



OPERATING INSTRUCTIONS

EN

Translation of the Original

AMI 1000

Leak testing equipment

PFEIFFER  **VACUUM**

Disclaimer of liability

These operating instructions describe all models and variants of your product. Note that your product may not be equipped with all features described in this document. Pfeiffer Vacuum constantly adapts its products to the latest state of the art without prior notice. Please take into account that online operating instructions can deviate from the printed operating instructions supplied with your product.

Furthermore, Pfeiffer Vacuum assumes no responsibility or liability for damage resulting from the use of the product that contradicts its proper use or is explicitly defined as foreseeable misuse.

Copyright

This document is the intellectual property of Pfeiffer Vacuum and all contents of this document are protected by copyright. They may not be copied, altered, reproduced or published without the prior written permission of Pfeiffer Vacuum.

We reserve the right to make changes to the technical data and information in this document.

Table of contents

1	About this manual	8
1.1	Validity	8
1.1.1	Applicable documents	8
1.1.2	Products concerned	8
1.2	Target group	8
1.3	Conventions	8
1.3.1	Instructions in the text	8
1.3.2	Pictographs	9
1.3.3	Labels	9
1.3.4	Abbreviations	10
2	Safety	11
2.1	General safety information	11
2.1.1	Safety instructions	11
2.1.2	Precautions	12
2.2	Intended use	13
2.3	Foreseeable misuse	13
3	Transportation and Storage	14
3.1	Receipt of the product	14
3.2	Handling	14
3.3	Storage	14
4	Product description	16
4.1	Product identification	16
4.2	Scope of delivery	16
4.3	Options	16
4.4	Human/machine interface	17
5	Installation	18
5.1	Pump set-up	18
5.2	Compressed dry air (CDA) connection	18
5.3	Venting gas circuit connection	19
5.4	Tracer gas circuit connection	19
5.5	Verification orifice leak connection	19
5.6	Interseal pumping connection	20
5.7	Mains connection	20
6	Operation	22
6.1	Preliminary precautions for use	22
6.2	Commissioning	22
6.3	Shutting down the equipment	22
6.3.1	Standard shutdown procedure	22
6.3.2	Emergency stop	22
6.4	Equipment status display	23
6.5	Home page	24
6.5.1	Access authorization	25
6.5.2	Audible warning device	26
6.6	Test procedure	26
6.7	Characteristics of the UUT to be used	27
6.8	Calibration	27
6.8.1	Validity of a recipe	28
6.8.2	Calibration of a recipe	28
6.9	UUT batch test	32
6.9.1	Creation of a test	32
6.9.2	Creation of the 'Sample information' list	34
6.10	Opening/Closing the test chamber	34

6.10.1	Equipment Standby mode	34
6.10.2	Safety device on the test chamber.	35
6.11	Data management	35
6.12	Reports	35
6.12.1	Creation of a report	36
6.12.2	Details of an operation	36
6.12.3	History	37
6.12.4	Opening a current report	37
6.12.5	Report export	37
7	Advanced settings	39
7.1	Access authorization	39
7.2	'Exit' menu	39
7.3	'Users Manager' menu	40
7.3.1	Operator/Advanced/Maintenance user level	40
7.3.2	Administrator level user	40
7.3.3	Password modification	42
7.3.4	Creation of a user account	42
7.3.5	Modification of a user account	42
7.4	'Files Transfer' menu	42
7.5	'Configuration' menu	43
7.6	'Events' menu	44
7.6.1	Details of an event	45
7.6.2	Filters	45
7.7	'Maintenance' menu	45
7.7.1	[General] tab	46
7.7.2	[Air Sensor] tab	46
7.8	'Leak Signal Monitoring' menu	46
7.9	'Recipe Manager' menu	47
7.9.1	Details of a recipe	47
7.9.2	Creation of a recipe	48
7.9.3	Modification of a recipe	51
7.10	'UTT Manager' menu	51
7.10.1	Display and modification of a UUT	52
7.10.2	Loading a configuration	53
7.10.3	Details of an operation	53
7.10.4	Creation of a new UUT	53
7.11	'Air Sensor Spectra' menu	54
7.12	'Buzzer Manager' menu	54
7.13	'Capillaries Manager' menu	55
8	Decommissioning	57
8.1	Shutting down for longer periods	57
8.2	Recommissioning	57
8.3	Disposal	57
9	Malfunctions	58
9.1	What happens in the event of a defect	58
9.2	Display and acknowledgement of messages.	58
9.3	Troubleshooting guide	59
9.3.1	Test result messages	59
9.3.2	Warning messages	59
9.3.3	Alarm Messages	59
9.4	Migration procedure	60
9.5	Recovery procedure in case of failure	61
10	Maintenance	62
10.1	Maintenance frequency	62
10.2	Location of the components	62
10.3	Access to internal components	64

10.3.1	Disassembly/Reassembly of the front panel	64
10.3.2	Disassembly/Reassembly of the rear panel	65
10.3.3	Dismantling/Reassembling of the upper rear panel of the trolley	65
10.3.4	Disassembly/Reassembly of the lower rear panel of the trolley	66
10.4	Pressure check	67
10.5	Cleaning/replacement of venting exhaust gas filter	67
10.6	Replacement of compressed dry air and calibration gas inlet filters	67
10.7	Replacement of vent expander	69
10.8	Spare parts	69
11	Service solutions by Pfeiffer Vacuum	70
12	Accessories	72
13	Technical data and dimensions	73
13.1	Technical characteristics	73
13.1.1	Environmental conditions	73
13.1.2	Compressed dry air characteristics	74
13.1.3	Venting gas characteristics	74
13.1.4	Tracer gas characteristics	74
13.2	Dimensions	75
	Declaration of Conformity	76

List of tables

Tbl. 1:	Labels	9
Tbl. 2:	Equipment status display	23
Tbl. 3:	Technical characteristics	73
Tbl. 4:	Conversion table: Pressure units	73
Tbl. 5:	Conversion table: Units for gas throughput	73
Tbl. 6:	Environmental conditions	74
Tbl. 7:	Compressed dry air characteristics	74
Tbl. 8:	Venting gas characteristics	74
Tbl. 9:	Tracer gas characteristics	74

List of figures

Fig. 1:	Human/machine interface	17
Fig. 2:	Compressed dry air filter	68
Fig. 3:	AMI 1000 dimensions	75
Fig. 4:	AMI 1000 on-cart dimensions	75
Fig. 5:	Maintenance space required	75

1 About this manual



IMPORTANT

Read carefully before use.

Keep the manual for future consultation.

1.1 Validity

This operating instructions is a customer document of Pfeiffer Vacuum. The operating instructions describe the functions of the named product and provide the most important information for the safe use of the device. The description is written in accordance with the valid directives. The information in this operating instructions refers to the product's current development status. The document shall remain valid provided that the customer does not make any changes to the product.

1.1.1 Applicable documents

Document	
MVP-070 - Operating instructions	Provided in the technical file of the equipment
Specification 4333 « Shutdown SOP »	Provided in the technical file of the equipment
EC Declaration of conformity	Included with this manual

1.1.2 Products concerned

This document applies to products with the following part numbers:

Part Number	Description
-	AMI 1000 - Customized version

1.2 Target group

These operating instructions are aimed at all persons performing the following activities on the product:

- Transportation
- Setup (Installation)
- Usage and operation
- Decommissioning
- Maintenance and cleaning
- Storage or disposal

The work described in this document is only permitted to be performed by persons with the appropriate technical qualifications (expert personnel) or who have received the relevant training from Pfeiffer Vacuum.

1.3 Conventions

1.3.1 Instructions in the text

Usage instructions in the document follow a general structure that is complete in itself. The required action is indicated by an individual step or multi-part action steps.

Individual action step

A horizontal, solid triangle indicates the only step in an action.

- This is an individual action step.

Sequence of multi-part action steps

The numerical list indicates an action with multiple necessary steps.

1. Step 1
2. Step 2
3. ...

1.3.2 Pictographs

Pictographs used in the document indicate useful information.



