Twin-Flow™ high (Twin-Flow™ low in Mode: sniff). The advice (calibration necessary) indicates that the filament has been switched over (→ 🗎 38), or no calibration has been made after “Load default” (→ 🗎 40). After calibration (→ 🗎 46).this advice disappears.
Filament	1(2) defective. Appears only when one of the both filaments is defective. This advice is visible up to exchanging of the filaments.

The Vent softkey is only activated, if Vent on stop is set to no (No venting upon STOP) in the "Valve settings" (→ 🗎 33).

The Calibr. softkey can be deactivated by the keylock.

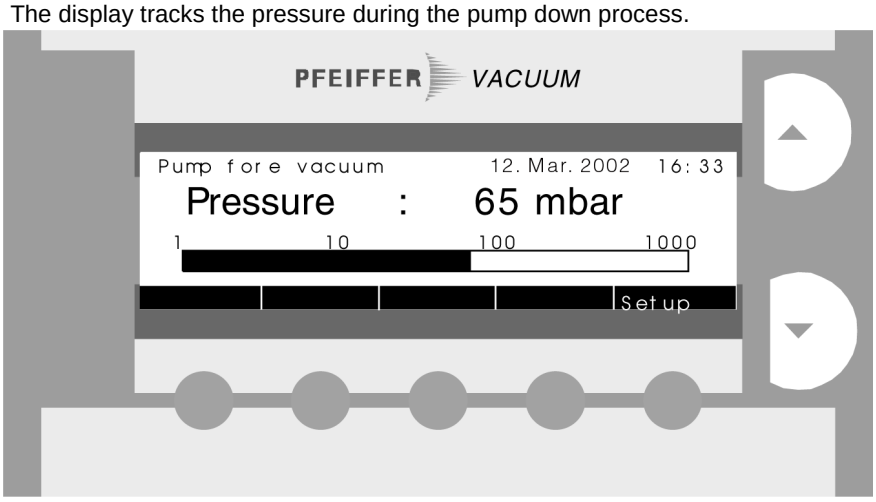
Softkey TL int. (→ 🗎 51)

6.2 Measurement

The leak detector is ready for operation as soon as Ready to start menu is displayed.

- Select the desired measurement mode (→ 🗎 29):
  Mode : vacuum or sniff.
- Check that the connections for the desired leak detection method are correctly made and that they are tight.
- Check that the parameters shown in the start menu are correct.
- To start the pump down process press the START/STOP key on the removable control display.

The display tracks the pressure during the pump down process.

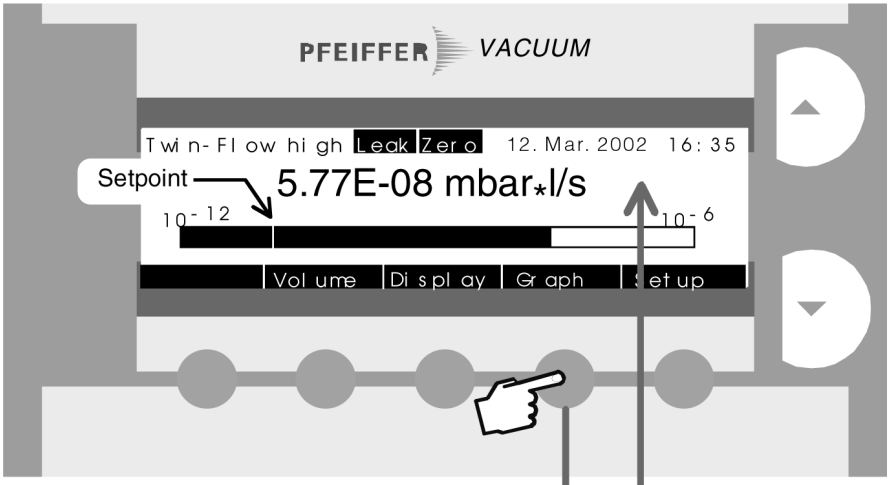


6.2.1 Measurement display

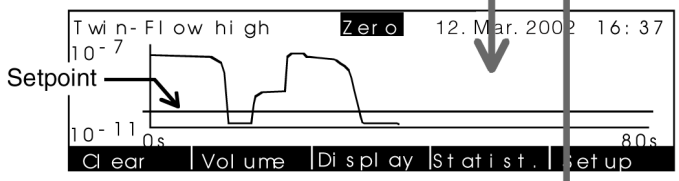
After the measurement pressure has been attained the measurement display appears in the same mode as used before:

- analog/digital with bargraph and large digits or
- graphical as a function of the measurement time or
- statistical as column chart with up to 99 measured values according to the settings made in "Statistics" (→ 🗎 34)

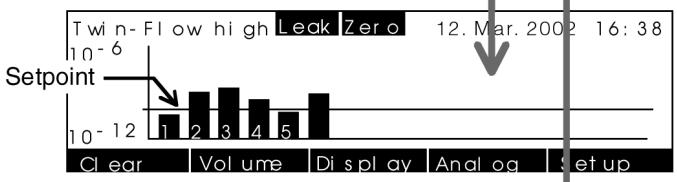
Analog / digital display



Graphical display



Statistical display



- The alarm-setpoint is visible in all display modes, if Alarm / Mode is set to setpoint (→ 🗎 32) and the value is within the range displayed.

- Leak appears when the alarm setpoint is exceeded.
- Zero appears when the background suppression is active (→ 🗎 15).
- Clear clears the values displayed and restarts the measurement (suppressable by keylock).
- With Display you can select the menu Display settings (→ 🗎 26).
- Press Volume to adjust the volume of the audio alarm (→ 🗎 27).

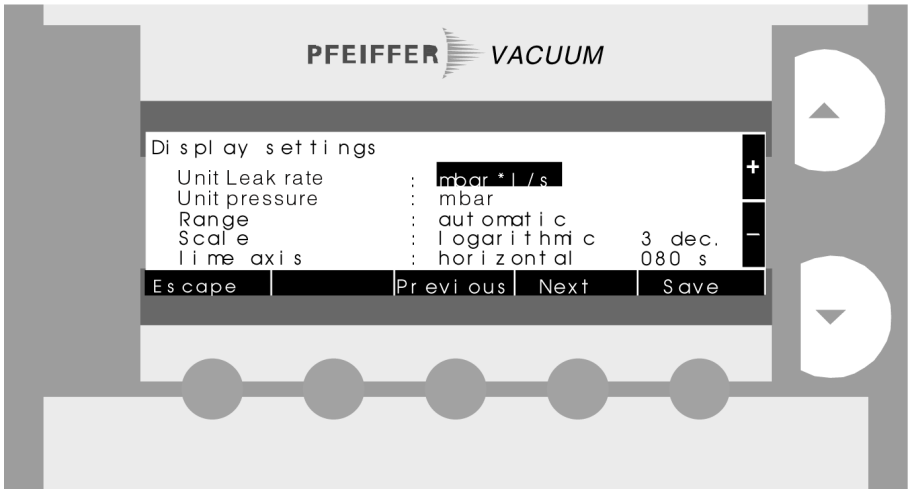
6.2.2 Measuring range

You can select the measuring range by means of the ▲ and ▼ keys.

However, if Range : automatic is selected (→ "Display settings"), the range will be adapted to the measured signal again in order to keep the signal within the range displayed.

6.2.3 Display settings

Press the Display softkey in one of the measurement displays.



- Select the desired parameter by pressing the Next or Previous softkey.
- Change its value using the ▲ and ▼ keys.
- With Save you store the new value, with Escape you return to the measurement mode without storing.

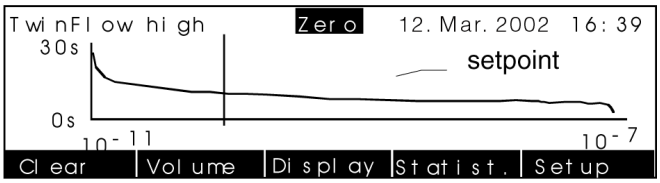
Save can be suppressed with the keylock.

Parameter	Settings	Explanation
Unit leak rate	mbar∗l/s	Customary for gas flow (pressure × volume per second). Vacuum and sniffing mode.
	Pa∗m3/s	As above, with SI units.
	sccm	Standard cm^3 per minute. Usual for process gas flow. Vacuum and sniffing mode.
	sccs	Standard cm^3 per second. Vacuum and sniffing mode.
	ppm	Concentration. Only in sniffing mode.
	g/a	Gas loss in grams per year. Only in sniffing mode.
	oz/y	As above in ounces per year. Only in sniffing mode.
Unit pressure	mbar	Customary for pressure Vacuum and sniffing mode
	Pa	As above, with SI units
Range	automatic	Automatic range selection.
	manual	Manual range selection.

Parameter	Settings	Explanation
Scale	linear	Linear display.
	logarithmic	Logarithmic display.
dec.	1 ... 9	Number of decades in log. display.
Time axis	horizontal 42 ... 420s	Horizontal time axis, time scale.
	vertical 6 ... 60s	Vertical time axis, time scale (for graphical display only).

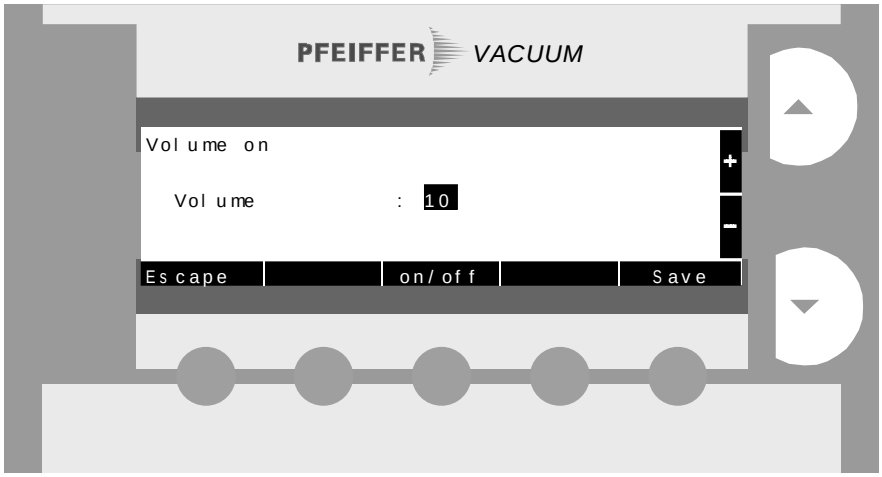
Vertical time axis

Graphical display with vertical time axis



6.2.4 Volume

Press the Volume softkey, for instance, in the measurement display.

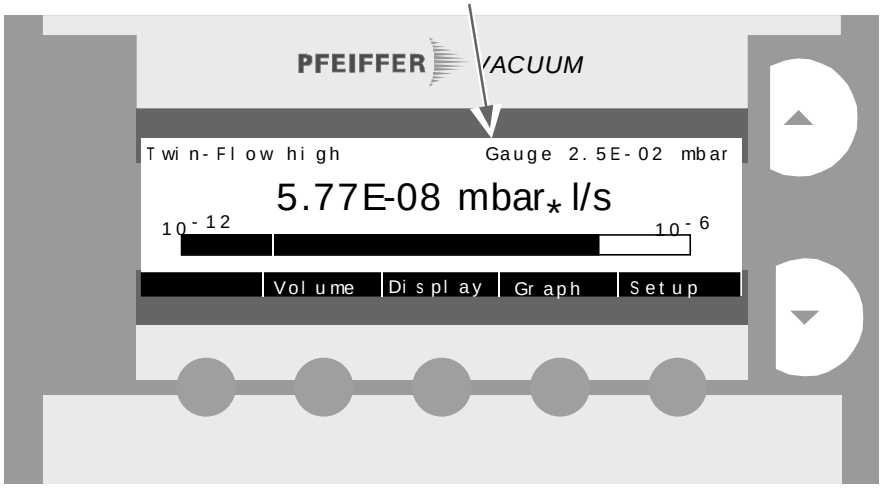


Parameter	Settings	Explanation
Volume	01 ... 10	Set the value with ▲ and ▼.
	on/off	Switch the sound on/off.

Press Escape to get back to the previous display.

6.2.5 Compact Gauge

If a Compact Gauge is connected and its display function is switched on (→ 🗎 42), its measured value appears instead of date and time.



6.2.6 Printing measured values

The measured values can be output (only in display mode Statistic (→ 🗎 34)) on a printer connected to the HOST or BCR connector (→ 🗎 45).

