A PASSION FOR PERFECTION

PFEIFFER VACUUM

MiniTest 300

Operating Instructions

EN

Translation of the original operating instructions

IG 0300 BEN_E (1605)

Product identification

The information on the rating plate is required for communication with Pfeiffer Vacuum.

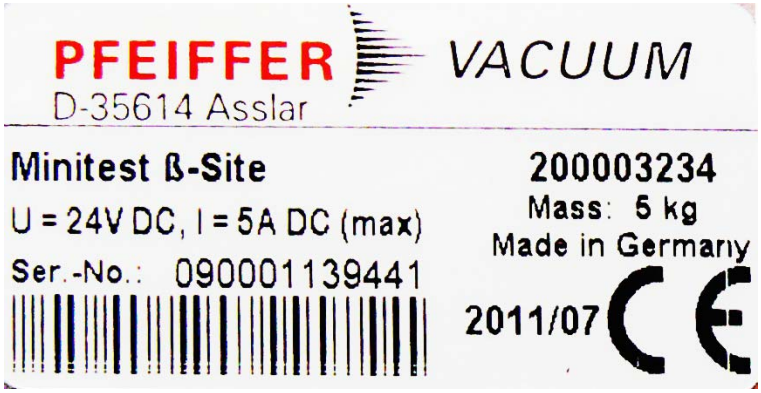

Abb. 1 Rating plate

Validity
This document is valid for products with the article number

MiniTest 300	PT L03 000

You can find the article number on the rating plate.
This document is based on the MiniTest firmware version 1.2 and higher. To use all functions, a remote control RC500 with firmware version 1.1 or higher is needed.
In case the unit does not function as described, check whether your unit is equipped with this version.
We reserve the right to make technical changes without prior notice.
The figures are not to scale.

Product characteristic
This product has been tested in accordance with the requirements set forth in guideline CAN/CSA-C22.2 No. 61010-1-12, second edition including revision 1, or a later version of the same standard applicable to the same level of rules of procedure for testing.
For more information on additional certifications, refer to the test seal (if applicable) or log on to:
www.tuvdotcom.com
Certificate number: 72132770

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1 Operating instructions

1.1 Description of the target group

This operating manual is intended for the user of the MiniTest 300 and for technically qualified specialists who are trained in the operation of the MiniTest 300 and have gained experience in vacuum technology, leak detection and leak testing.

1.2 Other applicable documents

- Operating instructions for remote control RC 500 / RC 500 WL, IG 0140 BDE.

1.3 Presentation of information

1.3.1 Warnings

DANGER

Imminent threat of danger resulting in death or severe injuries.

WARNING

Dangerous situation potentially resulting in death or severe injuries.

CAUTION

Dangerous situation resulting in minor injuries.

NOTICE

Dangerous situation resulting in damage to property or the environment.

1.3.2 Information, instructions and notes

✓ Check a precaution.

▶ An action to be taken

1 Execute actions in the specified sequence.
2 ...
3 ...

→ Shows the result of an action.

- List
- ...
- ...

Tip: Tips and useful information

"Settings":
Terms in quotation marks appear on the display as text or as a button.

2 Safety

2.1 Intended use

The MiniTest 300 is a helium leak detector and is used for localizing and measuring the smallest leaks.
It is intended for use in vacuum leak detection. The specimen must be evacuated and its outside sprayed with helium.

Tip: In order to have a comparison for the behavior of the MiniTest 300, use a reference pressure for the first measurement and observe the behavior of the MiniTest 300.

The unit is designed for mobile, industrial applications; however, it can also be installed as a stationary unit:

- for manufacturers and users of vacuum systems,
- to test for leaks in apparatuses, plants and pipe systems,
- to test for leaks in assemblies and components.

▶ Install, operate and service the unit only in compliance with this operating manual.

▶ Comply with the limits of application.

Unauthorized use

▶ Do not use the unit to vacuum off liquids. Never hold the inlet port in or near fluids; it must be connected to a vacuum system.

▶ Never expose the unit to overpressure. Pressure of more than 1100 hPa can damage the unit.

2.2 Restrictions of use

WARNING

Explosion hazard!
If the unit is operated in explosive areas, explosive mixtures could be ignited.
Temperatures of up to 400 °C can occur in the unit's vacuum system.

▶ The unit may be used only outside of explosive areas.

▶ Do not allow the vacuum system to come into contact with explosive gases.

Supposed risk
If safe operation is no longer possible, take the unit out of service and secure it against accidentally being switched on.
This can be the case, if:

- the unit shows signs of damage (outside or inside),
- a fluid has penetrated the unit,
- the unit is no longer operable,
- after extended storage under unfavorable conditions,

2.3 Dangers

Improper use of the unit can endanger the user or third parties and can damage the unit and other property items.

2.3.1 Danger due to electric voltage

WARNING

Possible danger due to electric voltage!
If a supply voltage of 24 V DC is applied, higher voltage is generated in the unit, which can be dangerous if the unit is opened in this state.

▶ Never open the unit when it is connected to the supply voltage.

WARNING

Possible danger due to electric voltage!
Opening a power supply pack can result in electric shock or injuries.

▶ Never open external power supply packs.

2.3.2 Danger due to permanent magnets

WARNING

Strong magnetic fields can disturb or impair the function of electronic instruments, such as pacemakers.

▶ Maintain a safety clearance of ≥10 cm between pacemaker and magnet or prevent the influence of magnetic fields with appropriate shields.

2.3.3 Danger due to radio interference

CAUTION

Possible danger due to radio interference!
During operation of the wireless RC 500 WL, a minimum distance of 7 cm must be maintained between the remote control and personnel, with the exception of hands and wrists[1].

- ▶ Operation at a shorter distance is not allowed.

[1] The RC 500 WL complies with Part 15 of the FCC regulations.
FCC: Federal Communications Commission,
approval authority for communication devices (USA)

2.3.4 Danger of material damage to unit

NOTICE

Possible material damage due to helium.
Even when the unit is switched off, the sensor is affected by nearby helium. Contact with increased concentrations of helium has a negative effect on the minimum detection limit and can cause damage.

- ▶ Always keep the connecting flange of the unit closed with a blank flange. Remove the blank flange only when installing the device on a system.
- ▶ Do not store the unit together with helium-filled gas cylinders (such as test leaks) in a transport case, container, housing or cabinet.
- ▶ Do not spray the unit directly with helium.

NOTICE

Material damage due to overpressure.
Absolute pressure of more than 1100 hPa in the unit's vacuum system can destroy the sensor.

- ▶ The absolute pressure must remain below 1100 hPa at all times.

NOTICE

Possible material damage due to chemical solutions.
Alkalis, acids or solvents can damage the unit.

- ▶ Keep the unit away from alkalis, acids and solvents; in particular, avoid penetration of these media into the connection flange.

2.3.5 Dangers due to handling of the battery

Battery of the wireless remote control RC 500 WL

When handling the battery of the wireless RC 500 WL, comply with the information in the operating manual for the remote control. (Document number IG0140BDE).

2.4 Operator requirements

Safety conscious operation

- ▶ Operate the unit only if it is in perfect working order and as intended, in a safety-conscious manner and fully aware of dangers, in compliance with this operating manual.
- ▶ Observe and ensure compliance with the following regulations:
  - Intended use,
  - Statutory or other safety and accident prevention regulations,
  - International, national and local standards and guidelines.
- ▶ Use only original spare parts or spare parts approved by the manufacturer.
- ▶ Keep this operating manual available at the operating site, also for later use.

Personnel qualifications

- ▶ All work must be performed only by technical specialists who have been trained on the unit.
- ▶ Make sure that the authorized personnel have read and understood this manual and all other applicable documents, especially the information on safety and operation of the unit, before starting work.
- ▶ Define responsibilities, authorizations and supervision of personnel.
- ▶ Allow personnel in training to work on the unit only under the supervision of technical specialists.
- ▶ Observe additional provisions and regulations that are specific to the unit.

2.5 User requirements

- ▶ Read, observe and follow the information in this operating manual and the working instructions created by the owner, especially the safety instructions and warnings.
- ▶ Perform all work based on the complete operating manual.

3 Transport, storage, unpacking

3.1 Transport

▶ Transport the unit only in the original packaging.

3.2 Storage

NOTICE

Possible material damage due to helium.
Even when the unit is switched off, the sensor is affected by nearby helium. Contact with increased concentrations of helium has a negative effect on the minimum detection limit and can cause damage.

▶ Always keep the connecting flange of the unit closed with a blank flange. Remove the blank flange only when installing the device on a system.

▶ Do not store the unit together with helium-filled gas cylinders (such as test leaks) in a transport case, container, housing or cabinet.

Tip: To prolong the life of the sensor and to shorten the run-up time, we recommend evacuating the unit or storing it in a helium-free gas (e.g. N_2).

3.3 Unpacking

▶ Check shipment to make sure it is complete (see Chapter 4.1).

4 Description

4.1 Scope of delivery

- MiniTest 300
- Power supply unit
- Power cable
- Product documentation
- Coupling for an external vacuum pump

Note: The remote control required for operation of the unit is not included in the scope of delivery (for ordering information, see Chapter 11.2)

4.2 Design of the unit

Fig. 1 MiniTest 300

The unit features a compact housing for mobile use.
On the rear side there is a DN KF 25 connection flange (see Fig. 3).
It is used to connect the unit to the system to be tested for leaks.
The MiniTest 300 has no wear parts and is therefore maintenance-free.

4.2.1 Display and operation

On the front side there is an operating mode display, which can light up in different colors:

Color	Meaning
Green	Ready for operation or in operation
Yellow	No connection to the remote control RC 500/RC 500 WL and no continuous connection to the computer.
Red	Malfunction

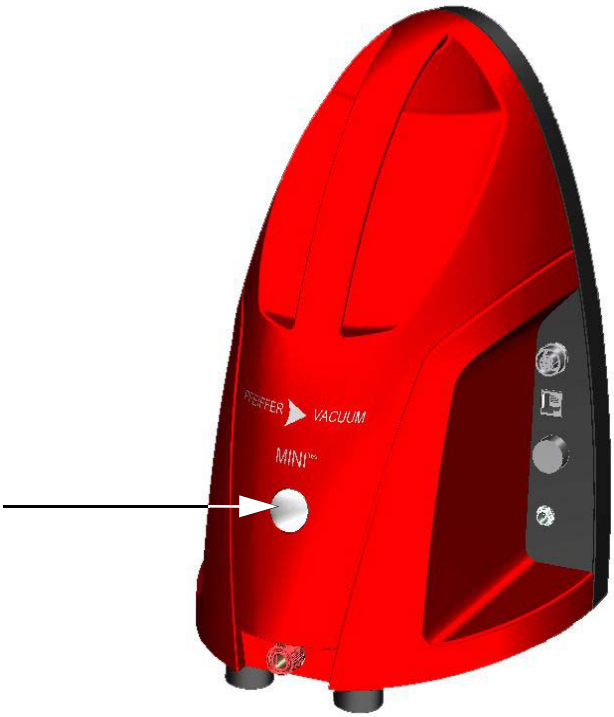


Fig. 2 The display element lights up in three different colors

All other operating and display elements are located on the remote control.

4.2.2 Connecting flange

The connection flange on the rear side of the unit must be closed with a blank flange when the unit is not in operation.
During installation on a system, a sealing ring with a sinter filter must be inserted at the connection flange (see Chapter 4.3.3).