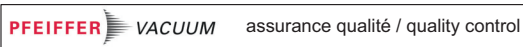
Note



Tip

1.3.3 Labels

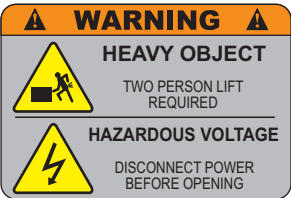
MAIN SWITCH	Main switch I/O (disconnects the general power supply)
USB	USB connector
ETHERNET	ETHERNET connector
HDMI	HDMI connector
CDA	Compressed dry air supply connector
MAIN POWER SUPPLY	Equipment main power supply:
90-250 V AC / 50-60 Hz / 16 A MAX	90-250 V AC / 50-60 Hz / 16 A MAX
Ext. Roughing Pump	External roughing pump connection
VERIFY ORIFICE	Verification orifice connection
CALIBRATION GAS	Calibration gas connection
VENTING GAS	Venting gas connection
ISOLATION VALVE	Backing pump isolation valve
PUMPING PORT	Backing pump connection



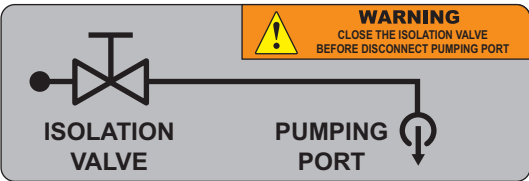
Safety label: guarantee that the packaging has not been opened since leaving the factory.



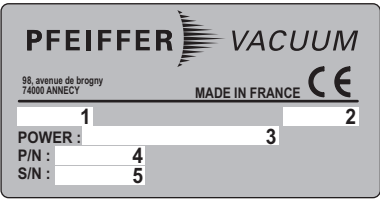
Indicates an electric shock hazard in the event of contact.



Heavy object: 2 people are required to lift the product.
Electrical hazard: disconnect the electricity supply to the product before opening it.



Close the backing pump isolation valve before disconnecting the pump from the equipment.



Product identification label (example).

- | | | | |
|---|--|---|---------------|
| 1 | Description | 4 | Part Number |
| 2 | Date of manufacture | 5 | Serial number |
| 3 | Operating voltage/frequency
Maximum power consumption | | |

Tbl. 1: Labels

1.3.4 Abbreviations

[XXXX] The control panel menus and settings are shown in bold between square brackets.
Example: **[TEST]** for the TEST menu.

UUT	Unit Under Test
CDA	Compressed Dry Air
SOP	Standard Operating Procedure
FDA	U.S. Food and Drug Administration
N ₂	Nitrogen

2 Safety

2.1 General safety information

The following 4 risk levels and 1 information level are taken into account in this document.

DANGER

Immediately pending danger

Indicates an immediately pending danger that will result in death or serious injury if not observed.

- ▶ Instructions to avoid the danger situation

WARNING

Potential pending danger

Indicates a pending danger that could result in death or serious injury if not observed.

- ▶ Instructions to avoid the danger situation

CAUTION

Potential pending danger

Indicates a pending danger that could result in minor injuries if not observed.

- ▶ Instructions to avoid the danger situation

NOTICE

Danger of damage to property

Is used to highlight actions that are not associated with personal injury.

- ▶ Instructions to avoid damage to property



Notes, tips or examples indicate important information about the product or about this document.

2.1.1 Safety instructions

All safety instructions in this document are based on the results of the risk assessment carried out in accordance with Directive 2006/42/EC Annex I relative to machines and standard EN ISO 12100 Section 5. Where applicable, all life cycle phases of the product were taken into account.

WARNING

Risk of fatal injury due to electric shock on account of incorrect installation

The device's power supply uses life-threatening voltages. Unsafe or improper installation can lead to life-threatening situations from electric shocks obtained from working with or on the unit.

- ▶ Ensure safe integration into an emergency off safety circuit.
- ▶ Do not carry out your own conversions or modifications on the unit.

WARNING

Risk of electric shock due to non-compliant electrical installations

This product uses mains voltage for its electrical supply. Non-compliant electrical installations or installations not done to professional standards may endanger the user's life.

- ▶ Only qualified technicians trained in the relevant electrical safety and EMC regulations are authorized to work on the electrical installation.
- ▶ This product must not be modified or converted arbitrarily.

WARNING

Danger of electrocution by contact during maintenance or overhaul

There is an electric shock hazard in case of contact with a powered product and not electrically isolated.

- ▶ Before carrying out any work, set the main switch to **O**.
- ▶ Take care to ensure that the mains connection is always visible and accessible so that the equipment can be disconnected at any time.
- ▶ Disconnect the mains power cable from the mains.

WARNING

Risk of poisoning when process gases are present in the atmosphere

The manufacturer has no control over the types of gases used with this equipment. Process gases are often toxic, flammable, corrosive, explosive or reactive. There is a risk of serious or fatal injury if these gases are allowed to escape freely into the atmosphere.

- ▶ Follow the relevant safety instructions in accordance with local regulations. This information is available from the operator's safety department.
- ▶ Check that the equipment is correctly connected to the customer's installation.
- ▶ Regularly check that there are no leaks where the equipment connects to the venting pipework.

WARNING

Risk of burns in case of contact with hot surfaces

For the operator's safety, the products are designed to avoid thermal risk. Depending on the application, the conditions of use generate high temperatures which require extra caution from users (surfaces > 65 °C).

- ▶ Pay attention to the marking of hot surfaces indicated by safety labels.
- ▶ Wait for the product to fully cool down before working on it.
- ▶ Protective gloves must be worn in accordance with standard EN ISO 21420.

2.1.2 Precautions



Duty to provide information on potential dangers

The product holder or user is obliged to make all operating personnel aware of dangers posed by this product.

Every person who is involved in the installation, operation or maintenance of the product must read, understand and adhere to the safety-related parts of this document.



Obligation to provide personal protective equipment

The operators or employers are obliged to provide the user of the product with the necessary personal protective equipment (PPE).

Persons responsible for installing, operating and repairing the product must wear PPE for safety.



Infringement of conformity due to modifications to the product

The Declaration of Conformity from the manufacturer is no longer valid if the operator changes the original product or installs additional equipment.

- Following the installation into a system, the operator is required to check and re-evaluate the conformity of the overall system in the context of the relevant European Directives, before commissioning that system.

Installation and maintenance procedures described in this manual must be performed by qualified technicians trained in the relevant health and safety aspects (EMC, electrical safety, chemical pollution). Our service centers can provide the necessary training.

- ▶ Do not expose any part of the human body to the vacuum.
- ▶ Comply with all safety and risk prevention instructions in accordance with local safety standards.

- ▶ Regularly check compliance with all precautionary measures.
- ▶ Do not remove the blanking plates sealing the inlet and exhaust ports if the product is not connected to the pumping line.
- ▶ Do not operate the product unless the inlet and exhaust are not connected to the pumping line.

2.2 Intended use

The AMI 1000 is specially designed for leak testing.

2.3 Foreseeable misuse

Misuse of the product will render the warranty and any claims void. Any use, whether intended or not, that diverges from the uses already mentioned will be treated as non-compliant; this includes but is not limited to:

- analysis of gas with a hydrogen concentration higher than 5%
- testing parts that are soiled or that have traces of water, vapors, paint, adhesive, detergent or rinsing products
- pumping liquids
- pumping dust or solids
- pumping corrosive, explosive, aggressive or flammable fluids
- pumping reactive, chemical or toxic fluids
- pumping condensable vapors
- use in potentially explosive areas
- use of accessories or spare parts, which are not named in this manual

The product is not designed to carry people or loads and is not for use as a seat, stepladder or any other similar purpose.

3 Transportation and Storage

3.1 Receipt of the product



Condition of the delivery

- Check that the product has not been damaged during transport.
- If the product is damaged, take the necessary measures with the carrier **and** notify the manufacturer.

- Keep the product in its original packaging so it stays as clean as it was when dispatched by us. Only unpack the product once it has arrived at the location where it will be used.
- Keep the blanking plates in place on the inlet, exhaust and purge ports while the product is not connected to the pumping line.



Keep the packaging (recyclable materials) in case the product needs to be transported or stored.

3.2 Handling

WARNING

Risk of crushing during product handling

Given the weight of the product, there is a risk of crushing during handling operations. Under no circumstances shall the manufacturer be liable if the following instructions are not followed:

- Only qualified staff trained in handling heavy objects are authorized to handle the product.
- The lifting devices provided **must be used** for the product and the procedures set out in this document must be followed.

WARNING

Risk of crushing related to product tilting

Although the product fully complies with the EEC safety regulations, there is a risk of tilting when it is moved over the floor or is not properly secured.

- Do not place the product on an inclined plane.
- Place it on a flat, hard floor.
- Do not push the product sideways.