6.2.7 Stopping the measurement

By actuating the START/STOP key again, the measurement is stopped. The valves at the test port are closed and the test port is vented.

Venting upon STOP can be prevented (→ 🗎 33).

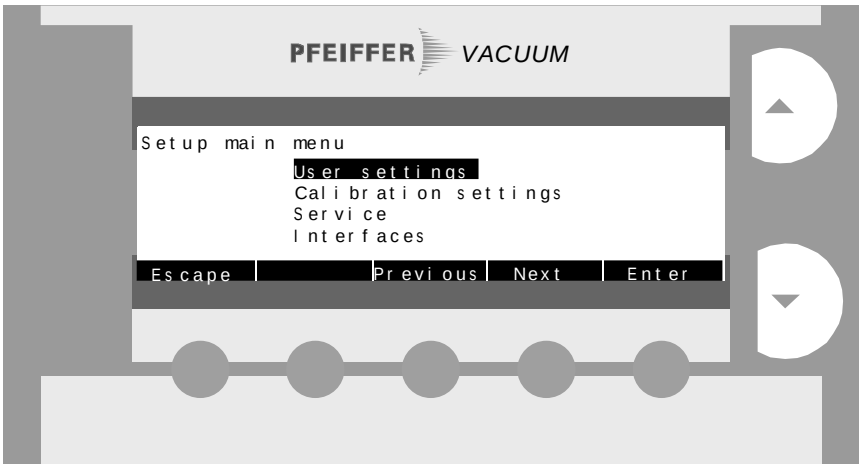
6.3 Setup

Select the Setup main menu by pressing the Setup softkey in each menu which contains it.

Note

Note the details on the keys given in the next two chapters. Later only menus, parameters and value tables are described.

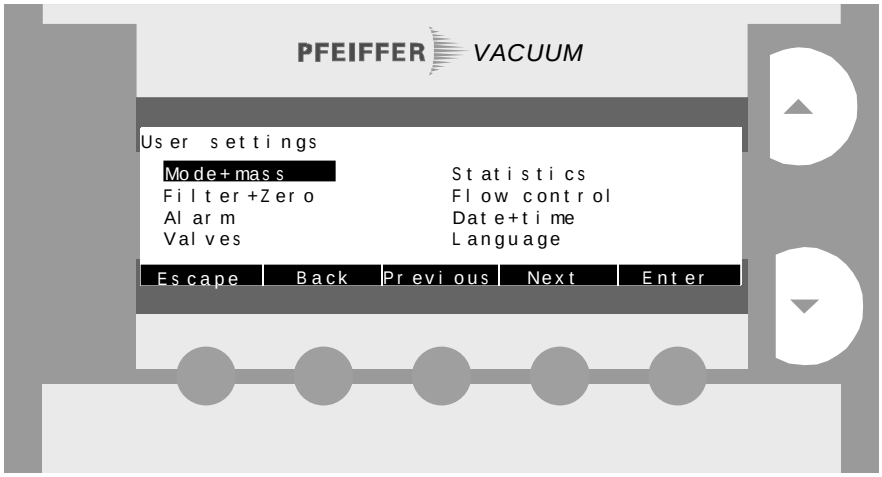
The green sheet in the middle of this manual gives an overview of the complete menu structure.



- Use the Previous and Next softkeys to select one of the four parameter groups. Prolonged pressing scrolls the selection.
- Press the Enter softkey to go to the selected group or
- Go back to measurement display by means of the Escape softkey.

6.3.1 User settings

Select Setup ⇨ User settings.

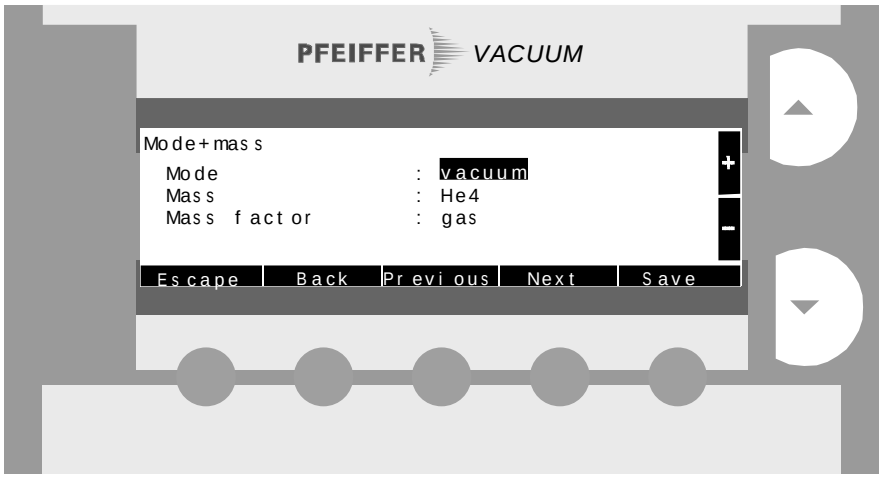


Eight submenus are displayed.

- Use the Previous and Next softkeys to select the desired menu.
- Press Enter to open the selected menu or
- Go back to the previous level by means of the Back key or
- Press Escape to return to measurement or Ready to start display.

6.3.1.1 Mode + mass

Select Setup ⇨ User settings ⇨ Mode+mass.



- Select the parameter by pressing the Previous or Next softkey.
- Change its value using the ▲ and ▼ keys, prolonged pressing scrolls the values.
- Save the new value by pressing Save or
- Go back to the previous level with Back or to measurement or Ready to start with Escape.

Save can be suppressed with the keylock.

Parameter	Settings	Explanation
Mode	vacuum	Vacuum mode
	sniff	Sniffing mode[1)]
Mass	He4	Detectable gas ^{4}He
	He3	Detectable gas ^{3}He
	H2	Detectable gas H_2
Mass factor	gas	Leak rate gas equivalent
	air	Leak rate air equivalent
user	1.00E-12 … … 9.99E+3	The leak rate is converted by a user-defined factor.

1) Connect the sniffer line before pressing the START/STOP key.

Mass factor converts the measured leak rate (^{4}He, ^{3}He, or H_2) to

- an equivalent leak rate of another gas type or
- an equivalent leak rate (^{4}He, ^{3}He, or H_2) under other than molecular flow conditions.

Under molecular flow conditions, the leak rate depends only on the gas mass.

Example 1

Measurement carried out with test gas helium 4 – leak rate indication for air:

$$LR_{air} = LR_{He} \times \sqrt{\frac{\text{Mass He}}{\text{Mass air}}} = LR_{He} \times \sqrt{\frac{4}{28.964}} = LR_{He} \times 0.372$$

With Mass factor Air the leak rate is converted according to the equation with the mass of the test gas (4, 3, or 2) to an equivalent leak rate for air under molecular flow conditions.

Example 2

Measurement carried out with test gas helium 3 – leak rate indication for argon:

$$LR_{Ar} = LR_{He} \times \sqrt{\frac{\text{Mass He}}{\text{Mass Ar}}} = LR_{He} \times \sqrt{\frac{3}{39.948}} = LR_{He} \times 0.274$$

With Mass factor user 2.74E-01 the leak rate is converted from the mass of the test gas (4, 3, or 2) to an equivalent leak rate for argon under molecular flow conditions.

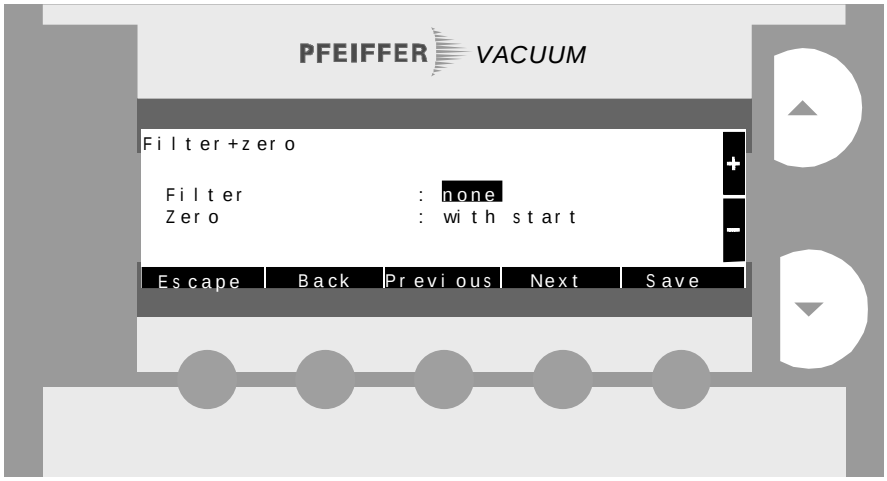
Note

Other gases

Please ask Pfeiffer Vacuum for factors of other gases, e.g. R134a.

6.3.1.2 Filter + zero

Select Setup ⇨ User settings ⇨ Filter+zero.



Parameter	Settings	Explanation
Filter	none	Unfiltered measured values, extremely fast reaction, recommended for vacuum and sniffing mode at leak rates >10^{-9} mbar l/s. Detection limit: 5×10^{-10} mbar l/s [1)]
	high	Linear filter, reaction time ca. 1 s, recommended for vacuum mode at leak rates 10^{-10} … 10^{-9} mbar l/s. Detection limit: 5×10^{-11} mbar l/s [1)]
	ultra	Linear filter, reaction time ca. 20 s, recommended for vacuum mode at leak rates <10^{-10} mbar l/s. Detection limit: 5×10^{-12} mbar l/s [1)]
	median low	Moving median from 5 measured values, eliminates spikes, very fast reaction, recommended for vacuum and sniffing mode. Detection limit: 3×10^{-10} mbar l/s [1)]
	median high	Moving median from 21 measured values, eliminates spikes, reaction time ca. 1 s recommended for vacuum mode. Detection limit: 3×10^{-10} mbar l/s [1)]
Zero	disabled	Manual Background suppression disabled.
	enabled	Manual Background suppression enabled.
	with start	The background suppression gets activated automatically with START, as soon as the most sensitive range is reached.
	constant	By actuating the “Zero” key the momentarily measured signal is stored as background signal and then subtracted from the succeeding values. (→ 🗎 16) The automatic background suppression is disabled. The Zero value will also be stored after pressing Stop. A new pressing of the “Zero” key overwrites the stored Zero value/background signal. The Zero value will be set to “0” in case of “Power Off” and changing the Zero-Function.

1) For accurate readings, measurements should be performed at a factor of 5 … 10 above the detection limit.

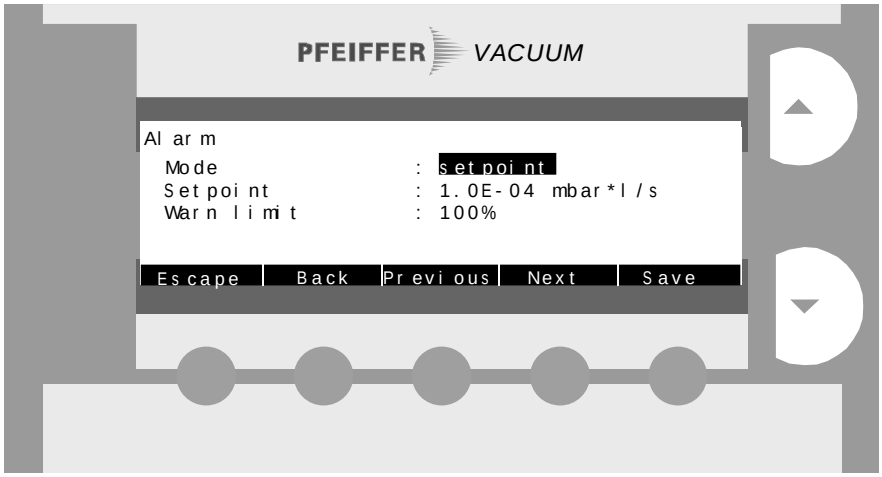
WARNING

Zero constant function:

The automatic background suppression is disabled. The Zero value will also be stored after pressing Stop.

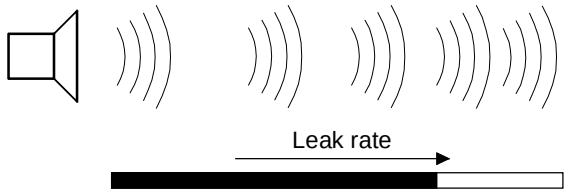
6.3.1.3 Alarm

Select Setup ⇨ User settings ⇨ Alarm.