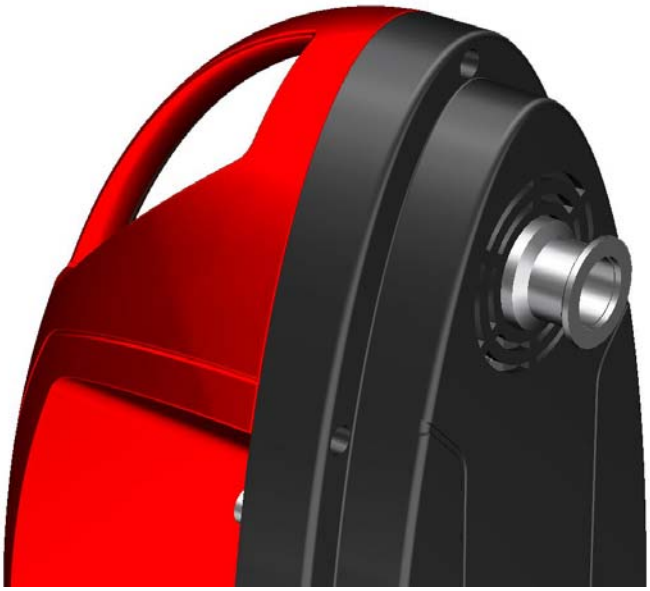


Fig. 3 Vacuum connection flange of the unit

4.2.3 Connection of optional vacuum pump

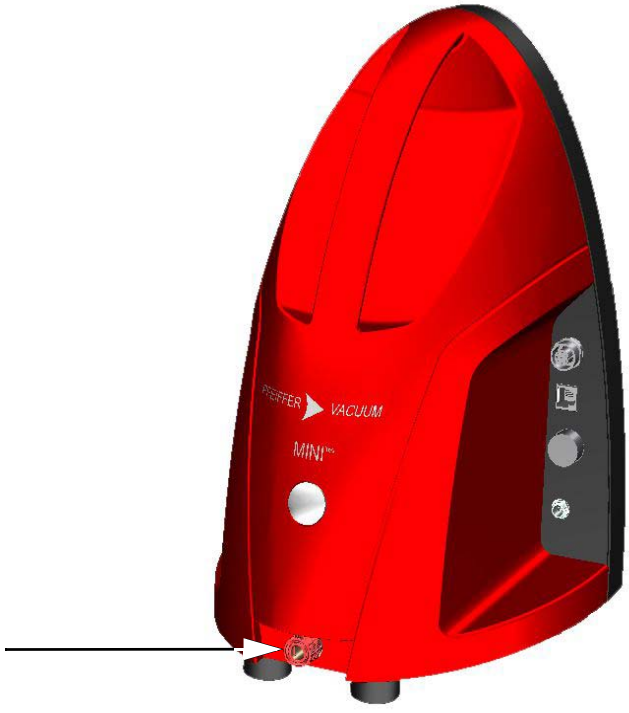


Fig. 4 Connection of vacuum pump

The connection for the optional vacuum pump has a shut-off valve. The valve allows passage when the coupling of the connecting hose is attached.
If the valve is actuated otherwise, this can result in venting of vacuum system and the connected system.
All vacuum pumps that generate a final pressure that is lower than the pressure in the system can be connected. See also Chapter 4.3.5.

4.2.4 Electrical connections

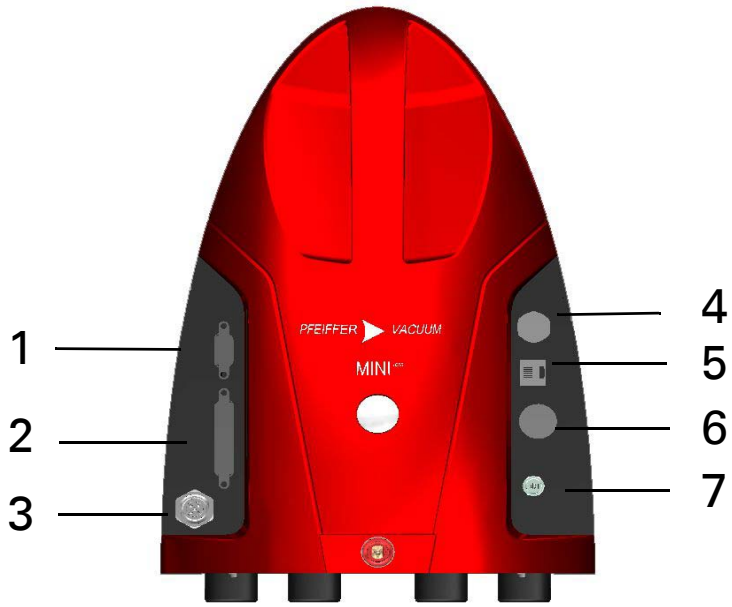


Fig. 5 Electrical connections on the MiniTest 300

No.	Description of connection
1	Radio transmitter: Radio transmitter for wireless remote control D-SUB (DE9)
2	Input / Output: Inputs and outputs for D-SUB (DB25)
3	RS-485: Host RS-485 (serial port)
4 *	Extension: Extension set
5	RC (Remote control): Wired remote control (RJ-25)
6	Gauge: External pressure sensor
7	24 V DC: Supply voltage to the unit (24 V DC power supply pack)

* This connection is not yet enabled.

WARNING

Possible danger due to electric voltage
If voltages >60V (DC) or 24V (AC) are connected to the socket, this can destroy the unit or cause danger to life and limb.

► Never connect a higher voltage than >60V (DC) or 24V (AC).

Input and output signals, 25-pin, D-sub socket

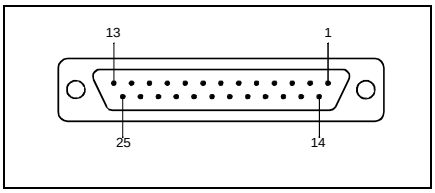


Fig. 6

Pin	Assignment	Explanation
1	Channel 1	Analog output 0 ... 10 V
2	Channel 2	Analog output 0 ... 10 V
3	AGND	Reference potential of the analog outputs
6	PLC_In_1	Clear: Resets warnings and errors *
8	PLC_In_2	Zero: Same function as ZERO key *
9	PLC_In_3	currently not used
14	DGND	Reference potential of the digital inputs
16	PLC_OUT_1	Set at factory: Ready; see Chapter 7.4.1.6.
17	PLC_OUT_2	Set at factory: Trigger; see Chapter 7.4.1.6.
18	PLC_OUT_3	Set at factory: WrnErr; see Chapter 7.4.1.6.
23	DGND	Reference potential of the digital outputs
25	+24 V	+24 V e.g. for actuating the digital inputs; max 100 mA

* The functions of the digital inputs Pin 6, 8 and 9 are triggered by a positive flank (+18 ... +30 V; ca. 1.2 mA) and are at the same level as the control unit.

4.3 Components and accessories

4.3.1 Power supply pack for the MiniTest 300

The power supply pack for the MiniTest 300 provides the supply voltage for operating the unit.

On the input side the power supply pack is connected to the mains voltage by means of a mains cable. The mains cable plugs into the power supply pack.

On the output side the cable is permanently connected to the power supply pack.
The cable has a coaxial power connector with a lock nut.

(For technical data, see Chapter 5.3.)

4.3.2 Mains adapter/charger for the wireless remote control RC 500 WL

The mains adapter/charger is used to charge the battery of the wireless remote control RC 500 WL.

The coaxial power connector on the cable of the power supply pack must be connected to the remote control for charging.
During charging the remote control is always switched on and the LED "CHARGING" lights up.

The LED switches off as soon as the battery has fully charged.

The battery can be charged during operation.

The power supply pack can be used anywhere in the world. The mains plug can be exchanged for adaptation to the national design.

(For technical data, see Chapter 5.3.)

4.3.3 Sinter filter for vacuum connection

The sinter filter protects the unit's vacuum system from contamination.
It is inserted at the vacuum connection flange of the unit (see Fig. 10, no. 1).

Fig. 7 Sinter filter for vacuum connection

4.3.4 Calibrated test leak (pin leak)

An optional calibrated test leak is installed on the system to be tested by means of a KF16 flange.
It provides defined leakage.
It is used to calibrate the MiniTest 300 on the system.
(See also Chapter 4.4.)

Fig. 8 Calibrated test leak with connection flange

4.3.5 Coupling for a hose to the vacuum pump

Internal diameter of the hose:	4 mm
External diameter of the hose:	6 mm

Fig. 9 Coupling

4.4 Function

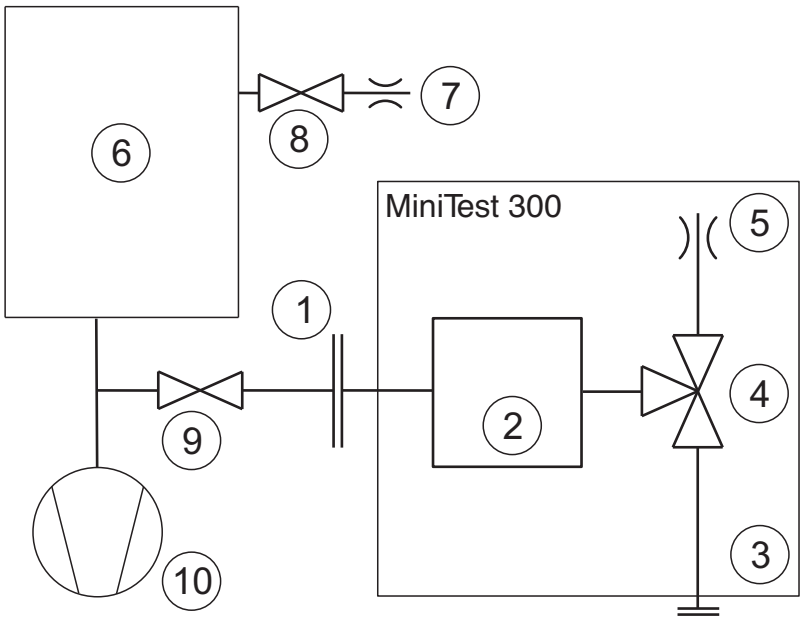


Fig. 10 For example: Vacuum diagram of the MiniTest 300 on a system

No.	Description
1	Vacuum connection flange DN KF 25
2	Sensor
3	Connection of optional vacuum pump
4	Valve
5	Inlet with throttle valve for purging the sensor with air
6	System being tested under vacuum
7	Calibrated test leak (pin leak)
8	Shut-off valve for test leak
9	Shut-off valve to MiniTest 300
10	Vacuum pump of system being checked

Functioning principle of the unit and of leak detection

Connect the unit to the system to be checked (6) via the vacuum connection flange (1).
The system (6) must be evacuated (P < 20 hPa) to test for leaks or find leaks.
The connection (3) can optionally be connected to an additional vacuum pump. To prepare for the leak test, this pump can evacuate the unit's vacuum system while the shut-off valve (9) is still closed.
For the test, the shut-off valve (9) has to be opened. The optional pump can generate a gas flow, which reduces the response time of the sensor at higher system pressures.
The sensor (2) measures the partial pressure of helium in the vacuum.
The displayed leakage rate is calculated based on this pressure and the throughput of the installed pump (10).

The throughput is not known to the unit, which is why it is calibrated to the system using a test leak (7).
The test leak is sprayed with helium to calibrate the unit.
The shut-off valve (8) is open during this time.
Suspected leaks in the system are sprayed from outside with helium to test their tightness and find leaks.

Note: For a multi-stage pumping system, it is recommended to install the MiniTest 300 on the inlet of the booster pump. This improves the effect of the volume flow rate of the system's main pump on the response time and the signal strength, since helium penetrating the system is actively supplied to the MiniTest 300.

Automatic purge

The unit’s sensor must be protected from excessively high helium partial pressure. Otherwise, the detection limit will temporarily become worse. Very high helium partial pressure over an extended period can also damage the sensor.

Automatic purge is enabled at the factory to protect the sensor:

The valve (4) opens the inlet with the throttle valve (5) if the maximum permissible limit for the helium partial pressure is exceeded. The sensor is purged for a short time with air from outside.
The air flows through the MiniTest 300 into the system being tested. (For the gas flow of the throttle valve see Chapter 5.4.)