NOTICE

Damage to the equipment if a detector is handled while switched on

If it is necessary to move or work on the product, the user must first make sure that the detector is fully shut down, otherwise there is a risk of damage to some of the detector components. When the main switch/circuit breaker is set to **O**:

- Unplug the power cable.
- Wait for the control panel screen to turn off completely before working on the product and/or removing the cover(s).
- Wait 5 minutes after power-off before working on the product.

3.3 Storage



Pfeiffer Vacuum recommends storing the products in their original transport packaging.

- Store the product in a clean, dry environment for a maximum of 3 months, in accordance with the specified temperature conditions (see chapter "Environmental conditions").

Beyond 3 months, factors such as temperature, humidity, salt in the air, etc. could damage some components (elastomers, lubricants, etc.). If this happens, contact our service center.

4 Product description

4.1 Product identification

To correctly identify the product when communicating with our service center, always have the information from the product rating plate available (see chapter "Labels").

4.2 Scope of delivery

- 1 AMI 1000 equipment
- 1 set of operating instructions
- 1 mains power cable: length of cable and type of socket customized according to the product part number
- 2 capillary certificates (1 certificate per capillary)
- 3 gauge certificates (1 certificate per gauge)
- 1 DN 50 ISO-KF TWISTLOCK adapter for the test port
- 1 DN 50 ISO-KF flange
- 1 DN 50 ISO-KF clamp
- 1 plug for the VERIFY ORIFICE port (delivered on the equipment)
- 1 gripping handle (for VERIFY ORIFICE)
- 1 verification orifice leak (model depending on equipment, delivered with its certificate)
- 1 key for opening the cart panel
- Additional supplies depending on the selected options.

4.3 Options

To enhance product suitability for specific applications, the manufacturer has made several options available that can be configured when ordering. How these options operate and how to use them are described where necessary in the chapters of this manual. The options are:

- the tool set: contents vary according to the AMI 1000 part number

4.4 Human/machine interface

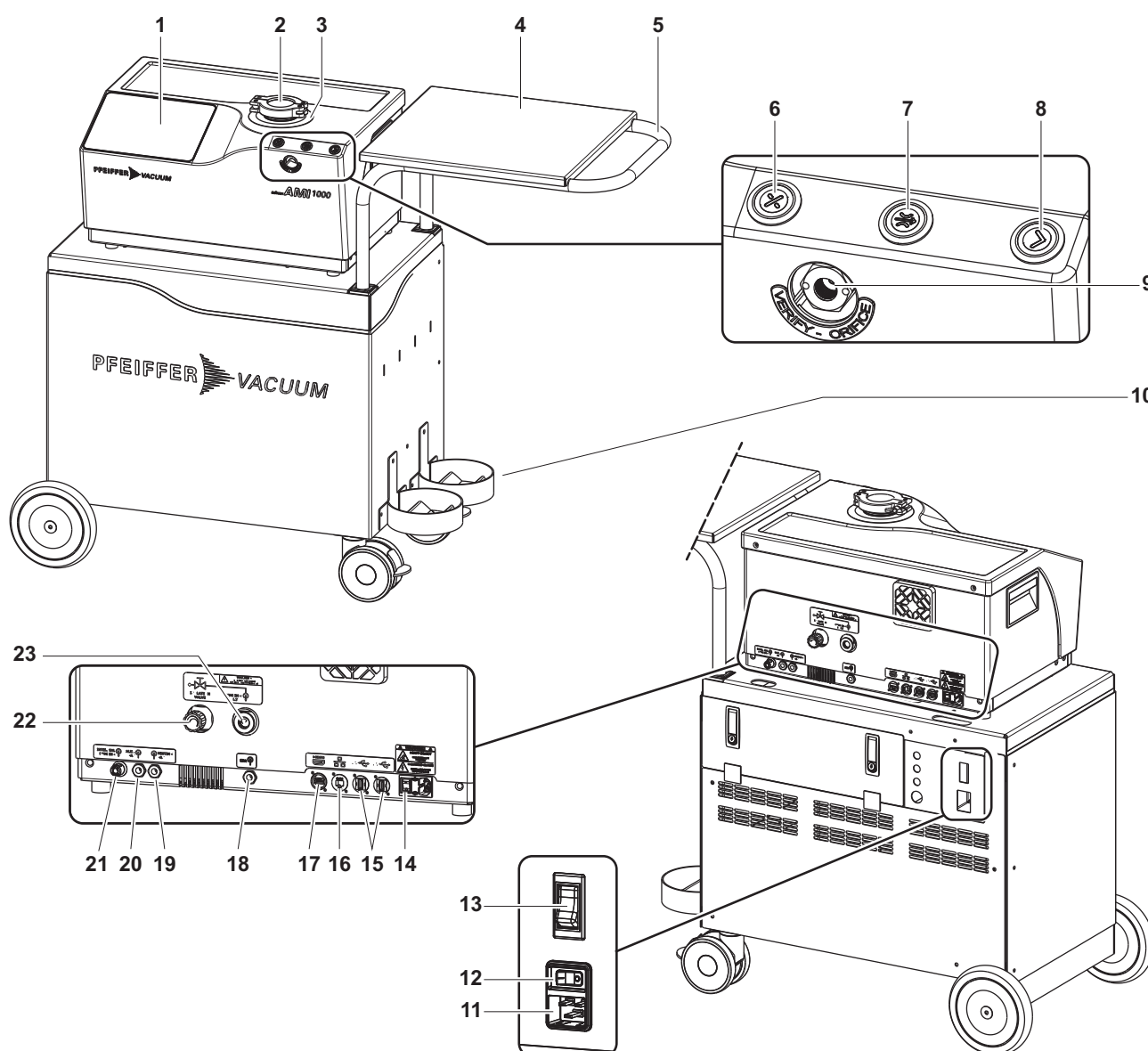


Fig. 1: Human/machine interface

- | | | | |
|----|--|----|--|
| 1 | Touchscreen | 13 | Main switch/Circuit breaker of trolley |
| 2 | Test input - TWISTLOCK interface | 14 | AMI 1000 switch |
| 3 | Light ring | 15 | USB3 connector (x2) |
| 4 | Laptop table | 16 | Ethernet connector |
| 5 | Handling handle | 17 | HDMI connector |
| 6 | ABORT/VENT button | 18 | CDA supply connector - G1/8' interface |
| 7 | VERIFY button | 19 | Venting gas supply connector - G1/8' interface |
| 8 | START button | 20 | Tracer gas supply connector - G1/8' interface |
| 9 | VERIFY ORIFICE verification orifice leak connection - VCO interface | 21 | Interseal pumping connector - Quick connector |
| 10 | Gas bottle holder (x2) | | |
| 11 | Power supply | 22 | Backing pump isolation valve |
| 12 | Equipment power supply switch | 23 | Backing pump connection |

5 Installation

5.1 Pump set-up

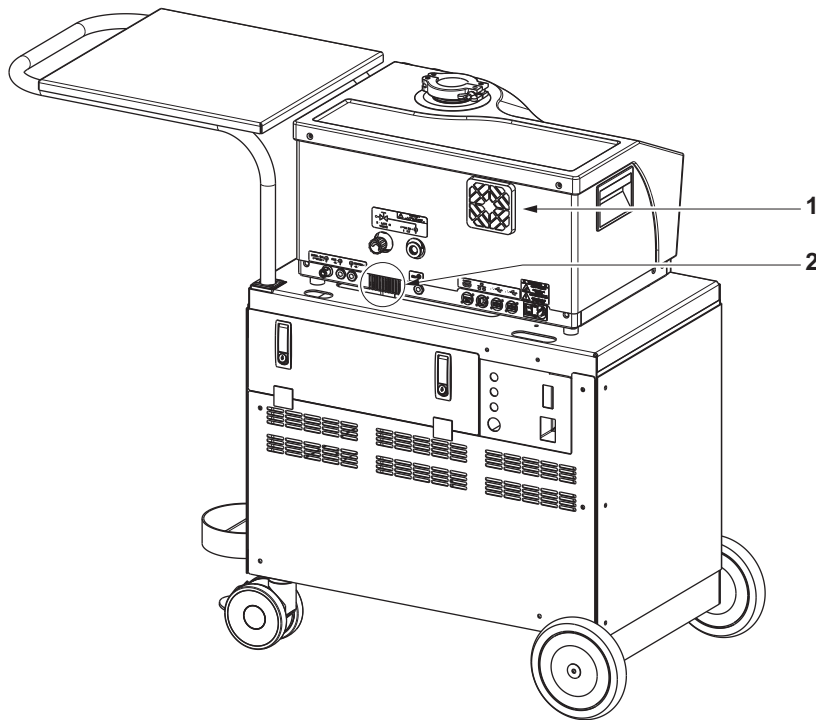
The equipment must be used in horizontal position, standing on its feet.