Parameter	Settings	Explanation
Mode	setpoint	Continuous sound if the setpoint value is exceeded.
	bargraph	The interval of the audio signal changes depending on the leak rate reading (→ illustration below).
Setpoint Vacuum + Sniffing	1.0E-11 … … 1.0E+00	Adjustment of the setpoint.
Warn limit	0 … 100%	Percentage of the setpoint value at which a warning signal with constant interval is generated (only in Mode setpoint).

In Mode: bargraph the interval shortens with rising leak rate.

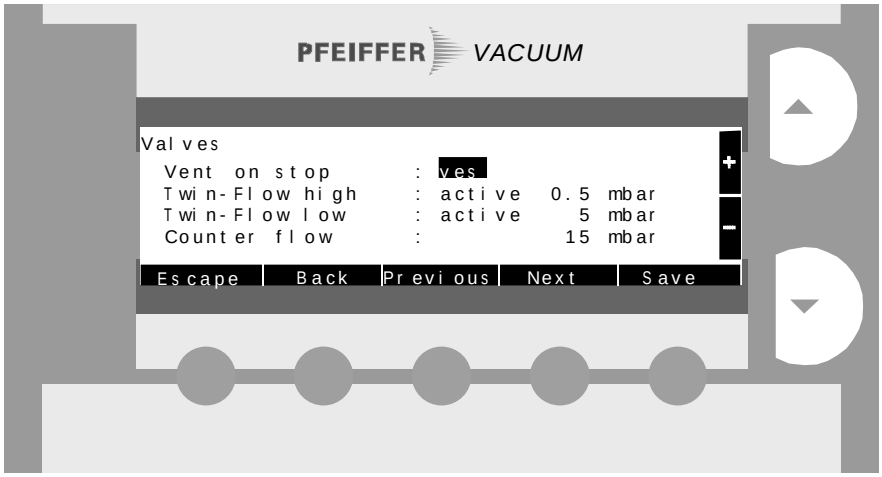


Note

If the user-defined mass factor (→ 🗎 30) is modified after the setpoint has been selected, the setpoint is adjusted accordingly. However, it is possible to select the previous setpoint again without affecting the new user-defined mass factor.

6.3.1.4 Valve settings

Select Setup ⇨ User settings ⇨ Valves.



Parameter	Settings	Explanation
Vent on stop	yes	Vent upon STOP
	no	No venting upon STOP
Twin-Flow high	active	Twin-Flow™ high active
	closed	Twin-Flow™ high not active
	0.1 … 0.5 mbar	Pressure at which valve V4 opens
Twin-Flow low	active	Twin-Flow™ low active
	closed	Twin Flow™ low not active
	1 … 5 mbar	Pressure at which valve V3 opens
Counter flow	1 … 25 mbar	Pressure at which valve V1 opens

Note

Modification of the default settings displayed can lead to a considerable reduction of the performance.

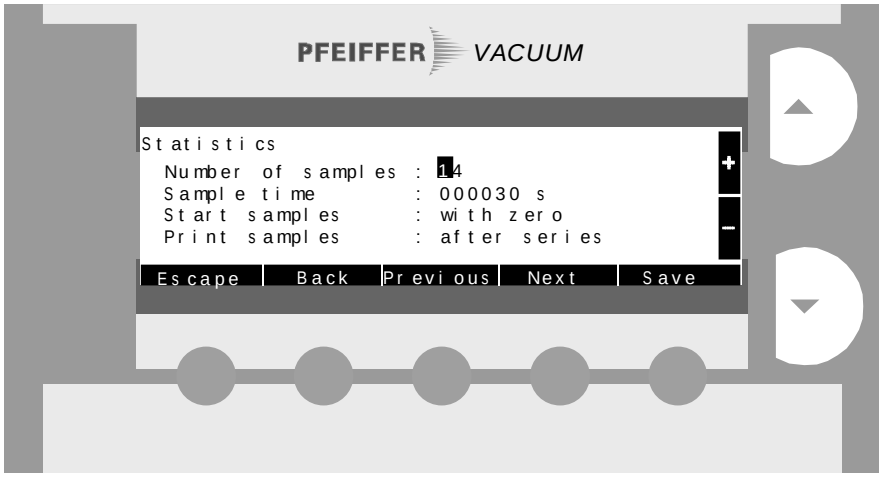
With Vent on stop: no , unintentional venting upon STOP of a vacuum apparatus connected to the test port is prevented. In the start menu (display Ready to start → 🗎 24), intentional venting can be performed by pressing the Vent softkey.

Note

In counter flow mode at 20 … 25 mbar, the turbo pump is under a heavy load. Avoid continuous operation in this mode.

6.3.1.5 Statistics

Select Setup ⇨ User settings ⇨ Statistics.



Parameter	Settings	Explanation
Number of samples	1 … 99	Length of series. Max. 14 values are displayed.
Sample time	0 … 99999 s	Measuring time of a sample.
Start samples	with zero	The measuring time starts with ZERO.
	with barcode	The measuring time starts with reading of a new barcode.
	with dig. input	The measuring time starts with a signal at the digital input "Start sample" (→ 🗎 60).
	with start	The measuring time starts with START.
Print samples	after each sample	Printing after each sample.
	after series	Printing after the number of samples has been measured.

Note

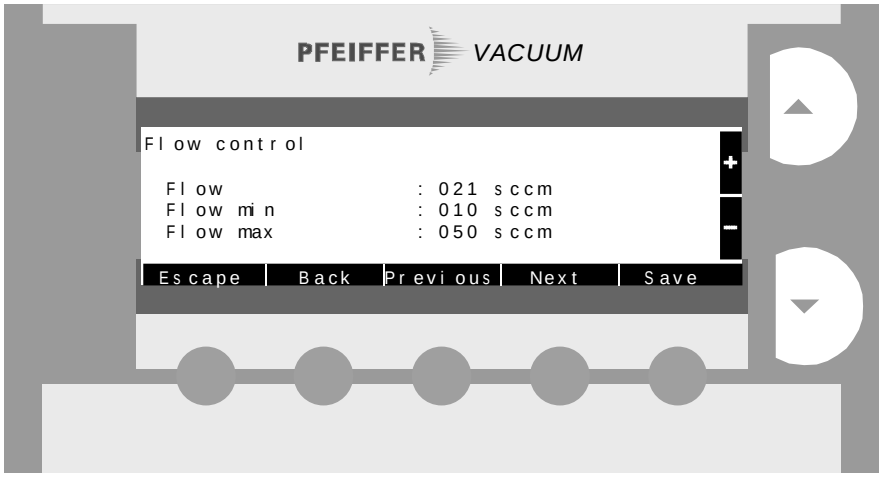
- When a sample is started with barcode, a "beep" sound signals that the barcode has been read correctly and that the measuring time has started.
- The end of the measuring time is always indicated with a "beep – beep" signal.

Note

For operation in the Statistics mode, first make the required settings in the Measurement display (→ 🗎 25).

6.3.1.6 Flow control

Select Setup ⇨ User settings ⇨ Flow control.



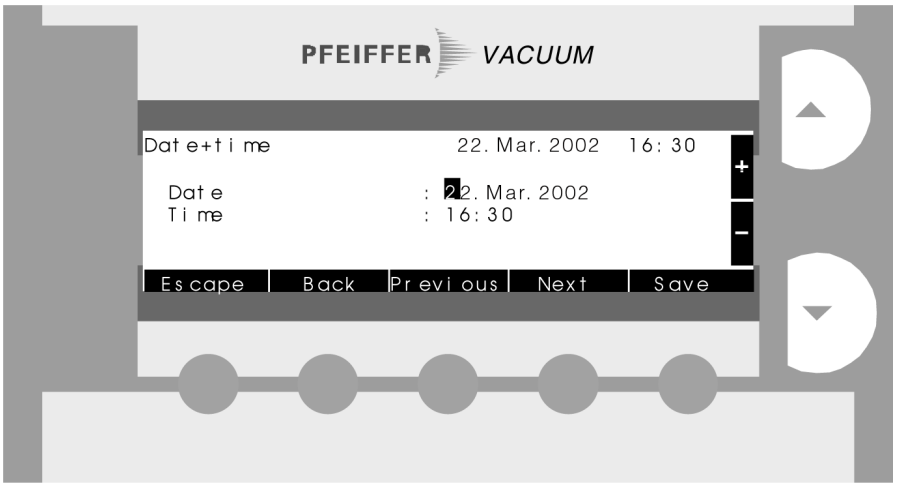
Flow control applies to mode: sniff only, it monitors the sniffer probe.

Parameter	Settings	Explanation
Flow	e.g. 21 sccm	Currently measured flow through the sniffer line.
Flow min	0 ... 20 sccm [1)]	Warning 103: Low flow! is displayed if the flow drops below this value.
Flow max	0 ... 50 sccm [1)]	Warning 104: High flow! is displayed if the flow exceeds this value.

[1)] Parameter setting is possible only in sniffing mode.

6.3.1.7 Date and time

Select Setup ⇨ User settings ⇨ Date+time.

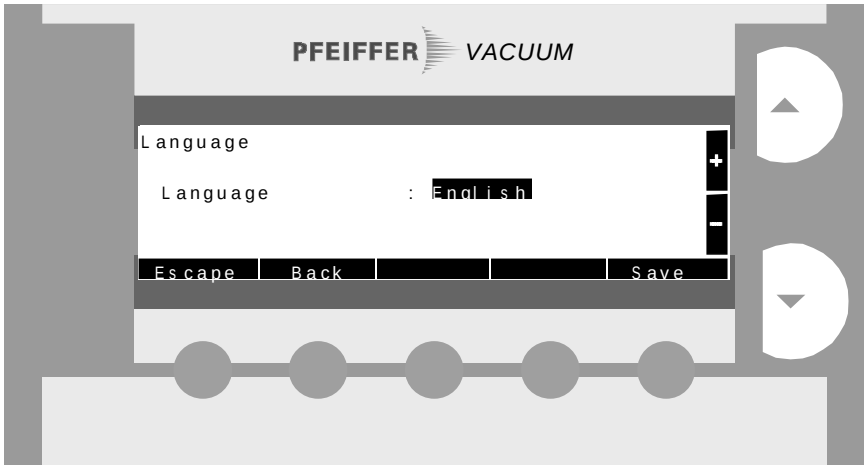


Parameter	Settings	Explanation
Date	e.g. 12.Mar.2002	Date: day 1 - 31 month Jan - Dec year 1998 - 2097
Time	e.g. 16:30	Time: minute 00 - 59 hour 00 - 23

The time setting becomes valid when Save is pressed.

6.3.1.8 Language

Select Setup ⇨ User settings ⇨ Language.

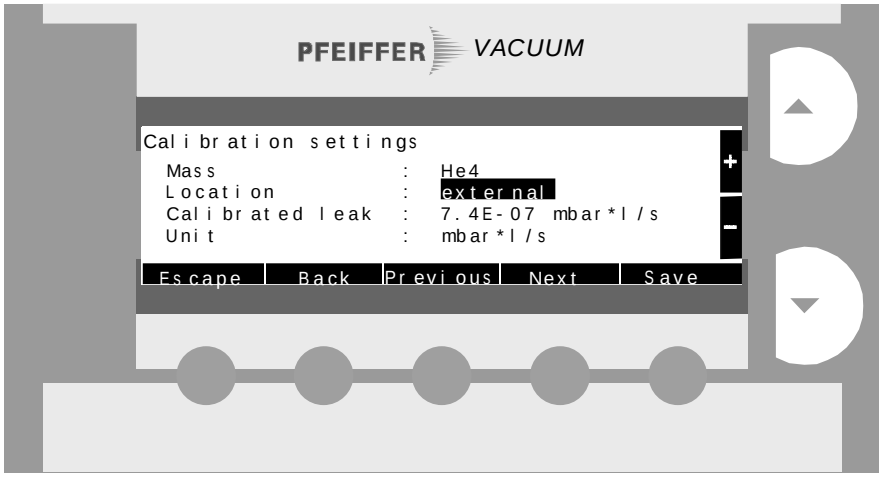


Parameter	Settings	Explanation
Language	German English French Spanish	Loading of the factory defaults does not affect this setting.

6.3.2 Calibration settings

Select Setup ⇨ Calibration settings.