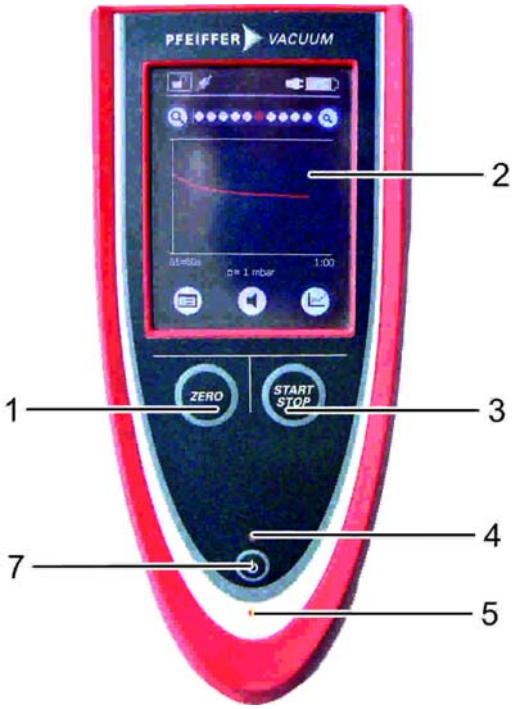
Note: Disabling automatic purge can extend the run-in period until the next measurement.

Note: Every purge increases the total pressure in the vacuum chamber by approximately 5E-2 hPa l per liter of vacuum chamber volume.

4.5 Remote control

The remote control is used to control the unit, as well as for display and data storage.
The remote control is available in two versions:

- Wireless connection to the unit (RC 500 WL)
  (The radio transmitter is connected to the unit. Alternatively, this remote control can also be connected by cable to the unit.)
- Cable connection to the unit (RC 500).



No.	Description
1	ZERO button
2	Touch Display
3	START/STOP button
4	Operating LED
5	CHARGE LED
6	POWER button

Fig. 11 Remote control RC 500 WL

ZERO button (1)

ZERO function; in measuring mode, the current helium underground is considered a zero value. In search mode the graph is started again.

Touch display (2)

Display and user interface.

START/STOP button (3)

Starts measuring from “READY” mode.
Press again to switch back to “READY” mode.

LED “Operation” (4)

Lights up right after switching on; flashes when the display is switched off.

LED “Charging” (RC 500 WL) (5)

Lights up while the battery of the wireless remote control is charging.

POWER button (6)

RC 500 WL: Switch-on button.

Press this button briefly to switch on the remote control; after starting, it is ready for operation.
Press again to display the switch-off menu.

RC 500: The remote control switches on when the cable is plugged in.
The Power button can be used to switch off the display of the remote control.

4.5.1 Paging function

Locate the remote control RC 500 WL by means of an audible signal:.
The remote control can be located by means of an audible signal by pressing the “Paging” button on the MiniTest 300 and there is a connection between the two devices.

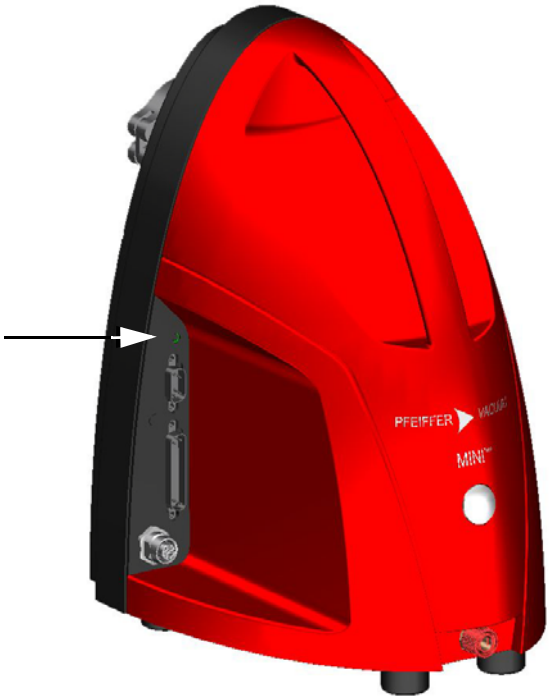


Fig. 12 PAGING button on MiniTest 300

4.5.2 User interface

Operation of the unit is sub-divided into various areas with different graphical interfaces:
measuring, calibration, configuration, reading of data, display of information and errors, etc.
The user can switch between these areas during operation of the unit. Icons and softkeys are provided for this purpose.

4.5.2.1 Measuring

The readings can be displayed in different ways. It is possible to switch between the different views. The graphical interface includes active softkeys and the display of status icons.

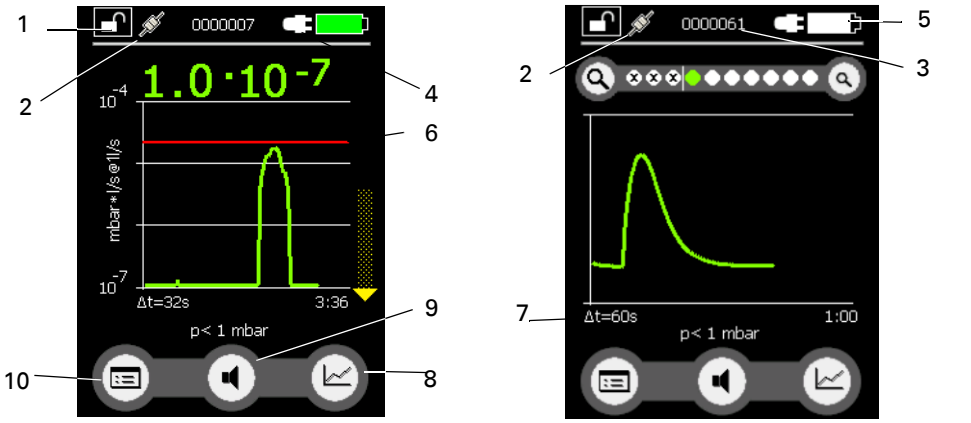


Fig. 13 Measuring and search mode

No.	Description
1	Keypad locking is off (see operating manual for remote control RC 500/ RC 500 WL, IG 0140 BDE)
2	Remote control is connected to the leak detector
3	Data recording, number of the current file
4	Charging voltage is connected to the remote control
5	Charging status of battery in the remote control Green: Relatively high charge Yellow: Relatively low charge white: Battery is charging
6	Displays trigger values as a line
7	Displays measuring interval
8	Switches display between measuring and search mode
9	Adjust loudness
10	Select main menu

- If the connection to the MiniTest 300 is interrupted:

→ The graph, the numerical values of the leakage rate and of the pressure become gray. The icon for the connection status changes.

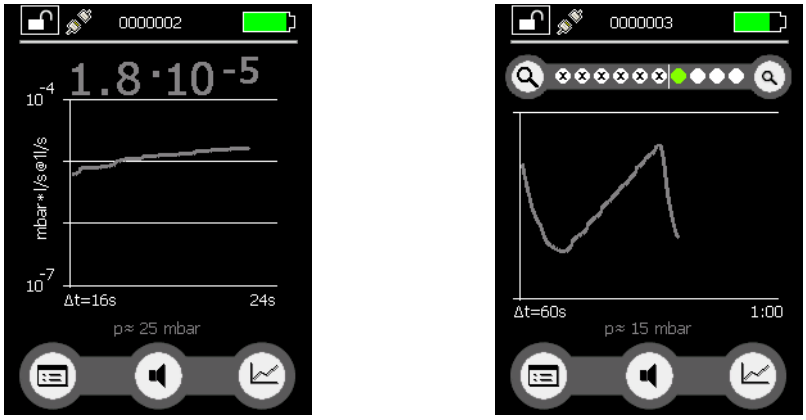


Fig. 14 Display in case of interrupted connection

4.5.2.2 User prompts

For certain operating steps the graphical interface displays text messages that prompt an action or a confirmation.

Fig. 15 User prompts and confirmation during calibration

The “TL” button can be used to enter the leakage rate of the test leak.

4.5.2.3 Menu tree

The parameters of the unit are arranged in a tree structure.
The top level is the main menu.
From here, it branches off into the other menu levels, where all parameters can be found.
(The entire menu tree is shown in Chapter 7.2.)
Softkeys are used for navigating in the menu tree.

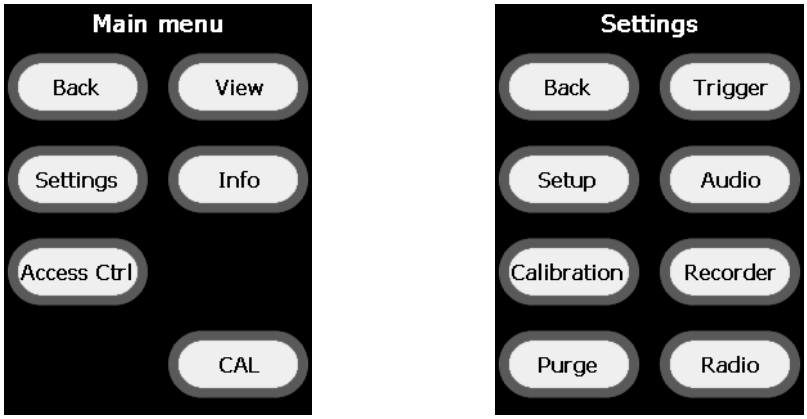


Fig. 16 Main menu and menu settings from the next level

4.5.2.4 Configuring parameters

Certain parameters can be enabled or disabled.
The active state is displayed.

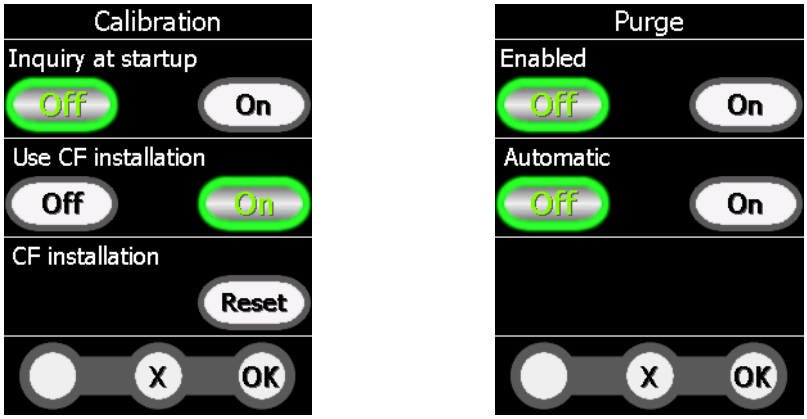


Fig. 17 Parameters to be enabled or disabled

Values can be set for many parameters.
The value can be changed with arrow keys or it can be entered as a numerical value.