- ▶ The equipment must be stored for at least 12 hours under normal usage conditions (see chapter "Technical characteristics") before switching on.
- ▶ The equipment must be correctly lighted to allow a clear view of its indicator lights and its touch screen, with no shadows or reflections.
- ▶ The equipment should be installed in an area with controlled humidity levels.
- ▶ Make sure the equipment is level.

Ventilation

To guarantee the characteristics and performances of the equipment within the boundaries of the operating conditions:

- ▶ Do not obstruct the air vents.
- ▶ Ensure the rear of the equipment with the air circulation grids is at least 110 mm away from fixed walls.



1 Ambient air extraction

2 Ambient air inlet

5.2 Compressed dry air (CDA) connection

The compressed air allows to operate the valves.

The compressed dry air supply is to be supplied by the customer.

- Connection (see chapter "Human/Machine Interface")

A compressed dry air supply with the given characteristics is required (see chapter "Compressed dry air characteristics").

The user and/or equipment integrator are ultimately responsible for the installation and must apply the specific safety instructions, in accordance with local regulations.

- ▶ When installing the compressed dry air circuit, provide accessories to isolate the equipment in the installation and facilitate its maintenance (isolation valve, etc.).
- ▶ Fit flexible hoses in the circuit to reduce the transmission of vibrations, and hoses of the same diameter as the connector.

5.3 Venting gas circuit connection

The venting gas is used to vent the equipment.

Argon, ambient air, nitrogen or CDA are the only gases authorized for use as venting gases. All other gases must be submitted to the manufacturer for approval.

The venting gas supply is to be supplied by the customer.

WARNING

Risk of asphyxia in the event of a burst hose

The equipment uses a specific gas (Air/O₂/N₂) which may cause a lack of oxygen in the atmosphere or inside the equipment in the event of a leaking hose.

- ▶ Install the equipment in an environment with sufficient ventilation to absorb any N₂ which may escape in the event of a leaking hose
- ▶ Install (recommendation) a flow limiter to prevent a risk of asphyxia in the event of a burst hose. The maximum authorized flow is 25 slm.

- Connection (see chapter “Man/Machine Interface”)
- “Filter” connector delivered with the equipment for use in ambient air.

A venting gas supply with the given characteristics is required for optimum performance (see chapter “Venting gas characteristics”).

The user and/or equipment integrator are ultimately responsible for the installation and must apply the specific safety guidelines, in accordance with local regulations.

- ▶ Fit flexible hoses in the circuit to reduce the transmission of vibrations, and hoses of the same diameter as the connector.

5.4 Tracer gas circuit connection

Tracer gas is the gas the AMI 1000 looks for to detect a leak.

Air, argon and nitrogen are the only gases authorized for use as tracer gas. All other gases are prohibited.

The tracer gas supply is to be supplied by the customer.

WARNING

Risk of asphyxia in the event of a burst hose

The equipment uses a specific gas (Air/O₂/N₂) which may cause a lack of oxygen in the atmosphere or inside the equipment in the event of a leaking hose.

- ▶ Install the equipment in an environment with sufficient ventilation to absorb any N₂ which may escape in the event of a leaking hose
- ▶ Install (recommendation) a flow limiter to prevent a risk of asphyxia in the event of a burst hose. The maximum authorized flow is 25 slm.

- Connection (see chapter “Man/Machine Interface”)

A compressed tracer gas supply with the given characteristics is required (see chapter “Tracer gas characteristics”).

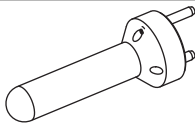
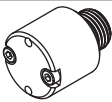
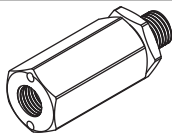
The AMI 1000 user and/or integrator are ultimately responsible for the installation and must apply the specific safety guidelines, in accordance with local regulations.

- ▶ Fit flexible hoses in the circuit to reduce the transmission of vibrations, and hoses of the same diameter as the connector.

5.5 Verification orifice leak connection

The verification orifice leak is used to check the operation of the equipment in a test batch.

- Connection (see chapter “Man/Machine Interface”)
- ▶ Do not leave the **VERIFY ORIFICE** port open to the air. Place the plug on the port if no verification orifice leak is fitted.

VERIFY ORIFICE gripping handle	VERIFY ORIFICE port plug	VERIFY ORIFICE verification orifice leak
		
To be used to remove the plug or verification orifice leak from the equipment.	To be installed on the equipment if no verification orifice leak is fitted.	To be installed on the equipment to check its operation.

5.6 Interseal pumping connection

The interseal pumping is used for pumping and venting the interseal space of specific tools.

The **INTERSEAL PUMPING** port is a quick connector to connect the interseal space of specific tools to the equipment (tools defined by the manufacturer with the customer).

The specific tools are to be supplied by the customer.

- Connection (see chapter "Man/Machine Interface").

The AMI 1000 user and/or integrator are ultimately responsible for the installation and must apply the specific safety guidelines, in accordance with local regulations.

5.7 Mains connection

WARNING

Risk of electric shock due to non-compliant electrical installations

This product uses mains voltage for its electrical supply. Non-compliant electrical installations or installations not done to professional standards may endanger the user's life.

- Only qualified technicians trained in the relevant electrical safety and EMC regulations are authorized to work on the electrical installation.
- This product must not be modified or converted arbitrarily.

WARNING

Danger of electrocution by contact during maintenance or overhaul

There is an electric shock hazard in case of contact with a powered product and not electrically isolated.

- Before carrying out any work, set the main switch to **O**.
- Take care to ensure that the mains connection is always visible and accessible so that the equipment can be disconnected at any time.
- Disconnect the mains power cable from the mains.

NOTICE

Risk of loss of performance due to electromagnetic disturbance

The products' EMC behavior is guaranteed only if the relevant EMC standards are followed during installation.

- Use shielded cables and connections for the interfaces in interference-prone environments.

NOTICE

Risk of electrical overload

The equipment is protected against overload via electromechanical-component circuit breakers.

- Never override these interlocks during installation, use, or maintenance.

The equipment is connected to the mains using the mains power cable provided: type E mains power cable.

Characteristics (see chapter “Technical characteristics”).

- ▶ Connect the mains power cable to the mains (see chapter “Man/machine interface”).

6 Operation

6.1 Preliminary precautions for use

- ▶ The equipment must be stored for at least 12 hours under normal usage conditions (see chapter “Technical characteristics”) before switching on.
- ▶ After switching on, place the equipment in standby and wait at least 12 hours before using it.

6.2 Commissioning

1. Check the connection to the facilities: power supply, CDA, venting gas, tracer gas (see chapter “Installation”).
2. Check the connection of the interseal pumping if specific tool used (see chapter “Installation”).
3. Switch on the equipment (power supply switch, trolley main switch/circuit breaker and AMI 1000 switch in position I).
4. When the “Not in standby, no batch open” status is displayed (see chapter “Equipment status display”), switch on the touchscreen.
 - The application starts.
5. Log in to the equipment interface.
6. Press **START STANDBY**.
7. Press the (flashing green) **START** button.