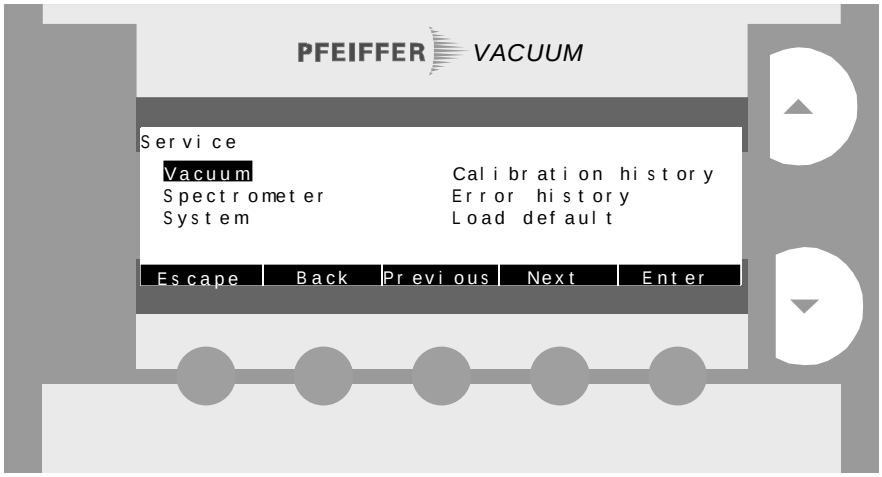
In this setup parameter group, the settings for calibration are made but not the calibration itself.



Parameter	Settings	Explanation
Mass	e.g. He4	Setting → 🗎 30
Location	external	External calibrated leak. In sniffing mode, the unit automatically switches to external and ^{4}He, ^{3}He or H_2 (→ 🗎 30).
	internal	Internal calibrated leak (^{4}He).
Calibrated leak Vacuum + Sniffing	External; internal: 1.00E+0 … … 1.00E-11	Setting of the calibrated leak value. The value of the internal calibrated leak can be found in the cover of the compartment for accessories. The value of the external calibrated leak is printed on the corresponding test certificate or on the container of the external calibrated leak. There is no default value.
Unit	→ table 🗎 26	Adjustable only if Location: external. (Vacuum + Sniffing)

6.3.3 Service

Select Setup ⇨ Service.



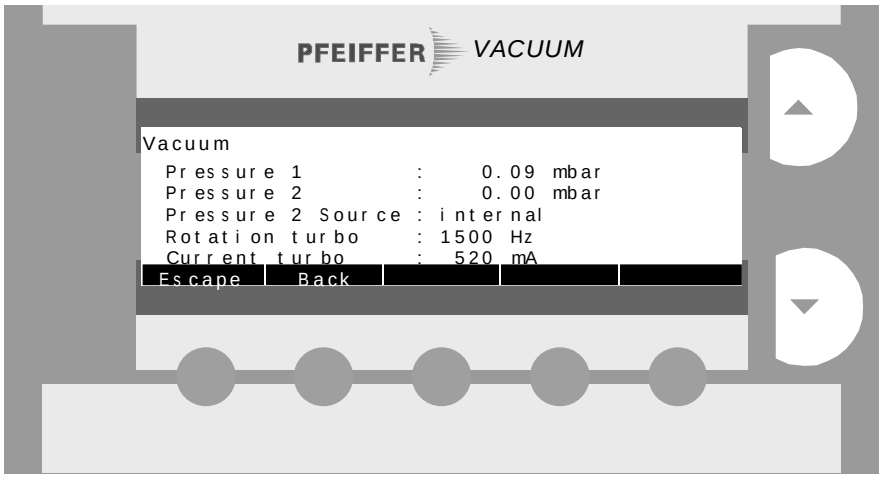
The Service group contains 6 submenus.

In the submenus, the actual values are displayed.

6.3.3.1 Vacuum

Select Setup ⇨ Service ⇨ Vacuum.

The most important data of the vacuum system are displayed:

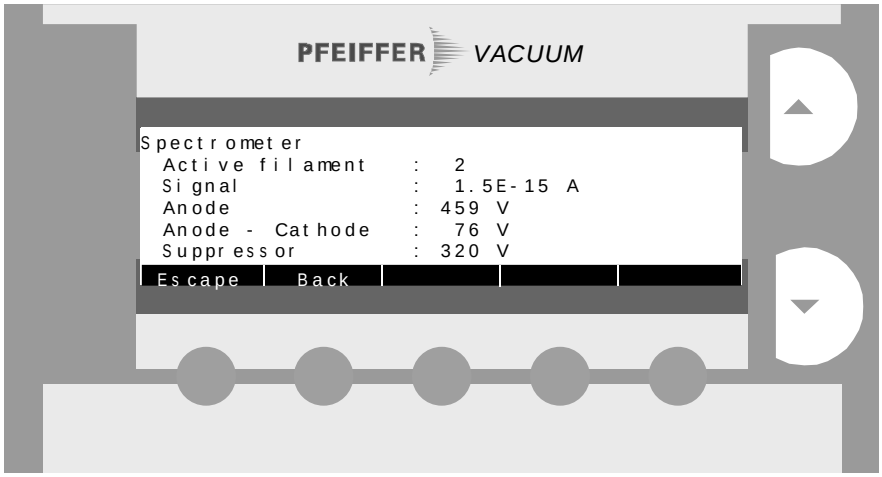


Parameter	Settings	Explanation
Pressure 1		Fore vacuum pressure
Pressure 2		Test port pressure
Pressure 2 Source	internal	internal gauge
	external	external gauge
Rotation turbo		Rotational speed of turbopump
Current turbo		Current consumption of turbopump

6.3.3.2 Spectrometer

Select Setup ⇨ Service ⇨ Spectrometer.

Spectrometer shows the most important mass spectrometer data:

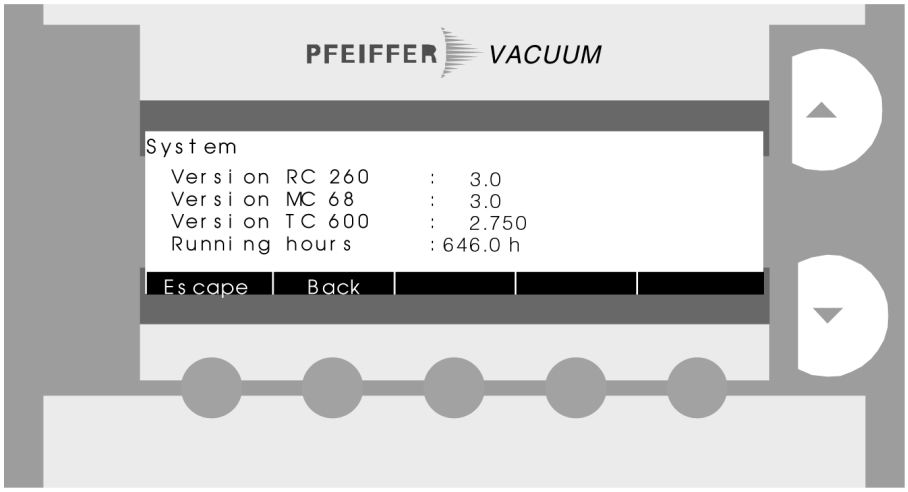


Parameter	Explanation
Active filament	Currently active filament. The unit is equipped with a spare filament, which it activates automatically.
Signal	Ion current signal of the mass spectrometer.
Anode	Anode voltage of the mass spectrometer.
Anode-Cathode	Anode-Cathode voltage of the mass spectrometer.
Suppress	Suppressor voltage of the mass spectrometer.

6.3.3.3 System

Select Setup ⇨ Service ⇨ System.

Under System you can read the versions of the firmware (EPROMs) and the operating hours:

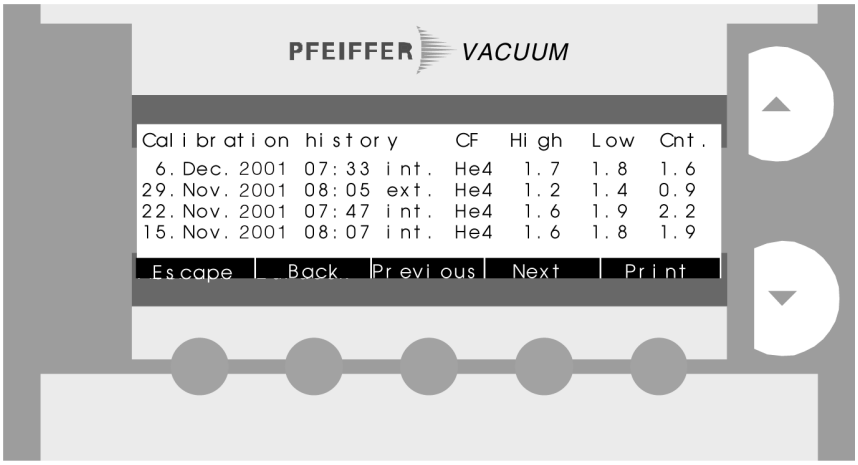


Parameter	Explanation
Version RC 260	Firmware version of the removable control display RC 260
Version MC 68	Firmware version of the main system MC 68
Version TC 600	Firmware version of turbo controller
Running hours	Running time meter

6.3.3.4 Calibration history

Select Setup ⇨ Service ⇨ Calibration history.

Calibration history shows the 10 latest sets of calibration data:

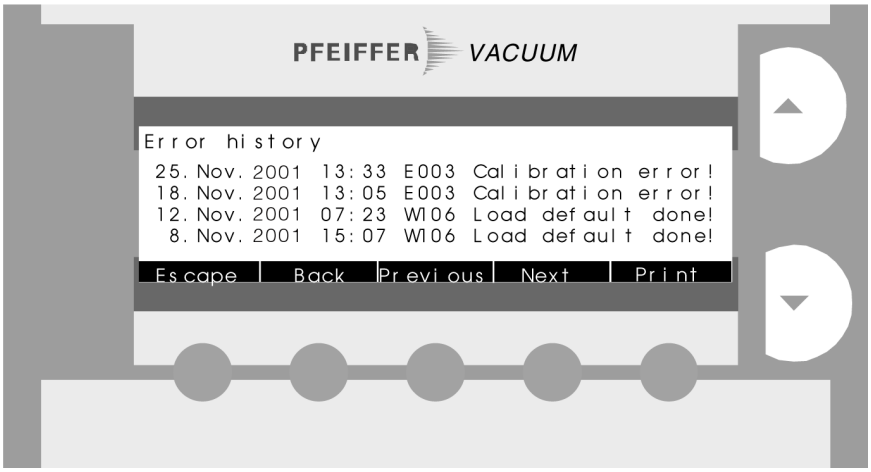


- The latest values are on top.
- You find further lines by Next and Previous or ▲ and ▼.
- With Print the list is printed (printer connection → 🗎 45).

6.3.3.5 Error history

Select Setup ⇨ Service ⇨ Error history.

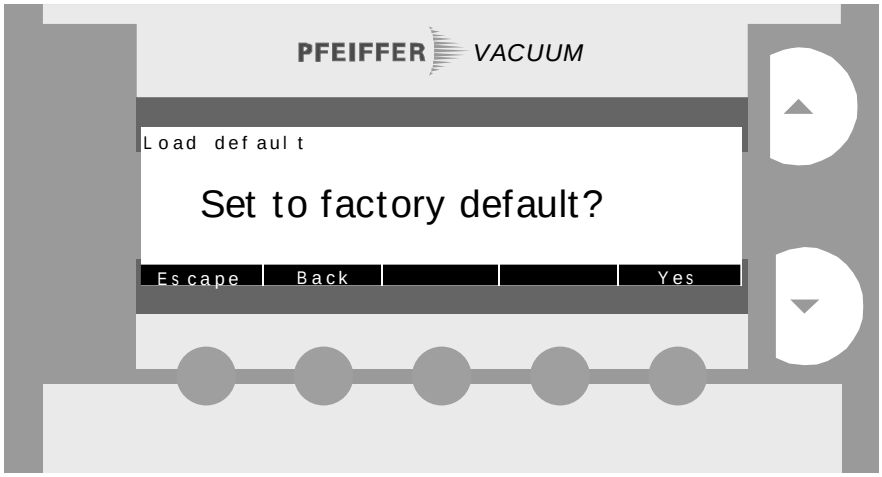
Error history shows a list of the 10 latest error messages and warnings:



- The latest values are on top.
- You find further lines by Next and Previous or ▲ and ▼.
- Description of warnings and error messages → 🗎 53.
- With Print the list is printed (printer connection → 🗎 45).

6.3.3.6 Load default

Select Setup ⇨ Service ⇨ Load default.