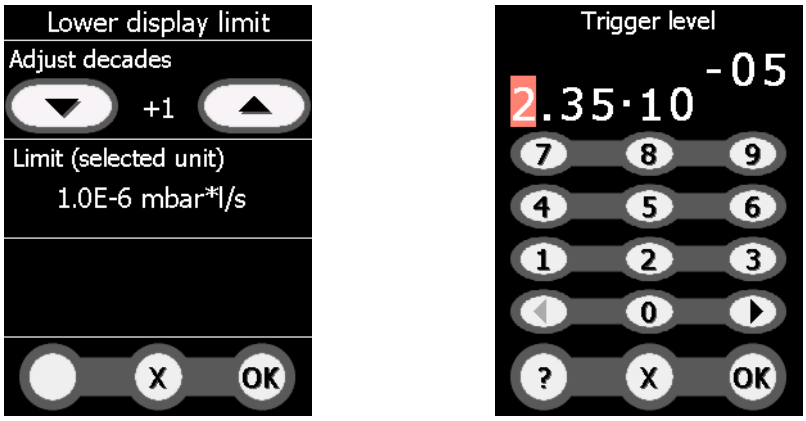


Fig. 18 Value to be changed with arrow keys and value entered numerically

4.5.2.5 Status of remote control and unit

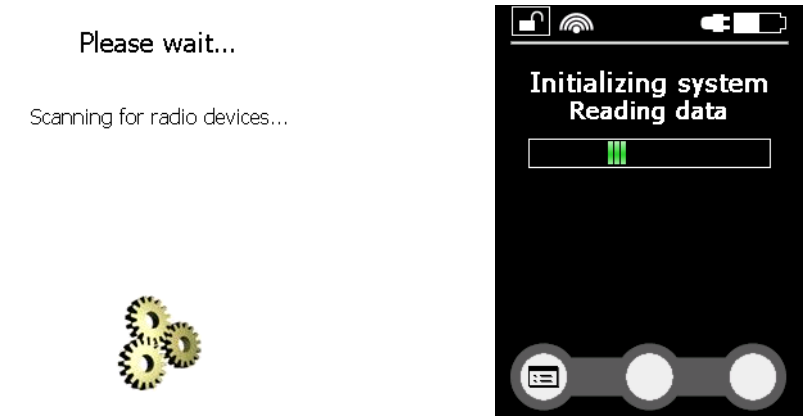


Fig. 19 Remote control radio scan and initialization with data transfer

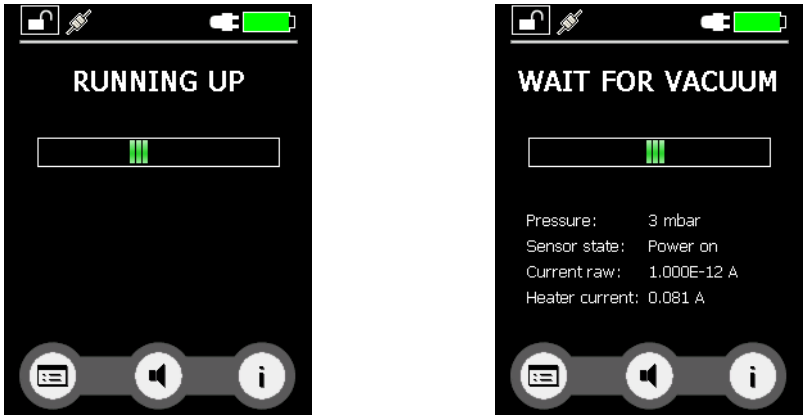


Fig. 20 MiniTest 300: Run-up and wait for vacuum

4.5.2.6 Information

The graphical interface provides various system information.

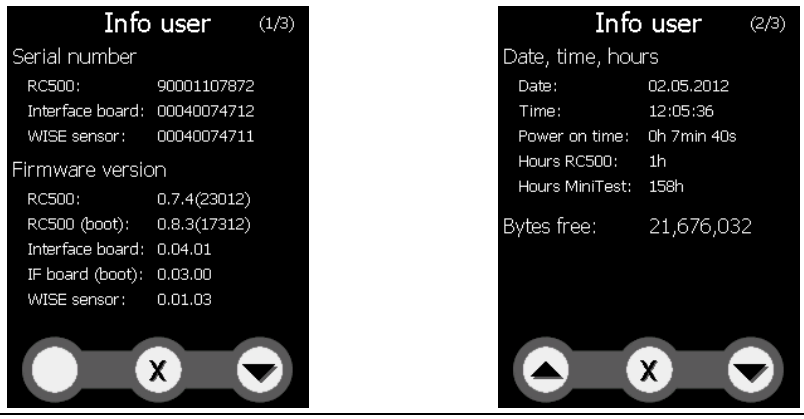


Fig. 21 Information on the version and basic data

4.5.2.7 Error Messages

Fig. 22 Warning 520 or calibration failed

The “C” key deletes the error message if this is possible.
(See also Chapter 8.1)

4.5.2.8 Help texts

Help texts can be opened in various menus by pressing the “?” key.

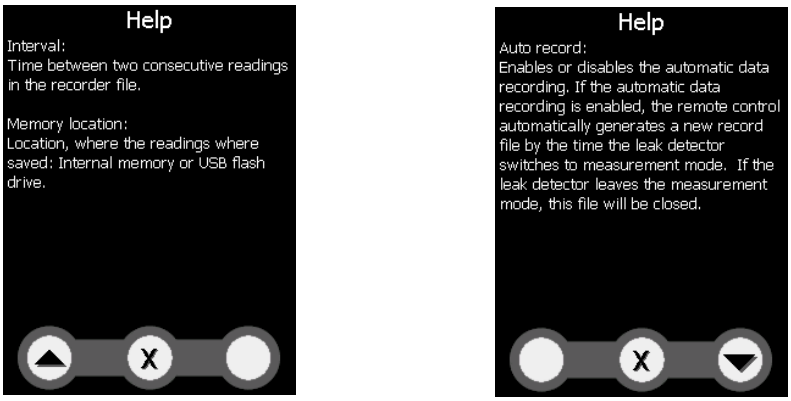


Fig. 23 Help texts

5 Technical data

5.1 Mechanical data

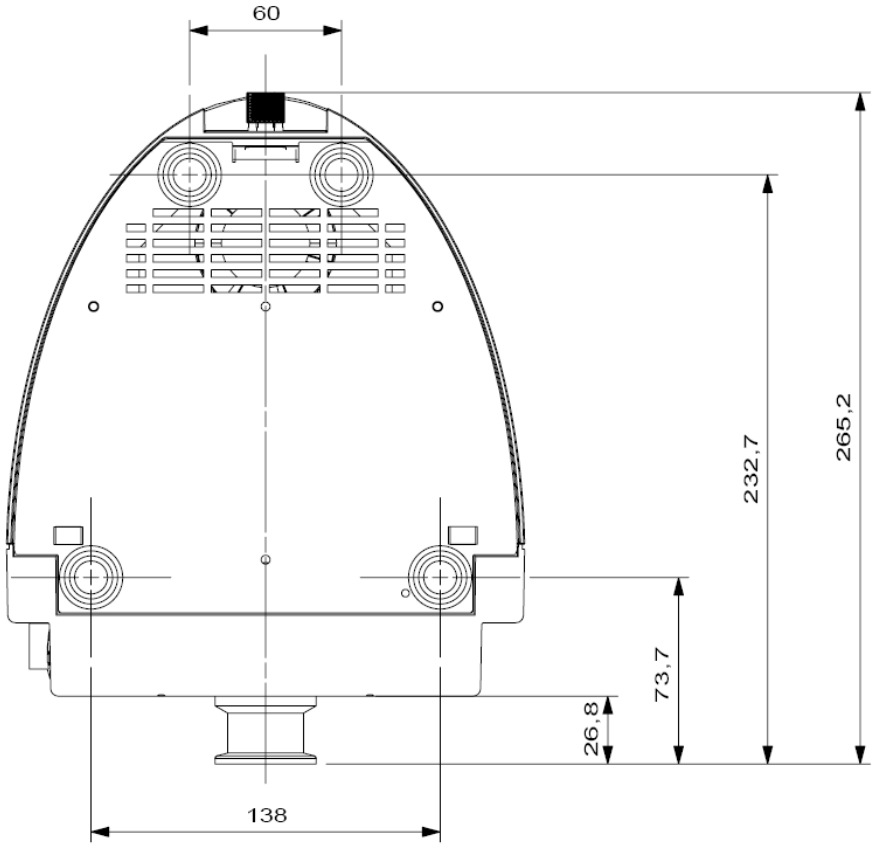


Fig. 24 Bottom side

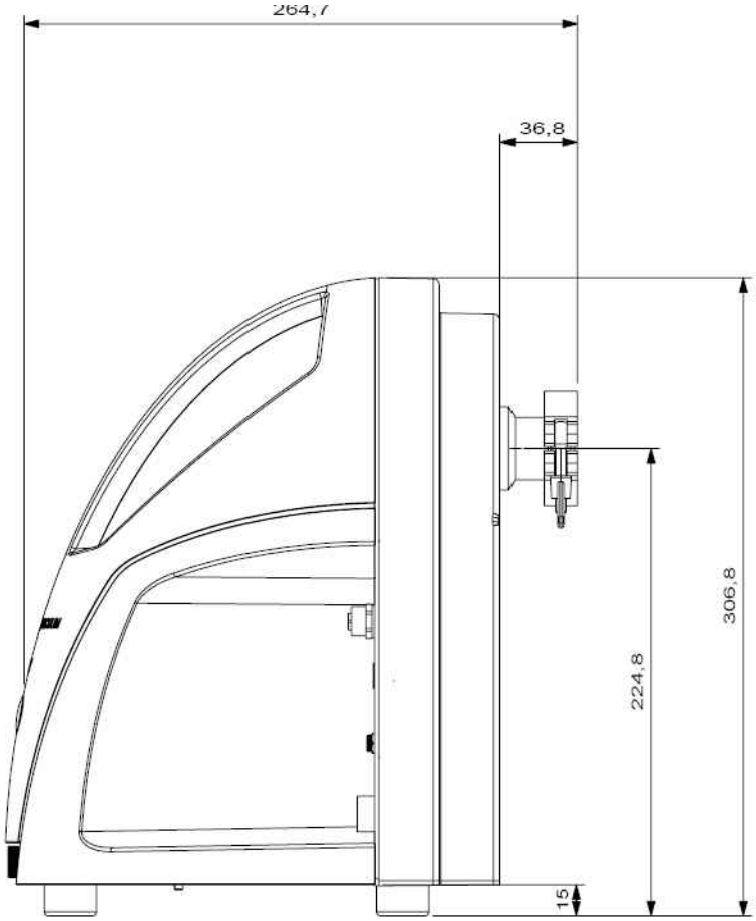


Fig. 25 Side view

Leak detector	
Dimensions (height x width x depth, including flange)	307 x 205 x 265 mm
Free space at the top and bottom for ventilation	10 cm each
Noise level	<70 dB/A (acc. to IEC standard)
Weight	5 kg

External vacuum pump	
Connecting hose	

5.2 Ambient conditions

Intended for indoor use only	
Max. permissible height above sea level (during operation)	2000 m

Leak detector	
Storage temperature	-10 °C ... +55 °C
Operating temperature	+10 °C ... +35 °C
Relative humidity	max. 80% up to +31°C, up to +35 °C lin. decreasing to 50%

5.3 Electrical data

Leak detector	
Power supply	U = 24 VDC I = 5 ADC (max.)
Power input of power supply pack	max. 2 A

5.4 Physical data

NOTICE

Imprecise measurements due to measuring with the internal pressure sensor.
The internal pressure sensor is not suitable for precise measurements; it is only a pressure indicator.

► Use an external pressure sensor for precise pressure measurements.

Maximum operating pressure (lower pressure → shorter response time)	200 hPa absolute
Minimum detectable leak rate (MDLR) (For helium volume flow rate of system pump = 1 l/s, larger volume flow rate → linear increasing value, e.g. volume flow rate = 10 l/s → MDLR = $5 \cdot 10^{-6}$ hPa l/s)	$5 \cdot 10^{-7}$ hPa l/s
Warm-up time of cold unit	20 ... 60 min.

Optional test leaks:	
TL3	$3 \cdot 10^{-3}$ hPa l/s
TL4	$3 \cdot 10^{-4}$ hPa l/s
TL5	$3 \cdot 10^{-5}$ hPa l/s
Gas flow of throttle valve for purging the sensor	1 hPa l/s

6 Installation

Tip: When the unit is switched on, it is not sensitive to condensation water in the vacuum system.
After it is completely installed, always switch the unit on and leave it switched on.