6.3 Shutting down the equipment

6.3.1 Standard shutdown procedure

1. Remove any product connected to the test port.
2. Install the DN 50 ISO-KF TWISTLOCK adapter on the test port.
3. Fit the test port with the seal carrier fitted with its seal, the blank-off flange and the DN 50 ISO-KF clamp.
4. Remove the verification orifice from the **VERIFY ORIFICE** port and fit the plug on this port.
5. On the home screen, click on **[Advanced]**.
6. Click on **[Exit]**.
7. Click on **[Shutdown]**.
 - The test chamber is placed in standby and the pumps shut down.
 - A confirmation window appears. Once confirmed, the shutdown procedure starts.
 - The touchscreen automatically disconnects.
 - Wait for the indicator light showing that the shutdown procedure has finished (see chapter “Equipment status display”).
8. Switch the equipment off by sliding the switches to position **O**.
 - AMI 1000 switch
 - main switch/Circuit breaker of trolley
 - mains power supply switch

6.3.2 Emergency stop

In case of an emergency stop:

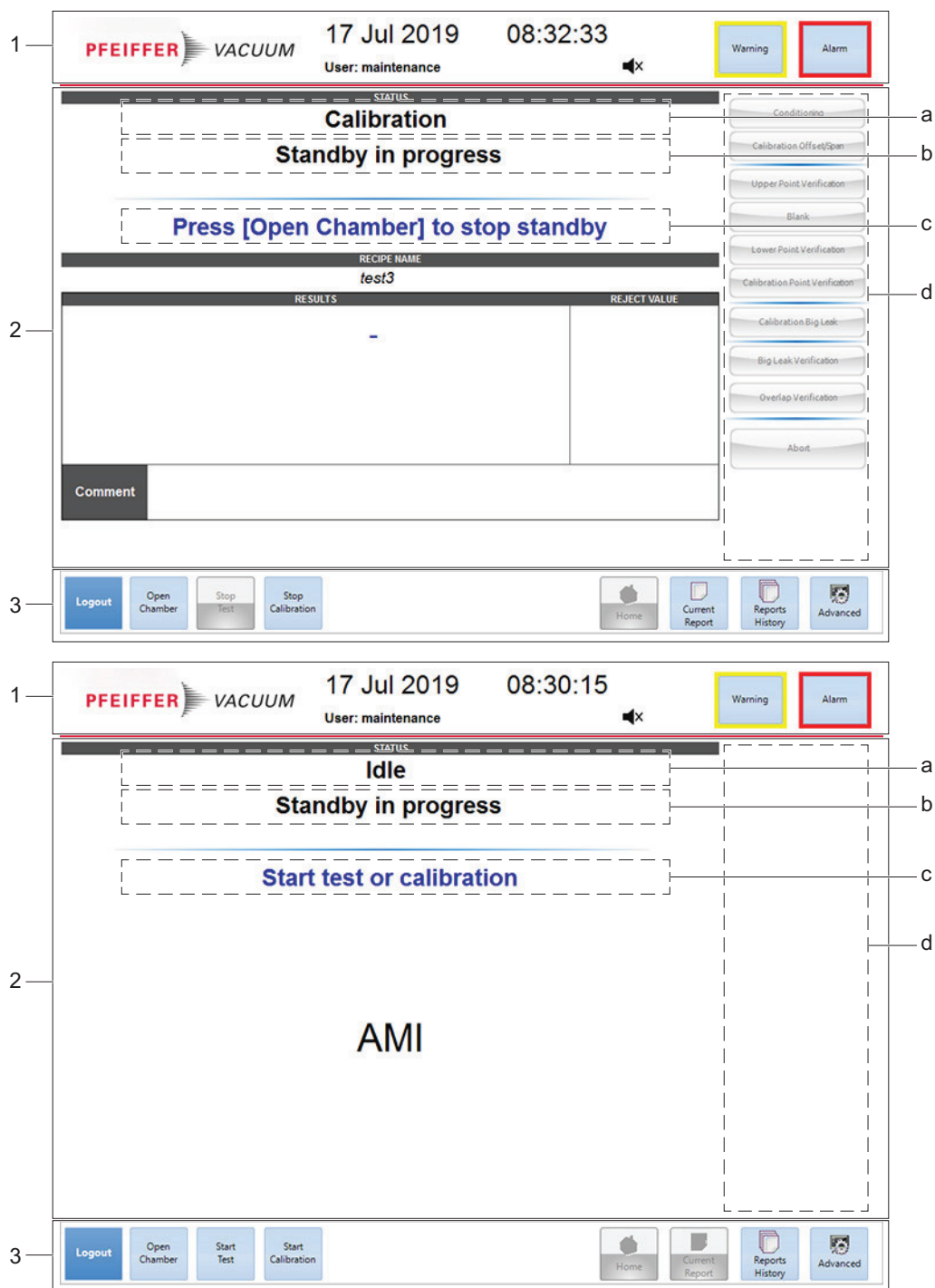
1. Disconnect the mains power cable from the equipment (see chapter “Human/machine interface”).
2. Correct the problem.
3. Restart the equipment according to the commissioning procedure.

6.4 Equipment status display

Status		Light ring	ABORT/ VENT but- ton	VERIFY but- ton	START but- ton
		Display: varies depend- ing on status (see below)	Display: Or- ange 	Display: Red 	Display: Green 
Start-up in progress		 White			
Standby in progress		-		-	
VERIFY ORIFICE: port open		-	-		-
Awaiting START Standby or await- ing START Test		-	-	-	
Cycle in progress		-	-	-	
Test result	PASS	 Green		-	-
	FAIL	 Red		-	-
	INVALID	 Violet		-	-
Venting in progress		-		-	-
Not in standby, test chamber at at- mospheric pressure		 White	-	-	-
The second- ary pump is not ready.	28,000 rpm < speed < 75,000 rpm	 Yellow		-	-
	speed < 28,000 rpm	 Red	-	-	-
The PC is off.		 Red	-	-	-
Shutdown procedure in progress. Do not disconnect the mains power cable.		 Red			
Shutdown procedure finished. Disconnect the mains power cable.		 Blue	-		-
Key (e.g. START button):					
Steady light: 					
Slowly flashing light: 					
Quickly flashing light: 					

Tbl. 2: Equipment status display

6.5 Home page



1 Area 1
2 Area 2
3 Area 3

Area 1

General information	Date - Time - Connected user
	Click on the icon to consult the details of current warnings.
	Click on the icon to consult the details of current alarms.

	'Buzzer enabled' icon Display of the 'Buzzer enabled' icon when the buzzer is enabled: • if the test chamber is open beyond the authorized period, • if the test result is invalid. Display of the icon according to settings Click on the icon to disable the buzzer (the icon disappears when the buzzer is disabled).
	'Buzzer disabled' icon The icon disappears when the buzzer is disabled.

Area 2

Status	Equipment status. • 1st line (a): global status of the equipment (Sleep mode/Test/Calibration/UUT Creation). • 2nd line (b): details of the global status of the equipment (operation in progress) 3rd line (c): instruction to be carried out by the user
Leak rate ¹⁾	Leak rate measured for the UUT being tested.
Recipe Name ¹⁾	Name of the recipe linked to the UUT
Reject Value ¹⁾	Reject threshold set for the UUT test
Comment ¹⁾	A comment can be entered for the current operation This comment will be included in the report.
Specific feature of the screen according to the general status of the equipment ¹⁾	Specific area (d) according to the global status of the equipment (operation in progress).

1) Display only when a calibration or batch test is open.

Area 3

[Login] / [Logout]	User login/logout No operation can be carried out unless the user is identified, apart from consultation of the history.
[Open Chamber] / [Start Standby]	Opening the test chamber and launch of standby mode
[Start Test] / [Stop Test]	Start/stop a batch test
[Start Calibration] / [Stop Calibration]	Start/stop a calibration
[Abort UUT creation] / [Close UUT creation]	Abort/Close UUT creation Only available during UUT creation
[Home]	Return to home page
[Current Report]	Display of the current report during a test, a calibration or UUT creation. Not available (grayed out) if no test, calibration or UUT creation in progress.
[Reports History]	Access to all the reports for tests, calibrations and UUT creation.
[Advanced]	Access to the Advanced menus

6.5.1 Access authorization

The functions available depend on the user's access authorization level.

Some functions are only available during calibration or a test.

Viewing and/or acknowledging alarms/warnings from the Home page.

The contents of the Advanced menu vary depending on the user's level of access.

Function	Level		
	Operator	Advanced and Maintenance	Administrator
[Open Chamber] / [Start Standby]	✓	✓	✓
[Start Test] / [Stop Test]	✓	✓	-
[Start Calibration] / [Stop Calibration]	✓	✓	-
[Abort UUT Creation]	-	✓	-
[Home]	✓	✓	✓
[Current Report]	✓	✓	✓
[Reports History]	✓	✓	✓
[Advanced]	✓	✓	✓
[Warning/Alarms]	✓ ¹⁾	✓	✓

1) Viewing only

6.5.2 Audible warning device

The equipment has an audible warning device to warn the user:

- when the result of a leak test is invalid ('Status' window red and red lamp on the light ring lighted),
- if the test chamber stays open too long (message is displayed),
- if an alarm is active.

The volume level of the audible warning device is not adjustable: the warning device can either be enabled or disabled.

Each audible warning device (test result, open test chamber or alarm) can be disabled (see chapter "Buzzer Manager" menu").

6.6 Test procedure

Before any operations are carried out in the test chamber:

- Check that the seals and the inside of the chamber are clean with no particles or dust.
If necessary, clean it with alcohol and a soft lint-free cloth.