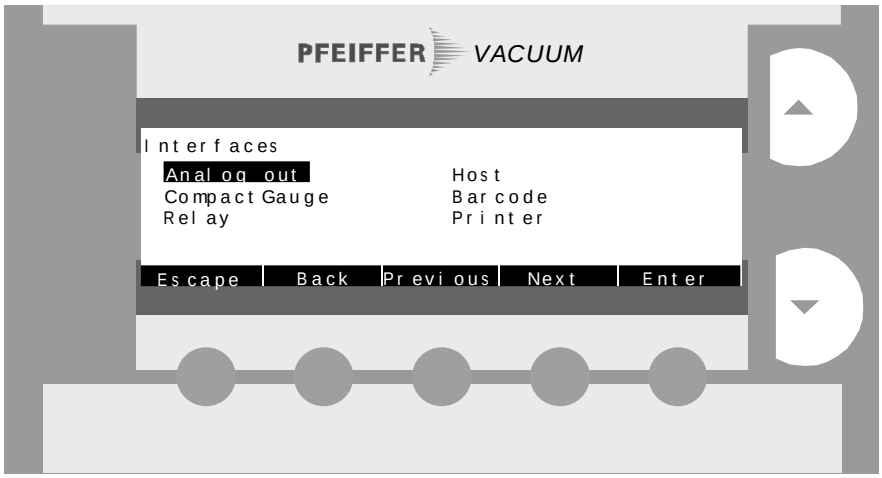


If you acknowledge by Yes the factory default parameter values are loaded.

The default values are shown in the illustrations of chapter 6.3. Exceptions are mentioned in the accompanying text.

6.3.4 Interfaces

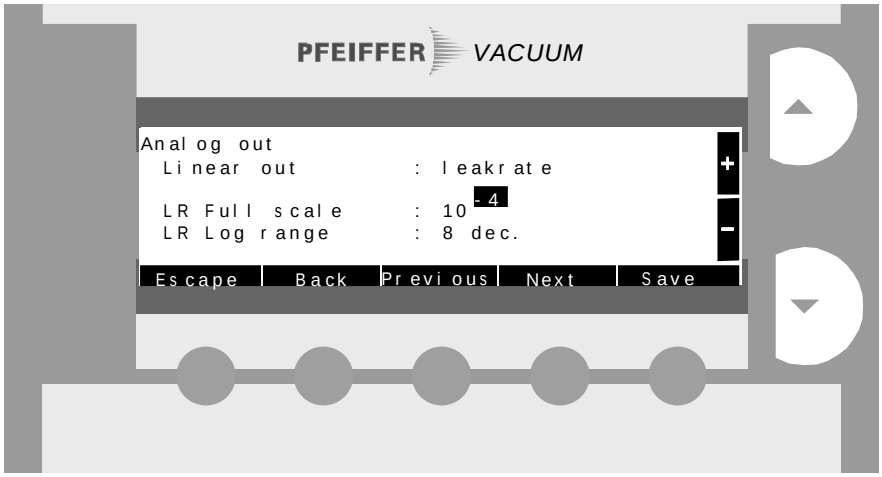
Select Setup ⇨ Interfaces.



With Interfaces you select one of the submenus displayed.

6.3.4.1 Analog output

Select Setup ⇨ Interfaces ⇨ Analog out.

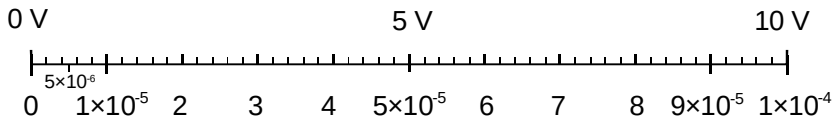


Parameter	Settings	Explanation
Linear out	leakrate	The analog outputs LIN_LEAK and LOG_LEAK provide the linear and logarithmic leak rate values.
	external gauge	The analog output LIN_LEAK provides the signal of the externally connected gauge (voltage to pressure conversion → 🕮 of the corresponding Compact Gauge). LOG_LEAK is the same as above (leakrate).
LR Full scale	10^{1} … 10^{-11}	Leak rate full scale of the analog outputs LIN_LEAK and LOG_LEAK (e.g. 10 V corresponds to 10^{-4}).
LR Log. range	1 … 9	Number of decades represented in the range 0 … 10 V of the LOG_LEAK output.

Analog outputs → 🗎 60.

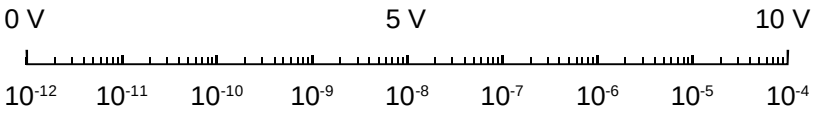
Example 1

Full scale = 10^{-4} at output LIN_LEAK:



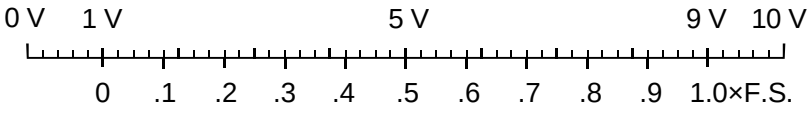
Example 2

Log width = 8 decades at output LOG_LEAK:



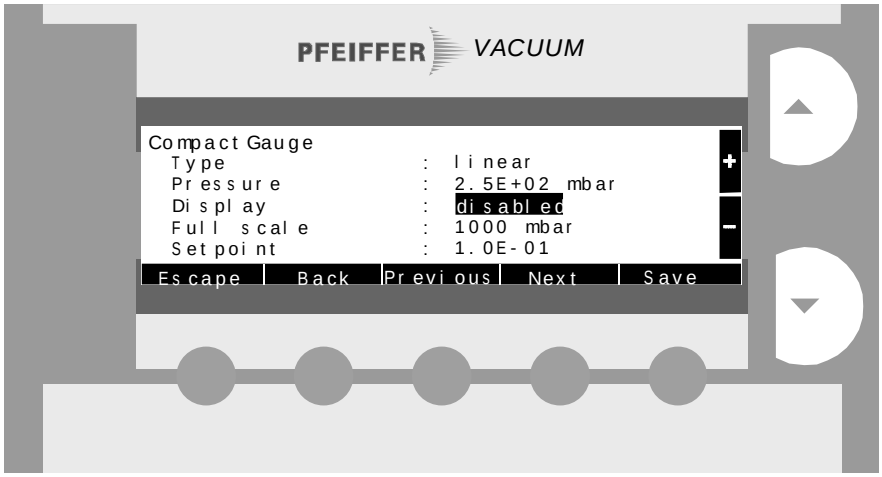
Example 3

Output LIN_LEAK for an external linear gauge (voltage to pressure conversion → 🕮 of the corresponding Compact Gauge).



6.3.4.2 External gauge

Select Setup ⇨ Interfaces ⇨ CompactGauge.



Parameters of the Compact Gauge at connector GAUGE HEAD (the illustration applies to connected a linear gauge with full scale 1000 mbar).

Parameter	Settings	Explanation
Type	none, PKR, TPR, linear etc.	The type of the gauge is displayed.
Pressure	e.g. 2.5E-02 mbar	Measured value of the Compact Gauge.
Display	enabled	The measurement display indicates the measured value of the Compact Gauge instead of the date
	disabled	The measured value is not displayed.
Full scale (only with linear gauge)	e.g. 1000	Set the full scale value (F.S.) indicated on the nameplate of the gauge.
Setpoint	10^{3} ... 10^{-10} mbar	Setpoint for relay output.

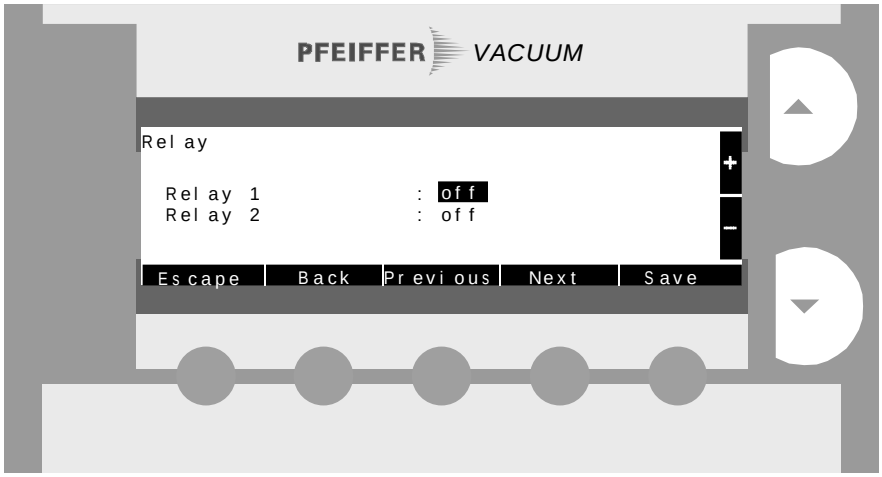
Compatible Compact Gauges → 🗎 59.

Note

The PBR and IMR gauges **must not be used** because of their high power consumption.

6.3.4.3 Relay

Select Setup ⇨ Interfaces ⇨ Relay.



Relay provides independent settings for the 2 output relays.

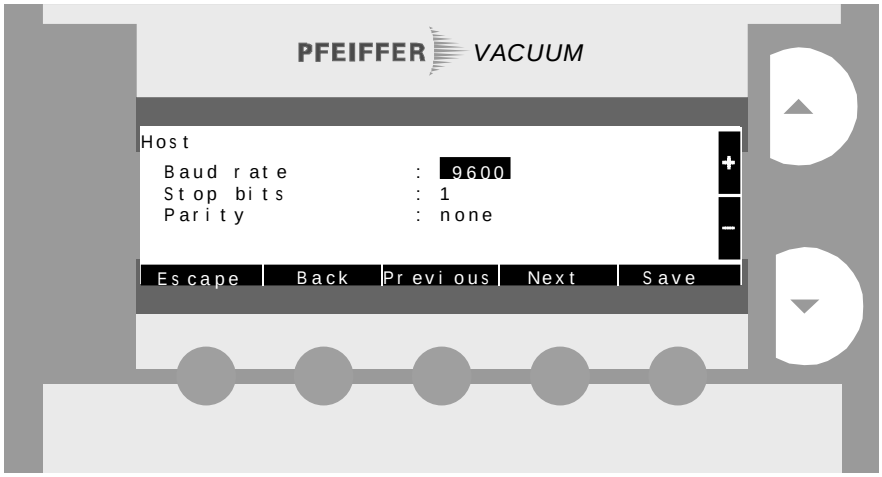
Parameter	Settings	Explanation
Relay 1 and Relay 2	off [1]	The relay is always deactivated.
	start	The relay picks up when valve V2 opens (→ Fig. 13).
	stop	The relay picks up when valve V6 opens (→ Fig. 13).
	start/stop	The relay picks up upon START and drops out upon STOP.
	ready	The relay picks up during measurement.
	setpoint	The relay picks up when the leak rate exceeds the setpoint and drops out when the leak rate drops 10% below the setpoint (→ 32).
	on [1]	The relay is always activated.
	warn limit LR	The relay picks up when the leak rate exceeds the warn limit (→ 32).
	Pressure setp.	The relay picks up when the pressure in the external Compact Gauge exceeds its setpoint (→ 42).

[1] The settings on and off are useful for testing the circuits connected to the relay outputs.

Connections → 58.

6.3.4.4 Host

Select Setup ⇨ Interfaces ⇨ Host.

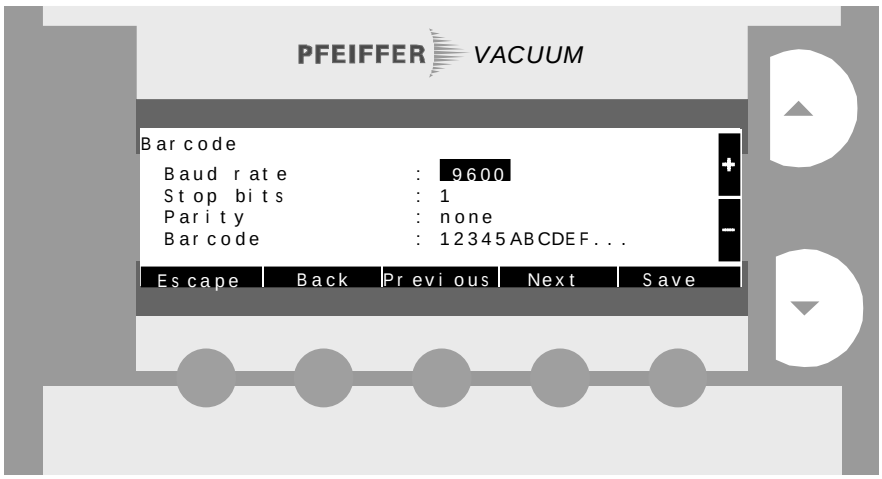


Host determines the parameters of the RS232 Interface at the connector HOST.