6.1 Preparation

NOTICE

Possible material damage due to helium.
Even when the unit is switched off, the sensor is affected by nearby helium. Contact with increased concentrations of helium has a negative effect on the minimum detection limit and can cause damage.

▶ When the unit is not in use, always keep the connection flange of the unit closed with a blank flange or shut-off valve on the system. Remove the blank flange only when installing the device on a system.

NOTICE

Possible material damage due to solvents.
Solvents can damage the unit if they penetrate it.
During operation, surfaces in the unit's sensor can reach temperatures as high as 400°C.

▶ Do not use any solvents.

✓ Check for completeness has been conducted (see Chapter 4.1).

✓ A free KF connection is provided on the system.

▶ Set the unit down in a clean environment.

▶ Remove the blank flange from the vacuum connection of the unit.

▶ Check inside of connecting flange to make sure it is clean and dry.
Insert sinter filter.

▶ Connect the unit to the plant vacuum system.

NOTICE

For systems with a high water vapor content, condensation water can accumulate inside the MiniTest 300.

▶ Turn the MiniTest 300 upside down to drain the condensation water from the unit.

6.2 Connecting the vacuum system

Tip: Avoid the accumulation of condensation water when the unit is switched off.

- If the unit must also remain installed in switched off condition,
- and condensation water is to be expected in the vacuum system,

▶ then the unit should be installed upside down (turned 180° around the connection flange).

▶ Check that the sinter filter is correctly seated on the connecting flange.

▶ Flange mount the unit and check for firm seat.

⚠ CAUTION

Potential injuries and material damage!
The handle of the unit is designed only for transporting the MiniTest 300 and is not suitable for carrying other loads.

▶ Use the handle only for transporting the unit itself.

Connection of optional vacuum pump

NOTICE

Avoid potential malfunctions or material damage.
The connection for the optional vacuum pump has a shut-off valve.
The valve allows passage when the connecting hose is attached.
If the valve is actuated otherwise mechanically, this can result in venting of the unit and the system.

▶ Take measures to prevent the valve from being actuated inadvertently.

For installation you will need the connection kit for the vacuum pump (see Chapter 11.2).

▶ Install a coupling on the connecting hose.

▶ Connect connecting hose with vacuum pump and unit (for further information on the coupling, see Chapter 4.2.3).

6.3 Connecting the controller

6.3.1 Wireless remote control

- ▶ Plug the radio transmitter for the wireless remote control into the SUB-D connection.
  (See Chapter 4.2.4, Fig. 5, no. 1)
- ▶ Alternatively, the wireless remote control can be connected to the unit by a cable.

Fig. 26 Radio transmitter connected to the MiniTest 300

6.3.2 Wired remote control

▶ Connect the wired remote control RC 500 to the MiniTest 300 using the RJ25 cable.
(See Chapter 4.2.4, Fig. 5, no. 5)

Fig. 27 Remote control connected by cable

6.4 Installing accessories

6.4.1 Connecting the test leak

✓ The system to be tested has a free connection flange for the test leak.

▶ Connect the calibrated test leak according to proper procedure (see Chapter 4.3.4) to the connection flange of the system.

6.5 Connecting the electrical power supply

✓ Mains voltage complies with requirements (see Chapter 5.3).

NOTICE

Avoid potential material damage.
Currents caused by compensation of potential can cause long-term damage if the electrical power supply is not connected in the order specified.

▶ Always connect the electrical power supply in the specified order.

1. Connect the coaxial power connector of the power supply pack to the unit and screw it tight
   ("24 V DC connection" see Chapter 4.4, Fig. 5, no. 6).
2. Connect the power cable to the power supply pack.
3. Plug the mains plug of the power cable into the socket (100...240 VAC).

→ The power-on indicator lamp of the unit lights up.

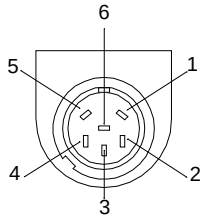
6.6 Connecting external pressure gauges

"Type" indicates the type of gauges that are connected and "Pressure p(ext)" indicates the measured value of the gauges (see also Chapter 7.4.1.6.).

CAUTION

The MiniTest 300 can be destroyed.
These gauges have a higher power requirement. Do not connect PBR and IMR.

GAUGE HEAD



Pin	Assignment
1	Identification
2	DGND (0 V)
3	Measured signal
4	Measured signal
5	Shielding
6	+24 V

Fig. 28

Compact gauges that can be used

Linear gauges	Display Control unit	Gauge designation
Compact Capacitance Gauges	linear	CMR 261, CMR 262, CMR 263, CMR 264, CMR 271, CMR 272, CMR 273, CMR 274, CMR 275, CMR 361, CMR 362, CMR 363, CMR 364, CMR 365, CMR 371, CMR 372, CMR 373, CMR 374, CMR 375
Compact Piezo Gauges	linear	APR 250, APR 260, APR 262, APR 265, APR 266, APR 267

Logarithmic gauges	Display Control unit	Gauge designation
Compact Pirani Gauges	TPR[1]	TPR 280
Compact Pirani / Capacitance Gauges	PCR 260	PCR 260
Compact FullRange^{TM} CC Gauges	PKR	PKR 251, PKR 261

[1)] The pressure value for gauges of type TRP / PCR is displayed only up to 1000 hPa. Pressures above 1000 hPa are displayed as >1000 hPa.

7 Operation

7.1 Switching on the unit

✓ The electrical power supply of the MiniTest 300 has been connected.

7.1.1 Wireless remote control RC 500 WL

Refer also to the operating manual for remote control RC 500/RC 500 WL, IG 0140 BDE.

▶ Press the POWER button to switch on the remote control.

✓ The remote control is set to wireless operation.

→ The remote control automatically attempts to connect to the unit that was used last.

→ The search for available units must be selected in the menu (see Chapter 7.4.7). Select the desired unit from the list of available units and confirm.

→ After a few seconds the remote control establishes the wireless connection to the unit.

Operating the remote control with a cable connection

✓ Connecting cable RJ25 has been connected (see Chapter 6.3.2).

▶ Select wired connection of the remote control by disabling the wireless connection (see operating manual for remote control RC 500/RC 500 WL IG 0140).

7.1.2 Wired remote control RC 500

Refer also to the operating manual for remote control RC500/RC 500 WL, IG 0140 BDE.

✓ The wired remote control RC 500 is supplied with power via the connecting cable to the MiniTest 300.
It switches on as soon as it has been connected and the power supply has been connected to the MiniTest 300.

7.1.3 Startup of the unit

✓ The remote control has established the connection with the MiniTest 300:

→ The system data are transferred to the remote control.
Display: “Reading data”.

✓ “Use CF installation” has been enabled and a calibration factor (CF) has been saved.

→ The prompt “Use CF installation” appears.

▶ Either confirm the prompt with “OK” if the saved calibration factor should be used. (This is useful only if a calibration was previously conducted on the same system).

▶ or respond with “NO” if the unit should remain uncalibrated or should be re-calibrated.

✓ The remote control is ready for operation.
The current status of the MiniTest 300 is displayed.

Status of MiniTest 300	**Action**
Running up	Wait for “READY TO START”
Heating	Wait for “READY TO START”
Wait for vacuum	Evacuate the system, reduce pressure below “Maximum operating pressure” 5.4, Wait for “READY TO START”
Ready to start	Press START/STOP, wait for Measurement screen.

After being switched on, the unit needs a **warm-up phase**.
The warm-up time depends on how long the unit was switched off and the storage conditions 3.2.
Full sensitivity is reached only after the unit has warmed up.

▶ Wait for completion of the warm-up phase before calibrating or measuring.

Fig. 29 MiniTest 300: Heating of the sensor and “READY TO START”

Press the “i” key to display additional information.

7.2 Navigation in the menu

▶ In the Measurement screen, press the “Main menu ” key to open the menu.

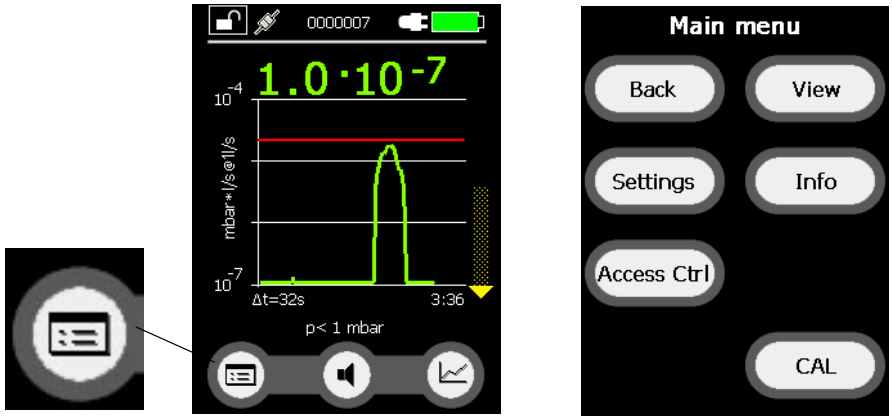


Fig. 30 Main menu key in the Measurement screen and the opened menu

The main menu is the topmost level of the menu tree.

▶ Press a key in the main menu to go to the next level.

▶ Follow the tree structure of the menu until you reach the desired parameter. (See menu tree on the following pages.)

▶ Set the desired parameter and confirm the setting.

▶ Press the “Back” key to go to the next higher level.

▶ In the main menu, press the “Back” key to go the Measurement screen.

The following overview shows the entire menu tree below the main menu.

Back				
Settings	Back			
	Setup	Back		
		Language	English, German, French, Spanish	
		Power	Display off after	15s, 30s, 1 min., 2 min, 5 min., 10 min., ∞
			Autom. shut-off after	5 min., 10 min, 20 min., 30 min., 1 h, 2 h, 4h, ∞
		Units (Other units)	MiniTest	Set
			HLT 5xx	Set
		Time	Time / date	
		Parameter	Back	
			Reset (Reset parameters)	Factory setting RC 500
				Factory setting MiniTest
		I/O	Back	
			PLC output (PLC outputs)	Configuration Output 1, 2, 3
			Serial (Serial interface)	
			Bus address	
			Gauge (Compact Gauge)	Full-scale deflection [hPa]
				Connected tubes
			Units (Interface units)	Leak rate
				Pressure
			Analog outputs (Analog outputs)	Configuration Output 1, 2
			Analog scaling (Analog scaling)	Scaling for the leakage rate
			Analog limit (Leakage rate upper limit)	
		Calibration	Prompt at start	Off, On
			CF installation use	Off, On
			CF installation	Reset
		Purge (Automatic purge)	Release	Off, On
		Trigger (trigger level)		
		Audio	Volume level	0...15
			Mode	Prop leak rate, Setpoint, Pinpoint

Continued on next page

Settings	Recorder (Recorder settings)	Back		
		Recorder (Recorder settings)	Data recording	Off, On
			Interval	200 ms, 500 ms, 1 s, 2 s, 5 s
		Screenshot (Screenshot setting)	Release	Off, On
			Storage location	USB, internal
		Copy (Copy file)	copy to USB flash drive	
		Delete (Delete file)	delete in flash	
	Radio	Back		
		Wireless connection	Off, On	
		Other units	search for units, available units, connect	
Access ctrl	Back			
	Service			
	Lock (Locking stage)	Calibration	Off, On	disabled CAL
		Zero	Off, On	disabled ZERO
		Change settings	Off, On	disabled Settings
View	Back			
	Limit value (display limit)	Pre-selection limit	0, +1, +2, +3	
		Limit (unit)		
	P Adjustment	Pressure zero point	Clear, Set (+value)	
		Pressure flooded	Clear, Set (+value)	
		Pressure	35 hPa (current reading)	
	Units (display units)	Leak rate	hPa l/s, Pa m^3/s, Torr l/s, atm cc/s, sccm, sccs	
		Pressure	hPa, Pa, atm, Torr	
	P selection (pressure selection)	Displayed pressure	internal	
			external	
		Connected tubes		
Info	Back			
	System (System info)	10 Pages		
	Errors (error list)	16 entries on 4 pages		
	Status report			
	User (Info User)	3 Pages		
CAL				

7.3 Basic functions

7.3.1 Use key with basic functions

The menu screens for setting parameters include three softkeys with basic functions:

Fig. 31 Keys with basic functions

▶ Press “?”.