Step	Description	See chapter . . .
1	The product must be created in the equipment.	Create a UUT (see chapter "Creation of a new UUT")
2	The product will be tested according to a setting defined in a recipe.	Create the recipe (see chapter "Creation of a recipe")
3	The recipe linked to the product must be calibrated to ensure that its setting is correct.	Calibrate the recipe (see chapter "Calibration")
4	A batch test can be performed. • Collection of one or more UUTs on a production line • The user creates a batch test during which each UUT will be tested.	Test UUTs (see chapter "UUT batch test")

6.7 Characteristics of the UUT to be used

Characteristics	Global status		
	Creation of a UUT	Calibration	Test
It is essential that the UUTs used for the calibration and the test are in the same conditions (temperature, humidity). If this is not the case, there is a risk that the measurements will be rejected and invalid or even impossible. The UUTs must be stored near to the equipment for a sufficient period of time (at least 1 hour) for their temperature and humidity to be stabilized.	-	✓	✓
Change of UUT for each step.	✓	✓	-
Wait for at least one hour before reusing the same UUT. For the best result, you are advised to wait 24 hours between using the same UUT to allow the UUTs to completely recharge in humidity.	✓	✓	-

6.8 Calibration

Calibration allows a recipe to be calibrated and validated before it is used for a batch test.

Specific feature of the home page (Area 2, mark 6, see chapter “Home page”)

[Abort] / [Open Chamber]	The current operation is aborted. Validate abort and indicate the reason for aborting (option). Open the chamber to insert a new UUT and proceed to the next step.
[Conditioning]	Performance of a no-load cycle to prepare the equipment.
[Calibration Offset/ Span]	Calibration offset/ALPS sensor span
[Upper Point Verification] ¹⁾	Verification of a point located above the set reject threshold (result = Rejected).
[Blank] ¹⁾	Performance of a blank test with a sealed UUT: the measurement must be less than the reject threshold set in the recipe (see chapter “Recipe Manager” menu).
[Lower Point Verification] ¹⁾	Verification of a point located below the set reject threshold (result = Accepted).
[Calibration Point Verification] ¹⁾	Verification of the calibration point, which corresponds to the reject threshold set during configuration (see chapter “Recipe Manager” menu).
Massive Leak Detection Mode: [Pressure Adjustment] ²⁾ Vacuum Decay Mode: [Calibration Big Leak] ³⁾	Calibration of Gross Leak mode. 2 possible Gross Leak modes (see chapter “Creation of a recipe”): - Massive Leak Detection - Vacuum Decay Massive Leak Detection: [Pressure Adjustment] Selected sensor: ALPS + Massive Leak Detection 2 measurements (sub-steps) during the 'Pressure Adjustment' step 1st sub-step with a sealed UUT 2nd sub-step with no UUT Follow the instructions on the screen. Vacuum Decay: [Calibration Big Leak] Selected sensor: ALPS + Vacuum Decay Only 1 measurement during the 'Calibration big leak' step Follow the instructions on the screen.

1) Setting: see chapter “Creation of a recipe”, **[Calibration] tab**

2) Setting: see chapter “Creation of a recipe”, **[Massive Leak Detection] tab**

3) Setting: see chapter “Creation of a recipe”, **[Vacuum Decay] tab**

[Big Leak Verification]	Verification of detection in Gross Leak mode. Use of a UUT with a gross leak or measurement with no UUT to simulate an empty UUT Follow the instructions on the screen.
[Overlap Verification]	Verification at an overlap point of simultaneous detection with the ALPS sensor and the Gross Leak mode (Massive Leak Detection or Vacuum Decay mode) ¹⁾ For this measurement, it is necessary to connect a calibrated leak (potentially with the same volume as the sample) to the Verify Orifice port. The instructions are not provided on the screen: refer to the instructions provided in the technical file of the equipment.

1) Setting: see chapter "Creation of a recipe", **[Calibration] tab**

2) Setting: see chapter "Creation of a recipe", **[Massive Leak Detection] tab**

3) Setting: see chapter "Creation of a recipe", **[Vacuum Decay] tab**

Setting the reject thresholds for the tests **[Upper Point Verification]**, **[Blank]**, **[Lower Point Verification]** and **[Calibration Point Verification]**: see chapter "Creation of a recipe", **[Calibration] tab**.

Access authorization

(See chapter "Access authorization")

6.8.1 Validity of a recipe

- A validated recipe is available during the set period. After this time, the recipe will be invalid and a new calibration will be necessary before being able to use the recipe again.
- If one of the parameters of the recipe is modified, the recipe will be invalid and a new calibration will be necessary before being able to use the recipe again.
- If any of the UUT parameters used in a recipe are modified, **all** recipes using that UUT become invalid. To re-enable the recipes, recalibrate each of the recipes using the UUT.

If the test mode is changed in the recipe, the recipe will become invalid. To re-enable the recipe, recalibrate it.

6.8.2 Calibration of a recipe

- Characteristics of the UUT to be used (see chapter "Characteristics of the UUT to be used").
- A calibration which is in progress can be interrupted. Click on **[Close Calibration]**, then **[Abort]**: the calibration is aborted.
- When the ALPS sensor is selected, if the capillaries have not been configured, a message notifies the user. No operation (test, calibration, creation of UUT, replacement configuration) is possible until the settings have been completed (see chapter "'Capillaries Manager' menu").

1. Click on **[Start Calibration]**.
2. Complete the information requested.

Recipe	List of recipes created in alphabetical order. Select the recipe to calibrate in the list. • Only the activated recipes are in the list (see chapter "'Recipe Manager' menu"). • If the recipe to be selected is not in the list, contact a user authorized to manage the recipes (see chapter "Access authorization").
Calibration Status	Recipe calibration status: • 'Valid': Recipe calibration valid • 'Invalid - Calibration required': 1st calibration of the recipe to be carried out • 'Invalid - Expired' - Expired calibration (> 24 hours) - Carry out a new calibration
Calibration Name	Automatic creation of the name of the calibration: Calibration - Date - Time. This name can be modified by the user. A calibration report is automatically generated for each calibration: same name as that of the calibration (see chapter "Reports").
Calibration Comment	Possibility to add a comment to the calibration. This comment will be included in the report.

[Create]	Creation of a calibration
[Cancel]	Cancellation of creation. Return to home page.

- Continue the procedure according to user level: see below.

Procedure for Operator level user

For an Operator level user, the calibration procedure is guided: the user is told each operation which is to be carried out.

All the steps of the calibration must be followed and completed for the calibration to be valid.



Performing a non-automatic calibration is a privilege which can be granted to a user (see chapter "Administrator level user").

It is possible to disable one or more stages of the automatic calibration verification (see chapter "Creation of a recipe"), **[Calibration]**.

In the event of a type 37xx alarm or if an emergency stop is required, it is not possible to stop the calibration. Only a user who has the privilege (see chapter "Access authorization") can force the stop of the calibration by confirming the message displayed.

- Click on **[Create]**.
- Click on **[Open chamber]**.
- Follow the instructions given.
 - The number of steps varies according to the recipe settings (see chapter "Creation of a recipe").
 - The current report can be consulted at any time by clicking on **[Current Report]**.
 - The current step is indicated on an orange background.
- Manually insert a UUT.
- Press the (flashing green) **START** button to start a step.
- When the step is complete, the orange **ABORT/VENT** button will flash.

Press it for the chamber to return to atmospheric pressure in order to open it and change the UUT to perform the next step. To perform this operation, it is also possible to press **[Open Chamber]** on the human/machine interface to ventilate the chamber.

Result: display of a message with the result at each step.

- The orange/yellow colours of the 'Status' windows, orange/yellow are their default colors. Another color can be set by an administrator level user (see chapter "Configuration" menu).
 - The green/red colors of the green/red 'Status' windows cannot be configured.
 - Green 'Status' window: step valid
 - Orange 'Status' window: step invalid (incomplete step)
 - Aborted before the end by the user. Validate abort and indicate the reason for aborting.
 - Problem during the step. Follow the instructions given and/or repeat the step.
 - Red 'Status' window: step rejected
 - Fault on the equipment. Validate the message to open the test chamber.
- After the last step, click on **[Stop calibration]**.
Details of the calibration are displayed.
 - Complete the report which is automatically generated (see chapter "Creation of a report").
 - Close the calibration:
 - Click on **[Valid]**: the current calibration is closed and the result of the calibration is validated. If a fault appears during calibration, **[Valid]** is not available: abort the calibration.
 - Click on **[Abort]**: the current calibration is aborted and the result of the calibration is not validated. Validate the aborted operation.
 - Click on **[Cancel]**: the current calibration is not closed. Return to home page.
 - Click on **[Reports History]** to view the calibration report.