Parameter	Settings	Explanation
Baudrate	1200 ... 19200	
Stop bits	1 / 1.5 / 2	
Parity	none	
	even	
	odd	

6.3.4.5 Barcode

Select Setup ⇨ Interfaces ⇨ Barcode.

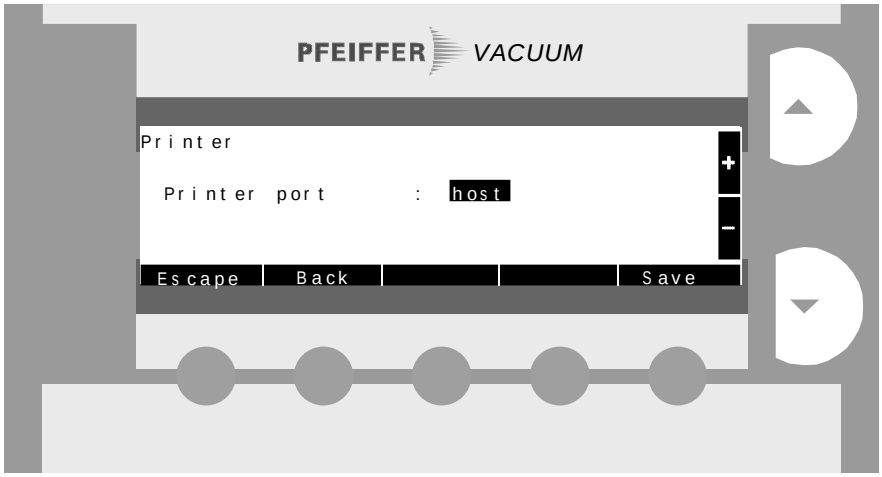


Barcode determines the parameters of the RS232 interface at the BCR connector. Parameters → Host.

Barcode displays the code read in by the reader.

6.3.4.6 Printer

Select Setup ⇨ Interfaces ⇨ Printer.



Parameter	Settings	Explanation
Printer port	host	Select host if the printer is connected to the HOST port.
	barcode	Select barcode if the printer is connected to the connector BCR port.

Printer port → Appendix 🗎 62.

6.4 Calibration in vacuum mode

Note

For precise calibration the QualyTest™ should be allowed to warm up for at least 30 minutes.

Please take care of the next recommended inspection for the calibrated leak!

See Quality Inspection Certificate.

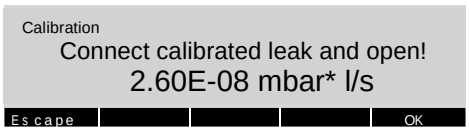
For calibration with the internal leak the test port has to be blanked off!

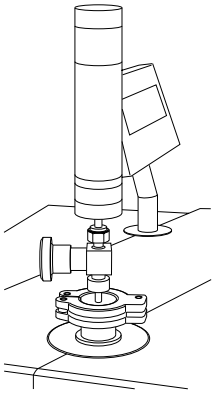
Press Calibr. in the Ready to start menu to start calibration.

If you are using the internal calibrated leak please go to "Calibration sequence".

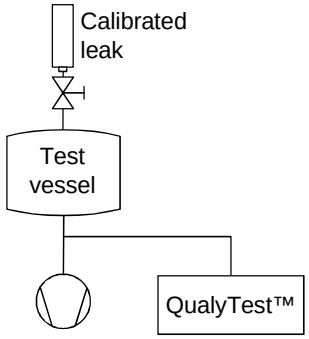
Calibrated leak external

With Location: external (→ 🗎 36), the following prompt is displayed:





- Is the displayed value the same as on the nameplate of the calibrated leak? (if not → 🗎 36).
- Connect the calibrated leak.
- The valve of the calibrated leak has to be open.
- Confirm with OK.



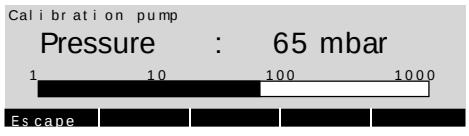
Note

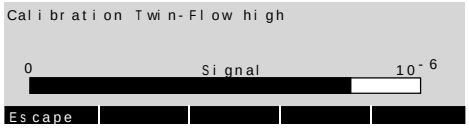
Partial flow configuration:

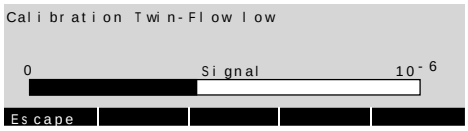
If the QualyTest™ is connected to a vacuum system with its own pump the calibrated leak has to be connected to the test vessel of that system.

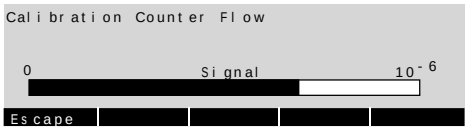
Calibration sequence

The following sequence is run:

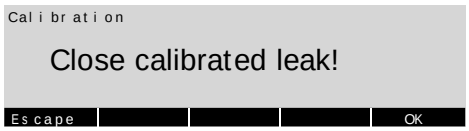




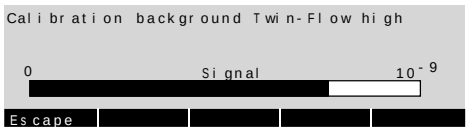


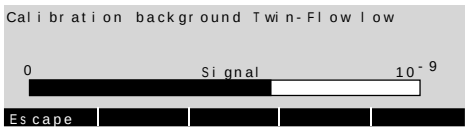


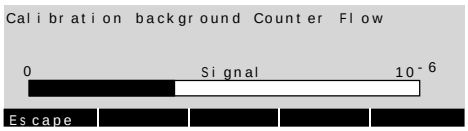
With Location: external (→ 🗎 36), the following prompt is displayed:



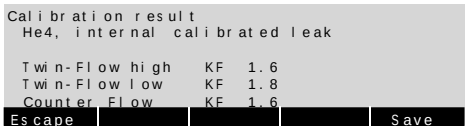
Close the valve of the calibrated leak.
If you are using test gas H_2, wait 5 minutes.
Confirm with OK.







On completion, the result is displayed:



Usual values for ^{4}He: Twin-Flow™ 0.5 … 10
Counter Flow 0.5 … 30

In order

- to accept the result, press Save to store the new calibration values
- not to not accept it, press Escape to return to the old values.

Note

If (after several attempts) the usual values are not obtained, please contact your local Pfeiffer Vacuum service center.

6.5 Calibration in sniffing mode

Note

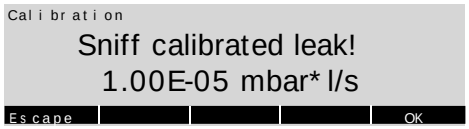
For most precise calibration the QualyTest™ should be allowed to warm up for at least 30 minutes.

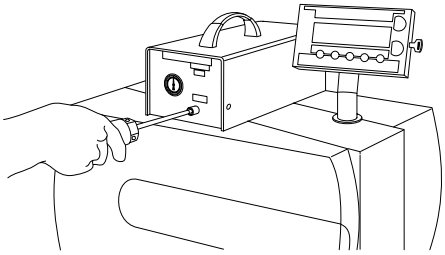
Please take care of the next recommended inspection for the calibrated leak!

See Quality Inspection Certificate.

Press Calibr. in the Ready to start menu to start calibration.

The following prompt is displayed:





- Is the displayed value the same as on the nameplate of the calibrated leak? (if not → 🗎 36).
- Hold the sniffer probe against the leak detection port of the calibrated leak.
- Confirm with OK or with the button on the probe.

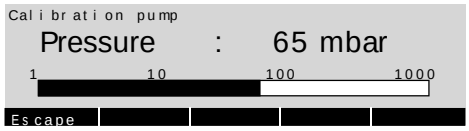
Note

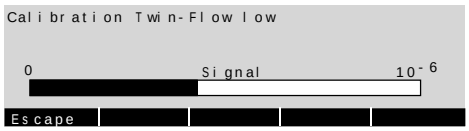
The probe tip must tightly fit the leak detection port of the calibrated leak between the prompts:

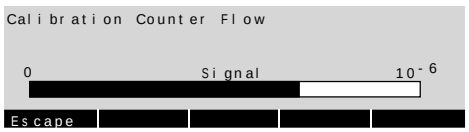
Sniff calibrated leak! and Sniff Air!

Calibration sequence

The following sequence is run:



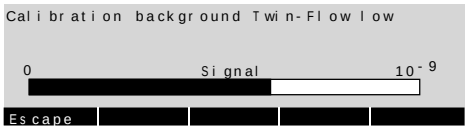


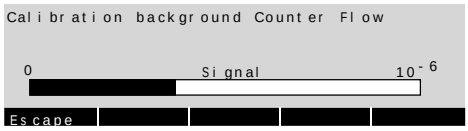


Now the following prompt is displayed:

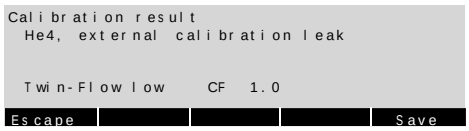


- Remove the probe from the calibrated leak in order for it to sniff air.
- Confirm with OK or with the button on the probe.





On completion the result is displayed:



Usual value for ^{4}He: 0.5 … 10

In order

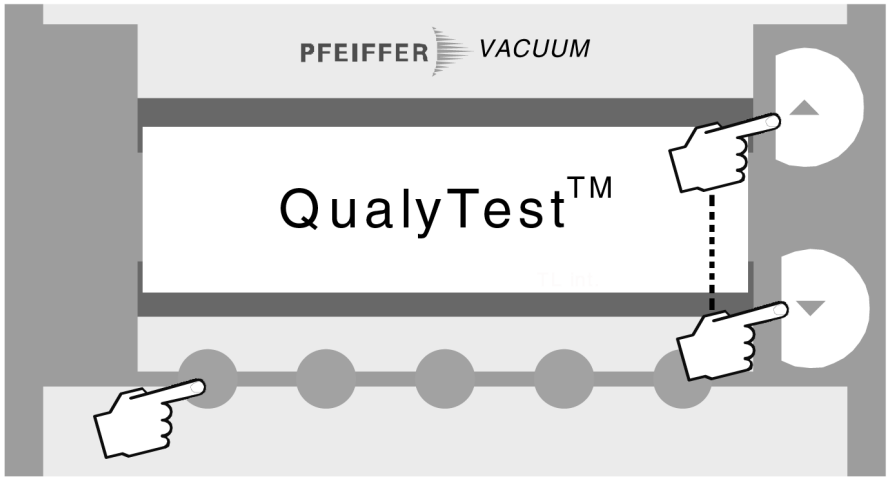
- to accept the result, press Save to store the new calibration values
- not to not accept it, press Escape to return to the old values.

Note

If (after several attempts) the usual values are not obtained, please contact your local Pfeiffer Vacuum service center.

6.6 Contrast Changing of the Display

It is possible to change the contrast (brightness) of the text display from each level of the menu!
See below mentioned: Note!



By pressing the left softkey **and** afterwards Δ or ∇ the contrast of the display can be changed individually.

This function is not depending on the level of the menu!

The last chosen adjustment of the contrast will be saved after release of the left softkey and it will be stored also after the power-supply is switched off!

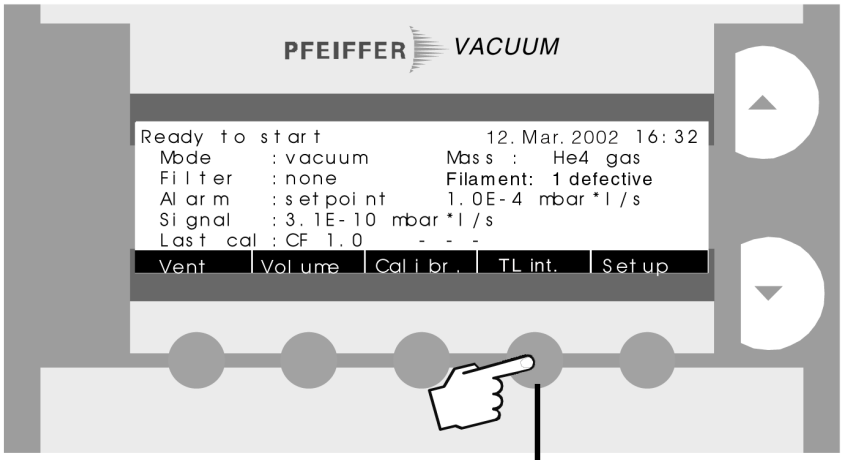
Note

The left softkey is occupied in some levels of the menu! Therefore an adjustment of the contrast leads to the execution of that function!