→ Opens a help window (if available).

▶ Press “X”.

→ Leave the current menu screen; changes are **not** saved.

Tip: Always leave menu screens by pressing “X” to leave the selected parameter unchanged or to cancel any changes that were made.

▶ Press “OK”.

→ Leave the current menu screen; changes are saved.

Tip: Always confirm with “OK” to save changed settings.

Tip: Press and hold “X”, “OK” or “Back” for at least one second and then release:

→ The function of the key is executed; then the display switches directly to the Measurement screen.

7.4 Settings

7.4.1 Setup

7.4.1.1 Language

Language	English, German, French, Spanish

▶ Select language in the display of the remote control and confirm.

7.4.1.2 Power

Power	Display off after	15 s, 30 s, 1 min, 2 min, 3 min, 5 min, 10 min, ∞
	Autom. shut-off after…	5 min, 10 min, 20 min, 30 min, 1 h, 2 h, 4 h, ∞

Power saving options of the remote control are set:

- ▶ Select automatic shut-off of the display (after 15 sec. ... 10 min., infinite = off.).
- ▶ Select automatic shut-off of the remote control (after 5 min. ... 4 hours, infinite = off.)

7.4.1.3 Units

Units	MiniTest	Set
	HLT5xx	Set

- ▶ Select unit in the display and confirm with “Set”.

7.4.1.4 Time

Time	Date/time

- ▶ Set time, format “HH.MM” and confirm, then:
- ▶ Set date, format “DD.MM.YYYY” and confirm

7.4.1.5 Parameter

Parameter	2 Reset (Reset parameters)	Factory setting RC 500
		Factory setting MiniTest

- ▶ Select corresponding unit in the display and confirm with “Set”.

7.4.1.6 I/O

I/O	PLC output (PLC outputs)
	Gauge (Compact gauge)
	Units (interface units)
	Analog outputs (Analog outputs)
	Analog scaling (Analog scaling)
	Analog limit (leakage rate upper limit)

PLC outputs:
The MiniTest 300 has 3 PLC outputs, which can be assigned the following functions:

- ▶ Open: the output is permanently set to 0 volts
- ▶ Trigger: enabled when the measured value exceeds the trigger value

- Ready: enabled when the MiniTest 300 is ready to measure
- WrnErr: enabled in case of errors or warnings
- Error: enabled only in case of errors
- Runup: enable during run-up, but not in the event of errors

If the selected event occurs (e.g. trigger), the corresponding output switches from 0 volts to 24 volts.
If the inverted function is selected the unit is set to 24 V in inactive state.
All functions can be selected in inverted form and are then marked by an overscore.

Gauge:
Full-scale deflection (hPa): Input of value (Full Scale) as shown on the rating plate of the gauge.
Connected tubes: The type of gauge currently connected is displayed (No gauge, TPR/PCR, PKR, linear)

Units:
Leakage rate: hPa l/s, Pa m^3/s, Torr l/s, atm cc/s, sccm, sccs

Pressure: mbar, Pa, atm, Torr
The interface units do not have to match the display units. This option defines the unit for all interfaces of the MiniTest 300.

Analog outputs:
The MiniTest 300 has 2 analog recorder outputs with the following configuration options:

- Off: The analog output is permanently set to 0 volts.
- Mantissa: The analog output displays the mantissa of the leakage rate in the current interface unit (1.0... 9.9 V); e.g.: 2.3 V for e.g. 2.3E-6 hPa l/s.
- Exponent: The analog output displays the corresponding exponent of the leakage rate in the current interface unit as a step function:
  U= 1...10V in steps of 0.5V per decade beginning with 1 V = 1E-12
  (e.g. . 2.3E-6 hPa l/s delivers 4.0 V for the exponent "-6").
- LR lin: The leakage rate is output in linear form from 0.1 ... 10 volts. The upper limit (= 10 volts) is specified by the setting "Leakage rate upper limit".
- LR log: The output voltage is scaled logarithmically. The upper limit (= 10 volts) is specified by the setting "Analog limit". The increase is specified by the setting "Analog scaling".
- Pressure: The voltage of the external gauges is output.
- Voltage: For test purposes only; do not select. If the MiniTest 300 is not ready for measuring, the voltage output is >10.2 V

Analog scaling:
The scaling indicates the increase for logarithmic scaling (LR log).
The increase can be set from 1V/dec to 10V/dec.
If the MiniTest 300 is not ready for measuring, the voltage output is >10.2 V in nearly all settings. The exceptions are the setting "Off" and "Voltage".

Analog limit:
The analog limit indicates the leakage rate value (in hPa l/s) that corresponds to an analog output voltage of 10.0 volts for LR lin and LR log.
The use of "warped" limits makes it possible to program the analog output also for other units (e.g. 1.33E-5 hPa l/s provides an output voltage of 10V with a leakage rate of 1E-5 Torr l/s).

7.4.2 Calibration

Calibration	Prompt at start	On. Off
	Use CF installation	On. Off
	CF installation	Reset

These settings affect the compliance with the calibration factor in Measurement mode.

Prompt at start:

- ▶ With "On", the user is prompted at each start-up to select whether the calibration factor should be used, based on the setting "Use CF installation".
- ▶ With "Off", the MiniTest 300 starts up without a prompt and the use of the calibration factor is controlled by the menu item "Use CF installation".

Use CF installation:

- ▶ With "On" the calibration factor is used in Measurement mode.
- ▶ With "Off" the measurement is conducted without calibration (this can be seen in the display of the measured value in Measurement mode by the axis designation: e.g. hPa l/s @ 1 l/s).

Note: **hPa l/s @ 1 l/s**: In uncalibrated state the MiniTest 300 has no information on the system's volume flow rate. In this case, a volume flow rate of 1 l/s is assumed. This assumption is reflected by the additional information "@ 1 l/s" in the leakage rate unit.

CF installation:

- ▶ With "Reset", the calibration factor is set to 1.0 and the settings "Prompt at start" and "Use CF installation" are set to "Off".

7.4.3 Purge

Note: Each purge increases the total pressure in the vacuum chamber by about $5 \cdot 10^{-2}$ hPa l/s

Purge (Automatic purge)	Release	On, Off

▶ Enable or disable purging of the sensor after supersaturation with helium (factory setting = enabled). See Chapter 7.10.7.

7.4.4 Trigger

Trigger (trigger level)		1.0E-9 ... 1.0E+6 (hPa l/s)

▶ Set the threshold (trigger) of the limit leakage rate and confirm (see Chapter 7.9.1.1 or 7.9.1.2).

7.4.5 Audio

Audio	Volume level	0 ... 15
	Mode	1: Prop. leakage rate; 2: SetPoint; 3: PinPoint

Setting audio options in Measurement mode:

▶ The loudness of the audible signal can be set in the range from 1...15; (0=Off).

▶ Mode:

→ 1: Prop. Leakage rate: The frequency of the audible signal is proportional to the display. The frequency range is between 75 Hz and 3000 Hz.

→ 2: Setpoint: No signal sounds if the leakage rate is less than the trigger value. A signal with a frequency that is proportional to the leakage rate sounds as soon as the leakage rate exceeds the trigger value.
A constant signal sounds if the leakage rate is 1000 times greater than the trigger value.

→ 3: Pinpoint: The frequency of the audible signal changes in proportion to the leakage rate, between 0.1 and 10 times the trigger value. A constant low-pitched signal sounds if the leakage rate is less than 0.1 times the trigger value and constant high-pitched signal sounds if the leakage rate reaches more than 10 times the trigger value.

7.4.6 Recorder

Recorder (Recorder settings)	Back		
	Recorder (Recorder settings)	Data recording	Off, On
		Interval	200 ms, 500 ms, 1 s, 2 s, 5 s
	Screenshot (Screenshot setting)	Release	Off, On
		Storage location	USB, internal
	Copy (Copy file)	to USB flash drive Copy	
	Delete (Delete file)	delete in flash	

Note: The “Copy” and “Delete” functions can be used in connection with the Recorder and Screenshot files.

Options for recording, copying and deleting measured data files:

- Recorder:

▶ Data recording:
Enable or disable automatic recording (see Chapter 7.10.5)

▶ Enter save interval and confirm (200 ms; 500 ms; 1 s; 2 s; 5 s)

▶ Select storage location (internal or USB flash drive) and confirm.

- Screenshot:

▶ Release: Enable or disable screenshot function.
If function is enabled, a copy of the measuring or search display is created by touching the touch display.
Format: PNG
Storage location: internal or USB stick

▶ Select storage location.

Note: The “Copy” and “Delete” functions can be used in connection with the “Recorder” and “Screenshot” files.

- Copy:

▶ Select data file by clicking,

▶ Start copying with “OK”.

- Delete:

▶ Select data file by clicking,

▶ Start deleting with “OK”.

7.4.7 Radio

Radio	Wireless connection	Off, On
	Other units	Search
	Preferred unit	

Establish wireless connection:

▶ Enable “Radio” setting.

→ Connection is established with transmitter.

▶ Disable “Radio” setting.

→ The cable connection is switched on.

Other units:

▶ Enable “Search” setting.

→ The scan for available units starts.

▶ Select a unit

→ A connection is established.

Preferred unit:
The name of the unit with which the last wireless connection existed is displayed (see also rating plate of the wireless transmitter).

7.5 Access ctrl

Protect MiniTest 300 against unintentional changes in the settings

Access ctrl	Back			
	Service			
	Lock (Locking stage)	Calibration	Off, On	disabled CAL
		Zero	Off, On	disabled ZERO
		Change settings	Off, On	disabled Settings

Service:

▶ Enter the PIN for access to the service menu.

→ The service menu is available only to trained service personnel.

Lock:

▶ “Calibration”: Enables or disables the “CAL” button and therefore the calibration.

▶ “Zero”: Enables or disables the “Zero” button.

▶ “Change settings”: Enables or disables the possibility of changing settings in the menu.

7.6 View

7.6.1 Lower display limit for leakage rate

The detection limit of the MiniTest 300 depends on the calculated calibration factor, which in turn is defined by the configuration of the system.

Limit value	Pre-selection limit	0, +1, +2, +3

In Measuring mode the displayed value of the leakage rate has a configurable lower limit.

▶ 1: Set the lower limit of the display (0 ...+3 decades).

→ The limit value is displayed in the current unit of measurement.

7.6.2 P Adjustment

P Adjustment	Pressure zero point	Clear, Set, (+value)
	Pressure flooded	Clear, Set, (+value)
	Pressure	For example: 35 hPa (current reading)

P adjustment is used to adjust the internal pressure sensor.

Pressure zero point:
Pump down system.
“Set” sets the pressure value to 0.
“Clear” deletes the adjustment value.

Pressure flooded:
Vent system.
“Set” sets the pressure value to 1000 hPa.
“Clear” deletes the adjustment value.

Pressure:
Displays the current measured value.

Note: Grayed out functions cannot be executed.

7.6.2.1 Units for leakage rate and pressure

Units	Leak rate	mbar l/s, Pa m³/s, atm cc/s, Torr l/s, sccm, sccs
	Pressure	mbar, Pa, atm, Torr

Set the units of the displayed values.

▶ 1: Select the unit for the leakage rate.

▶ 2: Select the unit for the pressure.