Procedure for Advanced level user

For an Advanced level user, the calibration procedure is not automatic.

1 st calibration of the recipe.	Compulsory steps for validating the calibration: • [Calibration Offset/Span] • [Pressure Adjustment] if the selected sensor is 'ALPS + Massive Leak detection' • [Calibration Big Leak] if the selected sensor is 'ALPS + Vacuum Decay' The other steps are optional.
Repeated calibration of the recipe after expiry of the previous one	Calibration can be validated without any step being performed

The list of steps to select is indicated against a blue background.

The current step is indicated on an orange background.

The current report can be consulted at any time by clicking on **Current Report**.

In the event of a type 37xx alarm or if an emergency stop is required, it is not possible to stop the calibration. Only a user who has the privilege (see chapter "Access authorization") can force the stop of the calibration by confirming the message displayed.

1. Click on **[Conditioning]** (recommended step).

This step is used to carry out a no-load cycle to prepare the equipment.

2. Follow the instructions given.
3. Click on **[Calibration Offset/Span]**.
4. Follow the instructions given.

For each step:

1. Select the step on the human/machine interface.
2. Press the (flashing green) **START** button.
3. When the step is complete, the orange **ABORT/VENT** button will flash.

Press it for the chamber to return to atmospheric pressure in order to open it and change the UUT to perform the next step. To perform this operation, it is also possible to press **[Open Chamber]** on the human/machine interface.

Result of the 'Calibration Offset/Span' step: a message is displayed with the result of the step.

- The orange/yellow colours of the 'Status' windows, orange/yellow are their default colors. Another color can be set by an administrator level user (see chapter "Configuration" menu).
 - The green/red colors of the green/red 'Status' windows cannot be configured.
 - Green 'Status' window: step valid
 - Orange 'Status' window: step invalid (incomplete step)
 - Aborted before the end by the user. Validate abort and indicate the reason for aborting.
 - Problem during the step. Follow the instructions given and/or repeat the step.
 - Red 'Status' window: step rejected
 - Fault on the equipment. Validate the message to open the test chamber.
5. To be followed if the gross leak mode is 'Massive leak Detection'.
 1. Click on **[Pressure Adjustment]** to start calibration.
 2. Follow the instructions given.
 3. Click on **[Big Leak Verification]** to start verification.

Verification is not available until the 'Pressure adjustment' step has been completed.

 - 4. Follow the instructions given.

Depending on the customer's application, this verification can be performed in different ways: without a UUT in the test chamber or with a UUT with a gross leak.

 - 5. Click on **[Overlap Verification]** to start verification.

Verification is not available until the 'Pressure adjustment' step has been completed.

 - 6. Follow the instructions given.

This step requires a tool with a calibrated hole and possibly a volume of the same size as the tested UUT to connect to **VERIFY ORIFICE**. The addition of this tool is not indicated in the instructions on the screen: refer to the instructions provided in the technical file of the equipment.

 - 6. To be followed if the gross leak mode is 'Vacuum Decay'.
 1. Click on **[Calibration Big Leak]** to start calibration.
 2. Follow the instructions given.
 3. Click on **[Big Leak Verification]** to start verification.

Verification is not available until the 'Calibration Big Leak' step has been carried out.

4. Follow the instructions given.

Depending on the customer's application, this verification can be performed in different ways: without a UUT in the test chamber or with a UUT with a gross leak.

5. Click on **[Overlap Verification]** to start verification.

Verification is not available until the 'Calibration Big Leak' step has been carried out.

6. Follow the instructions given.

This step requires a tool with a calibrated hole and possibly a volume of the same size as the tested UUT to connect to **VERIFY ORIFICE**. The addition of this tool is not indicated in the instructions on the screen: refer to the instructions provided in the technical file of the equipment.

7. The Advanced level user can close and validate the calibration result as soon as the 'Calibration Offset/Span' and 'Pressure Adjustment' or 'Calibration Big Leak' steps have been validated.

However, you are advised to carry out the 4 following verification steps: these verifications allow the ALPS sensor to be checked.

The user can carry out only some of the verifications: there is no obligation to carry out all the verifications.

The verifications do not have to be carried out in any particular order.

The **[Upper Point Verification]**, **[Blank]**, **[Lower Point Verification]** and **[Calibration Point Verification]** verifications are not available until the 'Calibration Offset/Span' step has been completed.

1. Click on **[Upper Point Verification]** to start verification.
2. Follow the instructions given.
 1. Manually open the test chamber.
 2. Insert the UUT.
 3. Close the test chamber.
 4. Press the (flashing green) **START** button.
 5. At the end of the step, press the (flashing orange) **ABORT/VENT** button to ventilate the chamber and open it.
3. Click on **[Blank]** to start verification.
4. Follow the instructions given.
 1. Manually open the test chamber.
 2. Insert the UUT.
 3. Close the test chamber.
 4. Press the (flashing green) **START** button.
 5. At the end of the step, press the (flashing orange) **ABORT/VENT** button to ventilate the chamber and open it.
5. Click on **[Lower Point Verification]** to start verification.
6. Follow the instructions given.
 1. Manually open the test chamber.
 2. Insert the UUT.
 3. Close the test chamber.
 4. Press the (flashing green) **START** button.
 5. At the end of the step, press the (flashing orange) **ABORT/VENT** button to ventilate the chamber and open it.
7. Click on **[Calibration Point Verification]** to start verification.
8. Follow the instructions given.
 1. Manually open the test chamber.
 2. Insert the UUT.
 3. Close the test chamber.
 4. Press the (flashing green) **START** button.
 5. At the end of the step, press the (flashing orange) **ABORT/VENT** button to ventilate the chamber and open it.
9. If one of the verifications is not satisfactory, you are advised not to validate the calibration, and to launch a new calibration. If after several calibrations, the results are still not satisfactory, consult the manufacturer.
10. If all the verifications are satisfactory, close and validate the calibration.
Click on **[Stop calibration]**.
Details of the calibration are displayed.

11. Complete the report which is automatically generated (see chapter “Creation of a report”).
Most fields are filled in automatically. At the end of a batch test, only an end comment can be entered.
12. Close the calibration:
 - Click on **[Valid]**: the current calibration is closed and the result of the calibration is validated. If a fault appears during calibration, **[Valid]** is not available: abort the calibration.
 - Click on **[Abort]**: the current calibration is aborted and the result of the calibration is not validated. Validate the aborted operation.
 - Click on **[Cancel]**: the current calibration is not closed. Return to home page.
13. Click on **[Reports History]** to view the calibration report.

6.9 UUT batch test

The user starts a batch test, however many UUTs there are to test (even just one).

A leak test is carried out on each UUT.

A test report is automatically generated when the batch test is closed summarizing the parameters and the result of each UUT tested.

Specific feature of the home page (Area 2, mark 6, see chapter “Home page”)

[Blank]	Performance of a blank test with a sealed UUT: the measurement must be less than the reject threshold set during configuration. This test is recommended if the equipment has not been used for at least one hour.
[Open Chamber] ¹⁾	Opening of the test chamber. To close the chamber, simply shut the lid.
[Abort] ¹⁾	Current measurement is aborted. Validate abort and indicate the reason for aborting.
[Acknowledge] ¹⁾	An interrupted or rejected measurement is acknowledged and the test chamber is opened. Give the reason for this acknowledgment.

1) Action that can be performed with the **ABORT/VENT** button

6.9.1 Creation of a test

During the test, the measured leak rate of the UUT is displayed. If the measured leak rate is outside of the configured range (range defined with the maximum/minimum leak values), the display is corrected (see chapter “Creation of a recipe” **[Threshold]** tab).

When the ALPS sensor is selected, if the capillaries have not been configured, a message notifies the user. No operation (test, calibration, creation of UUT, replacement configuration) is possible until the settings have been completed (see chapter “‘Capillaries Manager’ menu”).

It is possible to control the measurement with a reference sample inserted into the test chamber (click on **[Blank]**). The results of these tests are not taken into account in the calculation of the statistics for the report.

1. At any time, the user can press **Start/Standby** to put the equipment in standby mode.
2. Click on **[Start Test]**.
3. Complete the information requested.

If the equipment has the barcode reader option, use the reader to scan the batch label. The reader will emit a sound to validate label reading or 3 characteristic rapid sounds if reading is invalid. The pre-completed fields can also be modified by the operator.