Suggestion:Change the contrast in Menu: Ready to start!

6.7 Measuring of the internal leak

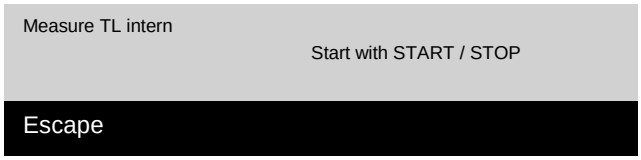
After the acceleration, the display changes automatically to Ready to Start (→ 🗎 24)



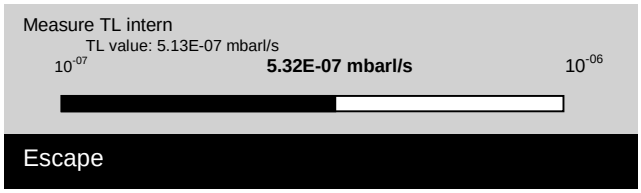
Softkey TL int. Leads to submenu:



Testport has to be blanked off!
Confirm with Ok.



Actuating the Start-key. Starts the measuring of the internal leak.



Next to the advice of the measured internal leak you can see the default value of the internal leak: e.g.: TL: 5,13E-07 mbarl/s

Softkey Abbruch leads in all cases to the main menu: Ready to start.

In the lowest menu the Stop-key also leads to the main menu: Ready to start

Note

The consistence of the measured value with the default value of the internal leak doesn't implicates a good accuracy of the system, while using the internal leak for calibration.

The advice of the internal leak gives only a reference!

For accurate measurings an external leak has to be used: (→ 🗎 46).

7 Maintenance and care

Maintenance instructions

The maintenance should be performed according to the maintenance schedule (→ 🕮 [2]).

Repair

We recommend returning the product to your local Pfeiffer Vacuum service center for repair.

Pfeiffer Vacuum assumes no liability and the warranty becomes null and void if any maintenance or service work is performed in an incompetent manner by the end-user or third parties.

7.1 Cleaning

Cleaning the outside

A slightly moistened cloth usually suffices for external cleaning. Do not use any aggressive or scouring cleaning agents.

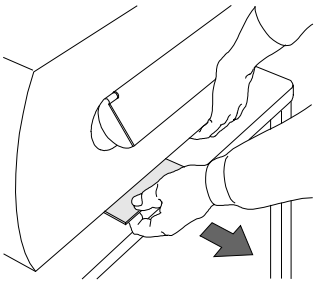
Note

Make sure that no liquids penetrate into the unit. Allow the equipment to dry completely before putting it back into service.

Cleaning the inside

→ 🕮 [2].

7.2 Replacing the filter mat



- To replace the filter mat, lightly lift the unit and slide the filter mat out of the fixture.
- Slide the new or cleaned filter mat well into the fixture.

8 Troubleshooting

8.1 Warnings

Warnings point to problems, however measurement is still possible.

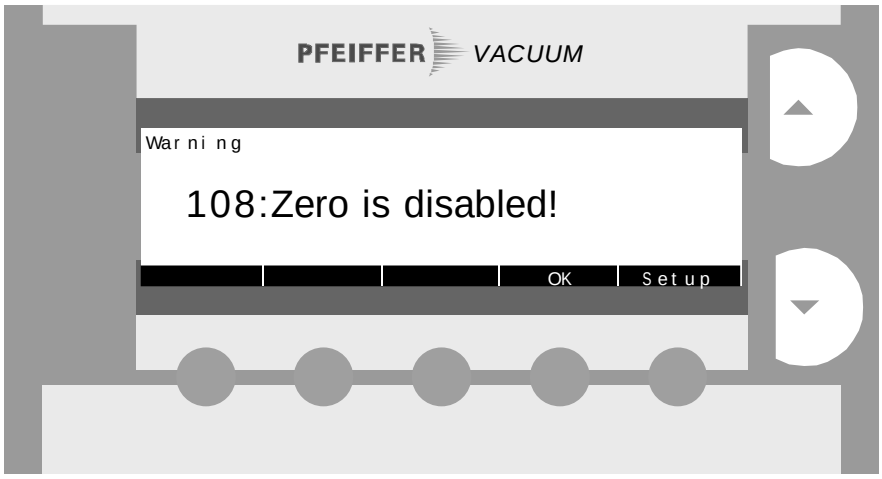
Note

Warnings are only indicated on the upper measurement level.

A warning is indicated by a continuous acoustic signal, and at the same time, one of the following messages is displayed:

No.	Display	Explanation
101	Unconfigured clock!	Battery not connected or discharged.
102	Filament changed!	Operation with 2nd filament, a new calibration should be made.
103	Low flow!	Sniffer probe obstructed.
104	High flow!	E.g. sniffer probe disconnected.
105	Global reset done!	Only for service staff.
106	Load default done!	The parameters have been reset to the default values.
107	Please perform maintenance!	→ 🕮 [2].
108	Zero is disabled!	ZERO has been pressed, however it is disabled.
109	Overrange!	LR ≥ 1 mbar l/s.

Example



- Press OK to acknowledge the message.
- Press Setup to go directly to the setup menu and modify the corresponding parameters.

8.2 Error messages

When an error message is displayed no measurement is possible.

There is only one error message at a time, but one cause can lead to several messages one after another.

Note

Errors are only indicated on the upper measurement level.

An error is indicated by a continuous acoustic signal, and at the same time, one of the following messages is displayed:

No:.. Calibration error!

No.	Description
1	During calibration, the measurement signal did not settle within a reasonable period of time.
2	No calibrated leak data have been entered yet (→ 🗎 36).
3	A calibration factor (CF) is <0.1 or >10.

No:.. Mass spectrometer

No.	Description
21	Suppressor potential setpoint too high.
22	Anode potential setpoint too high.
23	Anode heater fuse defective.
24	24 V supply too low.
25	Filament current too high.
26	Filament current too low.
27	Emission fault.
28	Both filaments broken.
29	Anode potential >110%.
30	Anode potential <90%.
31	Anode-cathode potential >130%.
32	Anode-cathode potential <30%.
33	Suppressor potential >363 V.
34	Suppressor potential <297 V.

41	Rotational speed of turbo pump too low.
42	Inadmissible pressure rise (air inrush).
43	No Vacuum Mode and / or Mass unequad 4

No:.. Turbo pump error!

61	Communication error TC 600.
62	Wrong response of TC 600.
63	Wrong checksum in response of TC 600.
64	No response from TC 600.

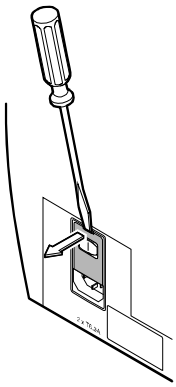
- Press OK to acknowledge the message.
- If the message is displayed again, try a restart of the measurement (or the calibration) or a complete restart by power off/on.

Note

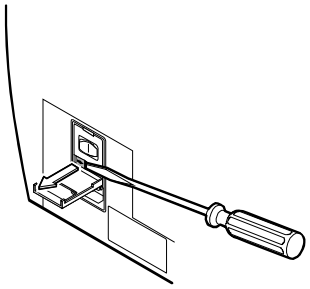
If a fault occurs which cannot be remedied, please contact your local Pfeiffer Vacuum service center.

8.3 Replacing the fuses

1. Turn the unit off and disconnect it from the AC outlet.
2. Detach the power cable.
3. Unlatch and tilt down the hinged cover of the fuse holders.



4. Remove the fuse holders and replace the defective fuses 10.0 AT (slow), 250 V, ø5×20 mm.



DANGER

Caution: mains voltage

Incorrectly fused products can be extremely hazardous.

Use only fuses with the ratings specified above.

5. Re-engage the fuse holders.
6. Close the hinged cover.
7. Reinstall the power cable.

Note

Do Make Use Our Service Facilities

In the event that repairs are necessary a number of options are available to you to ensure any system down time is kept to a minimum:

- Have the leak detector repaired on the spot by our PFEIFFER Service Engineers;
- Return the leak detector to the manufacturer for repairs;
- Replace with a new value leak detector.

Local PFEIFFER representatives can provide full details.

9 Disposal

DANGER

Caution: contaminated parts

Contaminated parts can be detrimental to health and environment.

Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

WARNING



Caution: substances detrimental to the environment

Products or parts thereof (mechanical and electric components, operating fluids etc.) can be detrimental to the environment.

Dispose of such substances in accordance with the relevant local regulations.

Separating the components

After disassembling the product, separate its components according to the following criteria:

Contaminated components

Contaminated components (radioactive, toxic, caustic, or biological hazard etc.) must be decontaminated in accordance with the relevant national regulations, separated according to their materials, and disposed of.

Other components

Such components must be separated according to their materials and recycled.

Pump fluids

Dispose of the fluids of the roughing and high vacuum pumps in accordance with the relevant local regulations.

10 Accessories and spare parts

Basic unit

	Ordering number
Filter mats (5 pieces)	B 8199 999 EG
Further spare parts	→ 🕮 [2]
Cart for QualyTest™, ready for roughing pump Varian Triscroll TS 600 [1]	
230 V~, 50 Hz	BG 449 330 -T
100 ... 120 V~, 50 ... 60 Hz	BG 449 331 -T
Cart for QualyTest™, with roughing pump Varian Triscroll TS 600 [1]	
230 V~, 50 Hz	BG 449 332 -T
100 ... 120 V~, 50 ... 60 Hz	BG 449 333 -T
Transport case for QualyTest™	B 6105 058 -T
Screw-in flange DN 16 ISO-KF for external roughing pump	PM 043 687 -T

[1] Without gas cylinder and pressure reducing valve

Removable control display RC 260

	Ordering number
Extension cable (cascadeable up to 100 m)	
15 m	B 4564 001 GB
30 m	B 4564 001 GD

Sniffer probes

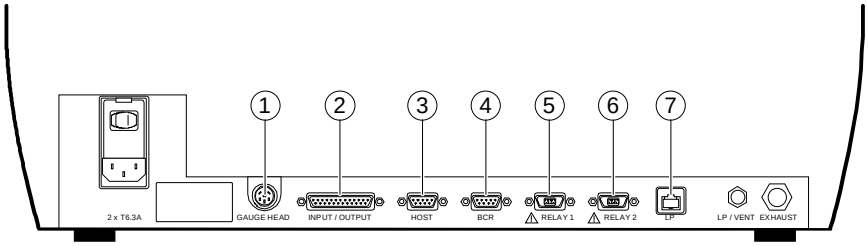
	Ordering number
Sniffer line with standard tip TP 312 (120 mm, stiff)	
LP 503 3 m	BG 449 207 -T
LP 505 5 m	BG 449 208 -T
LP 510 10 m	BG 449 209 -T
Sniffer tips	
TP 385 (385 mm, stiff)	BG 449 216 -T
TF 312 (120 mm, flexible)	BG 449 217 -T
TF 385 (385 mm, flexible)	BG 449 218 -T

External calibrated leaks

	Ordering number
Calibrated helium vacuum test leak	
CT 408 $\approx 10^{-8}$ mbar l/s	B 8116 557
CT 446 10^{-4} ... 10^{-6} mbar l/s, adjustable	B 8115 580
Calibrated helium sniffer test leak	
CL 004 10^{-4} mbar l/s	BG 447 704 -T
10^{-5} mbar l/s	BG 447 705 -T
10^{-6} mbar l/s	BG 447 706 -T
Calibrated H_2+N_2 (10/90%) sniffer test leak	
CL 002 10^{-5} mbar l/s (total leak rate)	BG 449 025-T
10^{-6} mbar l/s (H_2 leak rate)	

Appendix

A: Interfaces



① GAUGE HEAD: Connector for Compact Gauges

② INPUT/OUTPUT: Control and output signals

③ HOST: Connector for computer or printer, RS232C (option RS485)

④ BCR: Connector for barcode reader or printer, RS232C and supply 5V

⑤ RELAIS1: Relay contact

⑥ RELAIS2: Relay contact

⑦ LP: Connector for sniffer probe LP 503, LP 505 or LP 510



Skilled personnel



Wiring of the connectors described (except for standard cables supplied with the unit) may only be executed by skilled persons strictly adhering to the appropriate safety and EMC standards.