7.6.2.2 P selection

P selection (pressure selection)	Displayed pressure	internal
		external
	Connected tubes	

Displayed pressure:

▶ Select pressure gauges

→ The pressure is displayed.

Note: The internal pressure measuring point is decisive for the internal monitoring, also if an external pressure measuring point is connected to the unit.

Connected tubes:

→ The type of gauge is displayed.

7.7 Information

Info	System
	Error
	Status report
	User

▶ View system data:

- Unit information
- Error list
- If a USB flash drive is connected, an ASCII file is created on the drive upon actuation of the button. This file is used to store settings, measured values and statuses of the remote control and MiniTest.
- User information

7.8 Cal

Note: The “Cal” button is displayed on in Measurement mode.
For a meaningful quantitative measurement the MiniTest 300 is calibrated with a reference leak of a known size.
See Chapter 7.9.2 and 7.9.3

7.9 Measurement variants

7.9.1 Measurement and search mode

The measured value display “Measurement mode” displays a quantitative measurement. The Search mode can be used to conduct a fast qualitative localization.

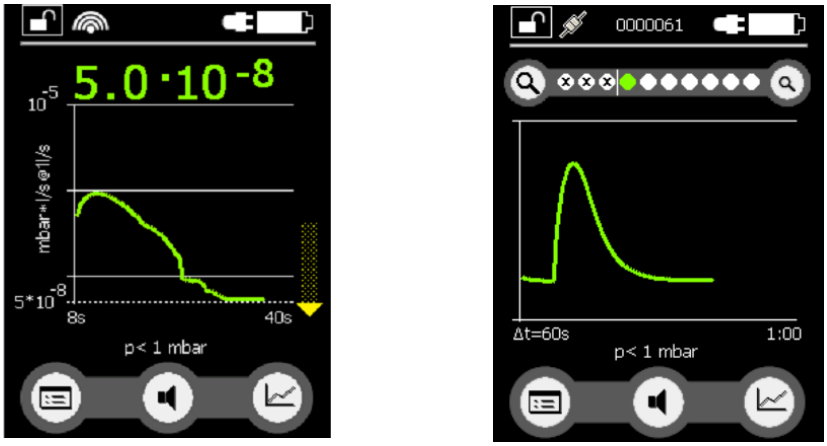


Fig. 32 Measurement and search mode

The right key (toggle function) with the diagram icon is used to switch from one mode to the other.

7.9.1.1 Measurement mode

Measurement mode requires calibration with a reference leak for quantitative display of the leakage rates.
The yellow hatched bar in Measuring mode indicates the range to which a quantitative measurement is possible.
After an extended run-in period, quantitative measurements are possible in increasingly smaller ranges.
If only the yellow triangle is visible, quantitative leakage rate measurement is also possible in the lowest range.

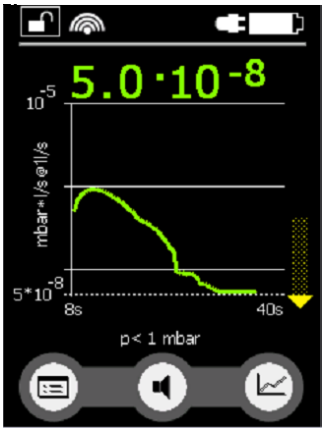


Fig. 33 Measurement mode

7.9.1.2 Search mode

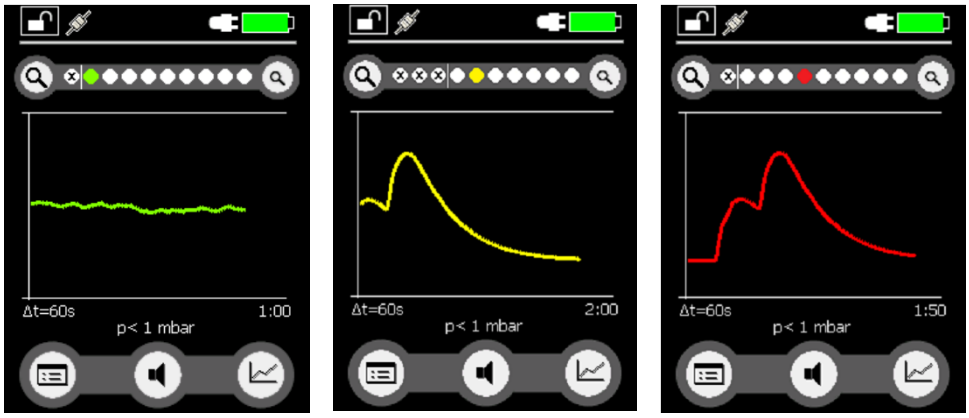


Fig. 34 Search mode

The display ranges are shown in the bar above the diagram.
The vertical white line represents the lower display limit. The areas to the left of the line, additionally marked “x”, are not included.
The point and graph are green, yellow or red. If the measured value is in the first range to the right of the limit, the measurement curve is green, in the second yellow and in all others red.
Tap the bar between the magnifying glasses to reset the display limit based on the current measured values.
The magnifying glasses to the left and right of the bar can be used to move the display limit.
At zero the display starts over.
The display area is automatically selected so that the entire series of curves is visible, i.e. nothing is truncated.

Measuring procedure in Search mode:
Comparison with reference leak:

1 Spray reference leak with helium.

Note: The reference leak should be the same size as the limit leakage rate of the system.

2 Observe the helium signal until a maximum is perceptible.

3 Tap the bar between the magnifying glasses to reset the display limit based on the current measured values.

Note: Do not change display limits once they have been set, since this could result in incorrect localization.

Leak localization:

1 The measurement is conducted within the previously determined display limits.

2 Spray the system with helium as usual.

3 All leak signals of the same size or larger will be displayed immediately.
If the leakage rate signal curve is yellow, the leak is approximately 3 times larger than the reference leak.

4 A red signal curve means that the detected leak is at least 10 times larger than the reference leak.

7.9.2 Preparing calibration

- ✓ Unit has been installed and switched on.
- ✓ Warm-up phase has been completed.
- ✓ Test leak has been installed on the system to be tested under vacuum.
- ✓ Helium for spraying is available.
- ✓ The system has been evacuated.

7.9.3 Calibrating the unit

The unit must calculate the calibration factor of the vacuum system in order to provide correct measured values:

Note: Calibration is possible only in Measurement mode and can be conducted only on the system.

1 Press the “Menu” key in the Measurement screen.

→ The main menu is displayed.

2 Press the “CAL” key in the main menu.

→ The “Calibration” screen is displayed.

3 Press “TL” and enter the test leak value.

→ The prompt “On offset stable: OK” appears.

✓ Wait until the measured value in the diagram is a horizontal line.

4 Press the “OK” function key.

→ The prompt “Spray as usual, then press OK on signal max” appears.

5 Spray the test leak with helium for the required time and wait until the measured value in the diagram has reached its maximum value.

Tip: The maximum value is indicated by an accompanying horizontal line.

6 Press the “OK” function key.

→ The old and new calibration factors are displayed.
Underneath, you can see the status (“Status”) of the calibration:

→ Either: Status = “Ready”:

6a Press the “OK” function key.

✓ The calibration was completed successfully.

→ Or: Status = “Malfunction .....”:
The calibration factor is outside of the limit values

6b Press the “X” function key. The calculated calibration factor is rejected.

7.10 Measuring

7.10.1 Preparing the measurement

Note: The response behavior of the MiniTest depends largely on the system configuration and the spraying behavior. Therefore, we strongly recommend – prior to the actual leak detection – to spray a known reference leak installed on the system with helium, to become familiar with the response behavior of the MiniTest.

✓ The unit has been installed and, if applicable, calibrated to the system.
(in non-calibrated state:
the display corresponds to the measured helium partial pressure in hPa.)

✓ The test leak has been shut off or disconnected.

✓ The system has been evacuated.

✓ Helium for spraying the system is available.

✓ The trigger value for the error leakage rate has been set. See Chapter 7.4.4.

✓ Automatic purge has been configured. See Chapter 7.4.3.

✓ Measurement screen is displayed, or if “READY TO START” is displayed:

▶ Press “START/STOP”.

7.10.2 Scale display area

Change display area of the time axis:

▶ At the bottom edge of the measurement screen, slide your finger from left to right.

→ An arrow is shown.

→ The time range is decreased.

▶ At the bottom edge of the measurement screen, slide your finger from right to left.

→ An arrow is shown.

→ The time range is increased.

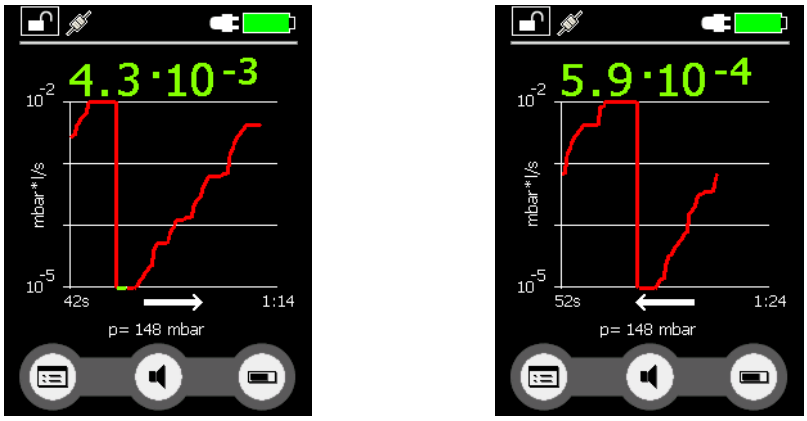


Fig. 35 Measurement screen with arrows on the time axis

7.10.3 Use helium underground

→ The current measured value of the helium partial pressure can be saved as a permanent background.

▶ Press “ZERO”.

→ The helium background is saved as the lower limit of the measured value. (“Zero” value)

▶ Press and hole “ZERO” for at least 3 seconds.

→ A bar graph shows the helium background.

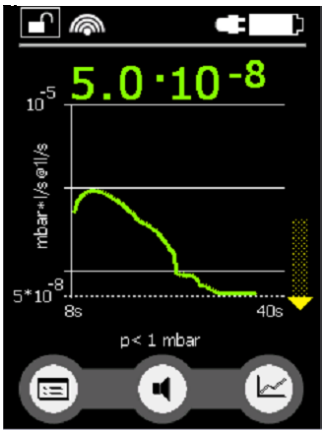


Fig. 36 Helium background display

7.10.4 Leak test

✓ Unit has been prepared 7.10.1.

✓ Measurement screen is displayed.

▶ Spray test areas of the evacuated system with helium.

▶ Observe the leakage rate on the remote control.

▶ Press “START/STOP” to stop the leak test (measurement).

7.10.5 Recording measured data

The value of the displayed leakage rate can be saved continuously.

✓ If “READY TO START” or the measurement screen is displayed:

▶ Press “START/STOP”.

▶ Select “Data recording on” 7.4.6.

▶ Set the “Interval” for the interval of the measured values 7.4.6.

▶ Specify the “Storage location” 7.4.6.

▶ Press “START/STOP” on the remote control,
in order to start the measurement.

→ When the measurement starts a new file is generated.
The file name is displayed in the status line during the measurement.
The measured values are continuously saved to this file.

▶ Press the “START/STOP” button on the remote control to stop the measurement.

→ When the measurement stops, the file where the measured data are saved is closed.

- Copy a data file to a USB flash drive:

▶ Use the function “Copy files” 7.4.6.

- Delete a data file from memory:

▶ Use the function “Delete files” 7.4.6.

7.10.6 Evaluation of measured signals

The measured file has an introduction with information about the recording, followed by the consecutive values of the measuring time and leakage rate.

Example of a measured value file:

```
// Record file: L0000018.txt
// created by RC 500 V0.7.4.23012
// Remote Control RC 500 ser. no.: 00041107585
// MiniTest ser. no.: 00040074711
// Start time: 25.04.2012 15:29:56
// Q(t) Selected unit: hPa l/s @1l/s
Time Leakrate
0.1 5.00E-8
0.8 5.00E-8
```

7.10.7 Contamination

- The MiniTest 300 is equipped with a Protection mode against contamination with large amounts of helium. This contamination mode will help the leak detector to clean up faster after detection of large leaks.
- Automatic purge has been enabled at the factory.
  If purging is disabled, it can be enabled via the menu in the event of contamination.
- Contamination mode has to be reset by pressing “C”. If the leak detector is still contaminated with helium, the message “Contamination” may appear again.

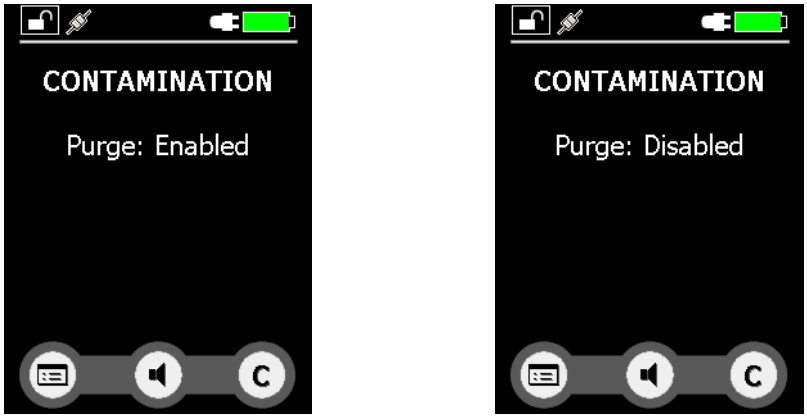


Fig. 37 Contamination

Note: The pictures (above) show the current menu setting

7.11 Switching Off

1 Switch off wireless remote control RC 500 WL.
(Press “POWER” for a longer time, see Chapter 4.5.)

2 Unplug the mains plug of the power cable from the socket.

→ The power-on indicator lamp of the unit goes out.
If the wireless remote control is used with the cable connected, the remote control has to be switched off separately after switching off the MiniTest 300.

3 Disconnect the coaxial power connector of the power supply pack from the unit.
(“24 V DC connection”, see Fig. 5, no. 6).

7.12 Disconnecting the unit

Disconnect the unit after use:

✓ The unit has been switched off.

1 Disconnect accessories (test leak, remote control, etc.)

2 Disconnect the unit from the system flange.

3 Remove sinter filter.
It is possible that condensation water has accumulated in the unit, depending on the system and type of use.

4 Hold the unit with the flange pointing downward and shake out any condensation water.

✓ The connecting flange of the unit is clean and dry on the inside.

5 Insert sinter filter.

6 Mount blank flange and vacuum connection on the unit.
Pack unit and accessories (see Chapter 3.2).

8 Malfunctions

8.1 Warning and malfunction messages

No.	Error / Warning	Error message	Remedy
102	W	Timeout EEPROM IF-Board	- Restart MiniTest - Check menu parameters
104	W	An EEPROM parameter is initializing	- Restart MiniTest
106	W	EEPROM parameter initializing	- Restart MiniTest - Check menu parameters
110	W	Clock not set	- Set clock with current time/date
120	W	WISE sensor EEPROM CRC error	- Contact service department
121	W	WISE sensor EEPROM read error	- Restart MiniTest - Contact service department
127	W	Incorrect boot loader version	- Contact service department
220	W	24V not in permissible range	- Check connection of power supply pack - Fuse F102 may be defective - Check connection of power supply pack
221	W	24V(1) not in permissible range	- Fuse F102 may be defective - Check connection of power supply pack
222	W	24V(2) not in permissible range	- Fuse F103 may be defective - Check connection to RC500
223	W	24V(3) not in permissible range	- Fuse F104 may be defective - Check connection of external pressure sensor, host RS485 and extension
230	W	3V3 not in permissible range	- Contact service department
250	W	5V not in permissible range	- Contact service department
251	W	5V(1) not in permissible range	- Check connection of radio transmitter
320	F	Heating voltage too low	- Restart MiniTest - Contact service department

No.	Error / Warning	Error message	Remedy
321	F	Heating voltage too high	- Restart MiniTest - Contact service department
322	W	Heater contact voltage too high	- Restart MiniTest - Contact service department
323	F	High voltage not in permissible range	- Restart MiniTest - Contact service department
324	F	Heating current not in permissible range	- Restart MiniTest - Contact service department
325	F	Offset current unstable	- Restart MiniTest - Replace sensor
326	F	Ignition error	- Allow MiniTest to stand 10 min vented and then restart ventilated
327	W	Signal very small, check system with test leak	- Check with test leak, to determine whether a signal comes normally and fast enough - Ventilate system 10 min; restart MiniTest
328	F	WISE current too high	- System contaminated - Pump down the system and restart MiniTest
329	F	Heating unstable	- Restart MiniTest - Contact service department
330	F	Amplifier offset not in permissible range	- Restart MiniTest - Contact service department
331	F	Timeout WISE sensor	- Contact service department
332	F	System is helium contaminated	- Purge system with fresh air - Pump down the system and restart
565	W	Voltage of the external pressure sensor is not within the permissible range	- Check external pressure sensor and connection of the external pressure sensor
620	W	WISE sensor pressure compensation failed	- Contact service department
621	W	Timeout WISE sensor pressure compensation	- Contact service department
710	W	IF board temperature too high	- Cool ambient air - Keep fan inlet and outlet clean and unobstructed
711	F	IF board temperature much too high	- Cool ambient air - Keep fan inlet and outlet clean and unobstructed
720	W	WISE sensor temperature too high	- Cool ambient air - Keep fan inlet and outlet clean and unobstructed
721	F	WISE sensor temperature much too high	- Cool ambient air - Keep fan inlet and outlet clean and unobstructed

9 Maintenance and service

Maintenance
The MiniTest 300 has no wear parts and is therefore maintenance-free.

Pfeiffer Vacuum offers first-class service!

- Replacement of operating fluids and bearings on site by our field service technicians
- Maintenance / repair in a nearby Service Center or Service Point
- Fast replacement with new value products
- Assistance in finding the most economic and fastest solution

Detailed information, addresses and forms at: **www.pfeiffer-vacuum.de (Service**).

Maintenance and repair in the Pfeiffer Vacuum Service Center
The following steps are necessary for fast and smooth processing:

→ Download service request and declaration on contamination.[1)]
→ Fill out service request and fax or e-mail it to your Pfeiffer Vacuum service address.
→ Include confirmation of service request from Pfeiffer Vacuum with the shipment.
→ Fill out the declaration on contamination and include with shipment (mandatory!).
→ Remove all accessories.
→ Drain operating fluids (applies to turbo pumps with a capacity of > 700 l/s).
→ Leave the electronic drive unit on the pump.
→ Seal flange openings with the original protective covers.
→ Send pump/unit in the original packaging, if possible.

Shipment of contaminated pumps or units
Units with microbiological, explosive or radioactive contamination will not be accepted. "Contaminants" are substances and compounds defined by the currently valid version of the hazardous substances regulations. If pumps are contaminated or if the declaration on contamination is missing, Pfeiffer Vacuum will conduct a decontamination at the customer's expense.

→ Neutralize pump by purging with nitrogen or dry air.
→ Seal all openings airtight.
→ Heat-seal pump or unit in suitable protective foil.
→ Ship pump/unit only in suitable, stable transport containers and in compliance with the applicable transport regulations.

[1)] Forms are available at www.pfeiffer-vacuum.de

Replacement units
In replacement units, the standard operating parameters area always preset. If you use different parameters for your application, you will have to reset them.

Service orders
All service orders will be carried out only in accordance with our repair conditions for vacuum units and components.

10 Taking out of service

NOTICE

Servicing of the MiniTest 300 leak detector may be performed only by trained employees of Pfeiffer Vacuum.

Note: The connection flange on the rear side of the unit must be closed with a blank flange when the unit is not in operation.

10.1 Return

WARNING

Danger to health!
Products sent to Pfeiffer Vacuum for repair must be free of hazardous contaminants. Products that are contaminated with radiation, toxins, caustic or microbiological substances cannot be sent in.

✓ Every unit sent in must be accompanied by a completed declaration of contamination.
See www.pfeiffer-vacuum.com

Dispatch of contaminated products:

▶ Designate hazards on outside of packing material.

▶ Comply with dispatch regulations of countries and transport companies involved.

▶ If products are not declared “free of contaminants”, they will be decontaminated and the customer will be billed for the charges.

10.2 Disposal

For disposal of the MiniTest 300, always comply with local and regional environmental and safety regulations.

11 Appendix

11.1 CE Declaration of Conformity

Declaration of Conformity

Product	MiniTest 300 Helium leak detector
Art. no.	PT L03 000
Declaration of Conformity in accordance with the listed EC directives	We herewith declare that the products defined above meet the basic requirements regarding safety and helath and relevant provisions of the relevant EC Directives by design, type and the versions which are brought into circulation by us. In case of any products changes made without our approval, this declaration will be void.

- **Directive 2014/30/EU (Electromagnetic Compatibility)**
- **Directive 2014/35/EU (Low Voltage)**

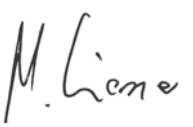
Applied harmonized standards:

DIN EN 61010-1: 2011 -07

DIN EN 61010-1: 2011 -07

Signatures

Asslar, 25 April 2016



Pfeiffer Vacuum GmbH
Berliner Str. 43, 35614 Asslar

Manfred Bender
Managing Director

Dr. Matthias Wiemer
Managing Director

11.2 Ordering Information

MiniTest 300 (complete, see Chapter 4.1)	PT L03 000
Transport case for MiniTest 300	PT 445 428
Pin leak $3 \cdot 10^{-3}$ hPa l/s	PT 445 425
Pin leak $3 \cdot 10^{-4}$ hPa l/s	PT 445 426
Pin leak $3 \cdot 10^{-5}$ hPa l/s	PT 445 427
Centering ring with fine filter DN25KF	PF 117 225-T
RC 500 WL	PT 445 420 AT
RC 500	PT 445 421 AT
Coupling for an external vacuum pump	PT 110 181

11.3 Conversion tables

For pressure units

	mbar	bar	Pa	hPa	kPa	Torr mm Hg
mbar	1	$1 \bullet 10^{-3}$	100	1	0.1	0.75
bar	$1 \bullet 10^{3}$	1	$1 \bullet 10^{5}$	1000	100	750
Pa	0.01	$1 \bullet 10^{-5}$	1	0.01	$1 \bullet 10^{-3}$	$7.5 \bullet 10^{-3}$
hPa	1	$1 \bullet 10^{-3}$	100	1	0.1	0.75
kPa	10	0.01	1000	10	1	7.5
Torr mm Hg	1.332	$1.332 \bullet 10^{-3}$	133.32	1.3332	0.1332	1
1 Pa = 1 N/m^2						

For gas throughputs

	mbar l/s	Pa m^3/s	sccm	Torr l/s	atm cm^3/s
mbar l/s	1	0.1	59.2	0.75	0.987
Pa m^3/s	10	1	592	7.5	9.87
sccm	$1.69 \bullet 10^{-2}$	$1.69 \bullet 10^{-2}$	1	$1.27 \bullet 10^{-2}$	$1.67 \bullet 10^{-2}$
Torr l/s	1.33	1.33	78.9	1	1.32
atm cm^3/s	1.01	0.101	59.8	0.76	1

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Pfeiffer Vacuum stands for innovative and custom vacuum solutions worldwide, technological perfection, competent advice and reliable service.

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Are you looking for a perfect vacuum solution? Please contact us:

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