Note

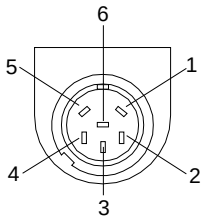


Illustrations of connectors

All connectors are viewed from the outside of the QualyTest™.

GAUGE HEAD

Compact Gauge connector



Pin	Signal
1	Identification
2	GND
3	Measurement signal +
4	Measurement signal –
5	Screen
6	V_{cc}

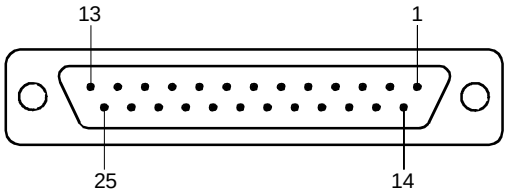
Compatible Compact Gauges

Linear gauges	Display RC 260	Gauge name
Compact Capacitance Gauges	linear	ACR 261, ACR 262, ACR 263, ACR 274
Compact Capacitance Gauges	linear	CMR 261, CMR 262, CMR 263, CMR 264, CMR 271, CMR 271, CMR 272, CMR 273, CMR 274, CMR 275
Compact Piezo Gauges	linear	APR 250, APR 260, APR 262, APR 265, APR 266, APR 267

Logarithmic gauges	Display RC 260	
Compact Pirani Gauges	TPR	TPR 250, TPR 260, TPR 261, TPR 265
Compact Cathode Gauges	IKR9	IKR 250, IKR 251, IKR 260, IKR 261
Compact Cathode Gauges	IKR11	IKR 270
Compact FullRange™ CC Gauges	PKR	PKR 250, PKR 251, PKR 260, PKR 261

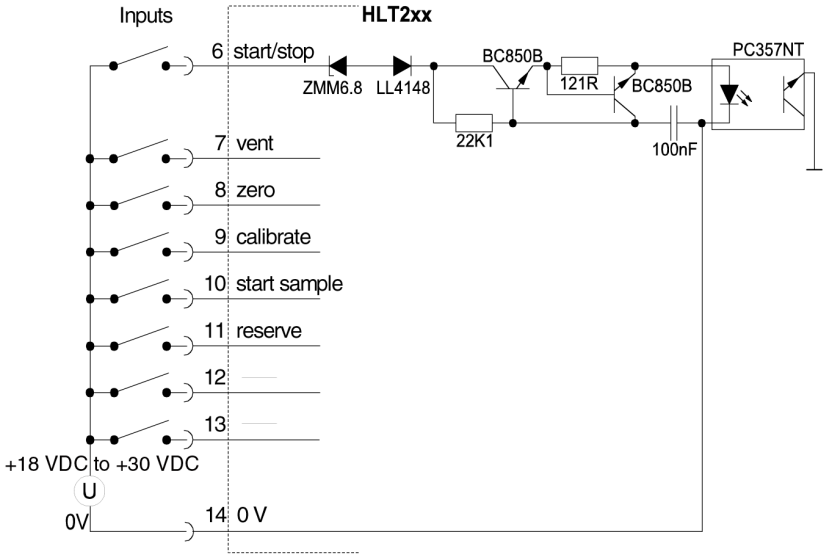
INPUT / OUTPUT

Input and output signals, 25 poles, D subminature female

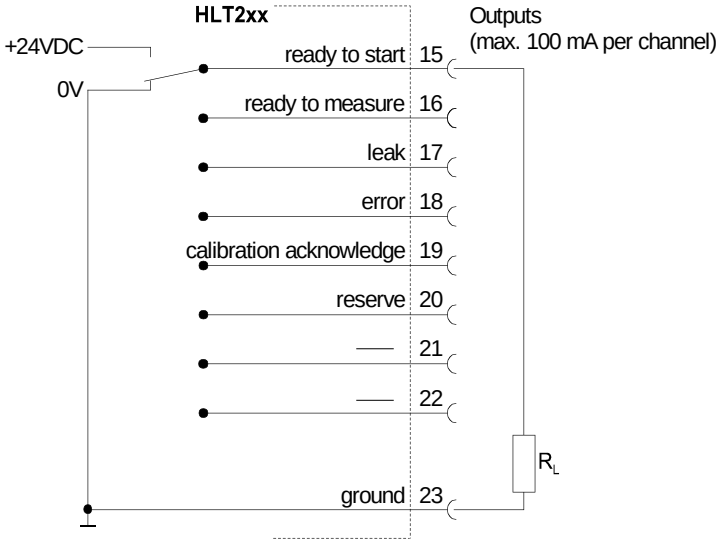


Pin	Signal	Explanation
1	LOG_LEAK	Logarithmic analog output 0 ... 10 V, Ri 3 kΩ function → 🗎 41
2	LIN_LEAK	Linear analog output, data as above
3	AGND	Reference potential of analog outputs, isolated
6 ... 13	DI1 ... 8	Digital inputs, +18 ... +30 V (ca. 5 mA) The functions are triggered by the positive slope. Same priority as removable control display.
6	Start/ Stop	Starts or stops measurement
7	Vent	Venting with valve setting Vent on stop: no → 🗎 33
8	Zero	Works like the ZERO key. If "high" for more than 3 s, ZERO is cancelled
9	Calibrate	Starts calibration or confirms calibration steps
10	Start sample	Starts measurement of sample
14	DGND	Reference potential of digital inputs, isolated
15 22	DO1 ... 8	Digital outputs, active 24 V ±10%, passive at PGND Maximum admissible current: 800 mA for all outputs together At turn on all outputs are activated for approx. 1 s
15	Ready to start	Active if QualyTest™ is ready for pumping down the test volume
16	Ready to measure	Active if QualyTest™ is measuring, i.e. in states counter flow, Twin-Flow™ low and Twin-Flow™ high
17	Leak	Active when the alarm setpoint is reached, passive under 90% of it
18	Error	Active in error state
19	Calibrate Acknowledge	Active if QualyTest™ is waiting for acknowledgment during calibration
23	DGND	Reference potential of digital outputs, not isolated

Example of digital inputs:



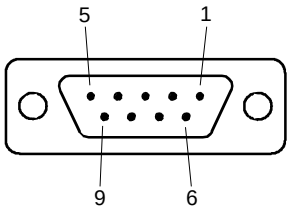
Example of digital outputs:



All outputs are wired like the "ready to start" output. The relay is shown in the off-position.

HOST

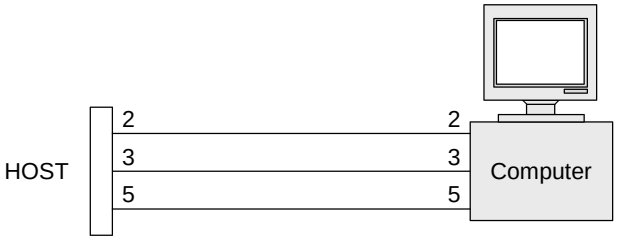
For computer (→ 🕮 [3]) or printer (→ 🗎 45)
9 poles, D subminiature female, RS232C (option RS485)

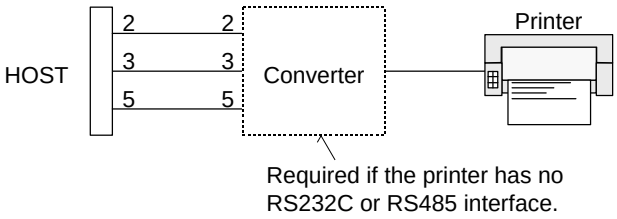


Pin	Signal	
2	TXD	Transmitted data
3	RXD	Received data
5	GGND	Reference potential isolated

Serial cable

1:1 connection

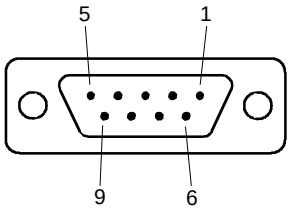




Required if the printer has no RS232C or RS485 interface.

BCR

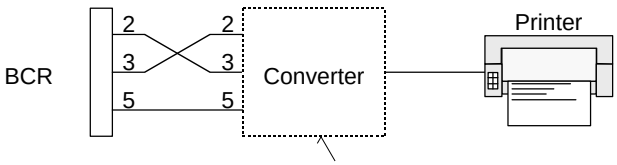
For barcode reader (→ 🗎 44) or printer (→ 🗎 45)
9 poles, D subminature female, RS232C and supply 5 V



Pin	Signal	
2	RXD	Received data
3	TXD	Transmitted data
5	GGND	Reference potential data
7	GND	Reference potential supply
9	+5 V	Supply

Serial cable

Transposed connection

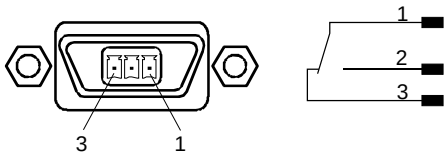


Required if the printer has no RS232C or RS485 interface.

RELAY 1

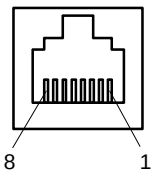
RELAY 2

Relay contact 230 V~, 3A, connector Phoenix Power Subcon, 3 poles



LP

Sniffer probe LP 503, LP 505, LP 510
RJ-45 , 8 poles



Pin	Signal
3	SUPPRESS
4	LEAK
5	READY
6	+24 V (Supply)

B: Literature

[1] Operating manual
Sniffer probe LP 503, LP 505, LP 510
BG 805 268 BE
Pfeiffer Vacuum GmbH, Berliner Strasse 43, D–35614 Asslar

[2] Maintenance instructions
QualyTest™ Helium leak detector
BG 805 457 BE
Pfeiffer Vacuum GmbH, Berliner Strasse 43, D–35614 Asslar

[3] Communication protocol
QualyTest™ Helium leak detector
BG 805 264 BE
Pfeiffer Vacuum GmbH, Berliner Strasse 43, D–35614 Asslar

[4] Operating manual
Cart for QualyTest™ helium leak detector
BG 805 265 BE
Pfeiffer Vacuum GmbH, Berliner Strasse 43, D–35614 Asslar

Declaration of contamination

The service, repair, and/or disposal of vacuum equipment and components will only be carried out if a correctly completed declaration has been submitted. Non-completion will result in delay.
This declaration may only be completed (in block letters) and signed by authorized and qualified staff.

1 Description of product

Type _____
Article Number _____
Serial Number _____

2 Reason for return

_____
_____
_____

3 Operating fluid(s) used (Must be drained before shipping.)

_____
_____

4 Process related contamination of product:

toxic	no ❑ 1)	yes ❑
caustic	no ❑ 1)	yes ❑
biological hazard	no ❑	yes ❑ 2)
explosive	no ❑	yes ❑ 2)
radioactive	no ❑	yes ❑ 2)
other harmful substances	no ❑ 1)	yes ❑



The product is free of any substances which are damaging to health yes ❑

1) or not containing any amount of hazardous residues that exceed the permissible exposure limits

2) Products thus contaminated will not be accepted without written evidence of decontamination!

5 Harmful substances, gases and/or by-products

Please list all substances, gases, and by-products which the product may have come into contact with:

Trade/product name	Chemical name (or symbol)	Precautions associated with substance	Action if human contact

6 Legally binding declaration:

I/we hereby declare that the information on this form is complete and accurate and that I/we will assume any further costs that may arise. The contaminated product will be dispatched in accordance with the applicable regulations.

Organization/company _____
Address _____ Post code, place _____
Phone _____ Fax _____
Email _____
Name _____

Date and legally binding signature _____

Company stamp

This form can be downloaded from our website.

Copies:
Original for addressee - 1 copy for accompanying documents - 1 copy for file of sender

Declaration of conformity

Product

QualyTest™
QualyTest™ Select
QualyTest™ Dry
QualyTest™ Dry+

Helium leak detector

HLT 260
HLT 265
HLT 270
HLT 275

Declaration of conformity in accordance with the listed EU guidelines

We herewith declare that the aforementioned products conform to the regulations in the listed EU guidelines.

Applied guidelines, harmonized standards and applied national standards in languages and specifications:

73/23/EEC 1993 .....

89/336/EEC 1993 .....

EN 61010–1/A2 1995 .....

EN 50081–2 1993 .....

EN 50082–2 1995 .....

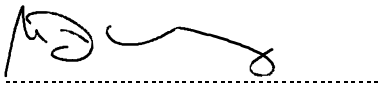
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Signature

Asslar, 8 March 1999



Wolfgang Dondorf
Managing director

Original: German BG 805 263 BD / A (0007)
bg805263be/ a

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