Test Type	Selection of the type of test to be carried out: • 'Production Test': Production test All tests carried out by Operator level users are automatically saved in 'Production Test'. • 'Preliminary Test': Preliminary Test. For tests which are not linked to production (e.g. equipment adjustment), only for Advanced level users.
Recipe	Selection of the recipe to be linked to the test. Select the recipe to be used in the drop-down list. • Only recipes with 'Enabled' status are in the list (see chapter "Details of a recipe"). • Only recipes with 'Valid' status can be selected. • If the recipe you are looking for is not in the list, contact an Advanced/Administrator level user. (To view available recipes, see chapter "Recipe Manager")
Calibration Status	Calibration status of the selected recipe. To use a recipe, the associated calibration must be validated. If this is not the case, calibrate the selected recipe (see chapter "Creation of a recipe").
Batch number ¹⁾	Batch number samples (compulsory).
Test Comment ¹⁾	Possibility to add a comment (optional) for the test being created. This comment will be included in the test report.
Sample Information ¹⁾	Origin of the batch of UUT in the drop-down list (compulsory). The drop-down list can be configured by the user (see chapter "Creation of the 'Sampling information' list"). It is pre-set by the manufacturer according to the customer's specifications.
[Create] ¹⁾	Creation of a batch test. A batch test cannot be created if the calibration of the selected recipe is invalid or if one of the parameters is not filled in.
[Cancel]	Cancellation of the creation and return to the home page.

1) Only available if the calibration of the selected recipe is valid.

4. Click on **[Create]**.

5. Click on **[Open Chamber]**.

6. Follow the instructions given.

- Possibility to add a comment **before** starting the UUT test (optional).

This comment will be included in the test report.

- The test starts when the user presses the (flashing green) **START** button.
- The result is displayed after the test.

The orange/yellow colors of the "Status" windows, orange/yellow are their default colors. Another color can be set by an Administrator level user (see chapter "Administrator level user").

The green/red colors of the green/red "Status" windows cannot be configured.

'Status' window	Light ring	Status	Action
Orange	Pink	Test aborted before completion or display of a test result message (see chapter "Test result messages"). The test chamber remains closed. The chamber is not ventilated; it is not possible to open it.	Click on [Acknowledge] to open the test chamber and give the reason for aborting the test.
Green	Green	Test accepted, correct piece (UUT leak rate below the reject threshold).	Click on [Open chamber] to open the test chamber.
Yellow	Yellow	Test accepted but the measured leak rate is close to the reject threshold (UUT leak rate less than the reject threshold but greater than the warning threshold).	Click on [Open chamber] to open the test chamber.
Red	Red	Test rejected, part incorrect (UUT leak rate greater than the reject threshold): the test chamber remains closed.	Click on [Acknowledge] to open the test chamber.

'Status' window	Light ring	Status	Action
Orange	Red	The UUT test is deemed to be invalid if the user interrupts it. In this case, give the reason for aborting the test and confirm (optional).	Click on [Acknowledge] to open the test chamber.
Orange	Red	If a problem arises during the measurement, the test will be stopped and the chamber will remain closed.	Click on [Acknowledge] to open the test chamber.

7. Repeat the operation for each UUT to be tested.
8. After testing the last UUT, click on **[Stop Test]**.
9. If the standby mode is not yet in progress, standby setting will be requested.

Click on the **START** button to start standby.

The equipment goes into standby mode.

- The batch test details are displayed.
- The name of the 1st UUT tested will be '001', the name of the 2nd will be '002', etc.

In the event of a type 37xx alarm or if an emergency stop is required, it is not possible to stop the UUT batch test in progress. Only a user who has the privilege (see chapter "Access authorization") can force the stop of the test by confirming the message displayed.

10. Complete the report which is automatically generated (see chapter "Creation of a report").

It is possible to add an end comment if desired.

11. Close the test:
 - Click on **[Close Test]**: the current test is closed. No more measurements possible in this batch test.
 - Click on **[Cancel]**: the current batch is not closed. Return to test screen.
12. Testing of new UUTs can continue.
13. Click on **[Reports History]** to view the test report (see chapter "Reports").

6.9.2 Creation of the 'Sample information' list

1. On the home page, click on **[Advanced]**.
2. Click on **[Configuration]**.
3. In the 'Presets' list, click on **[Reports]**.
4. Click on **[Sample Information Multiple Choice]**.
5. Click on **[Sample Information Multiple Choice Item 1]** to define the 1st choice.
6. Repeat the last operation for the other choices (10 maximum).

The list is pre-set by the manufacturer according to the customer's specifications:

- 'Start': UUT(s) collected at the beginning of manufacture.
- 'End': UUT(s) collected at the end of manufacture.
- 'Change of foil': UUT(s) collected during a change of foil during manufacture.
- 'IPC' (In Process Control): UUT(s) collected during manufacture.
- 'Unexpected machine stop': UUT(s) collected during an unexpected shutdown of the equipment during manufacture.
- 'Other': other source: add a comment.

6.10 Opening/Closing the test chamber

Any user, whatever his/her level, can open/close the test chamber.

The test chamber can be opened at any moment, but this will invalidate the current operation: follow the instructions.

The test chamber opens and closes manually.

- If the test chamber is under vacuum, it is difficult or impossible to open it.
- If the chamber has been ventilated (reset to atmospheric pressure), it can be opened by the user.

6.10.1 Equipment Standby mode

You are advised to limit the period during which the chamber is open in order to protect it from humidity, deposits of particles or regassing. For this purpose there is a Standby mode allowing the test chamber to remain empty during periods which it is not used.

The equipment must be placed in Standby mode if the test chamber has been open for more than 30 seconds.

1. Follow the instructions given.
2. On the home page, click on **[Start Standby]** and follow the instructions given.
3. Press the (flashing green) **[START]** button.

The equipment will enter Standby mode.

4. It is possible to exit Standby mode at any time by clicking on **[Open Chamber]**.

6.10.2 Safety device on the test chamber.

If the test chamber remains open too long, a safety mechanism is triggered (a message is displayed and the buzzer is activated). A depollution procedure must be launched in the test chamber.

1. Follow the instructions given.
2. Click on **[Start Standby]**.
3. Follow the instructions given.
4. Press the (flashing green) **[START]** button.

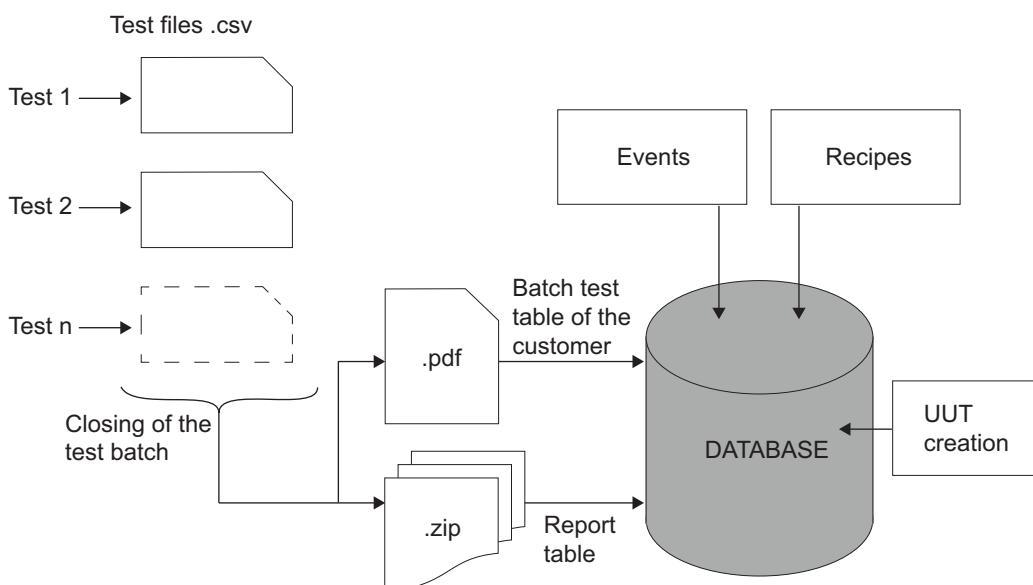
If the equipment is running a test, calibration or UUT creation, a countdown is displayed on the screen indicating the time remaining until the equipment can be used.

6.11 Data management

'AMI' software must be placed in a PC with Windows 10 (64 bits).

All the data (PDF, CSV, recipes, UUT configurations, tests, events) are saved in the database.

Diagram of the data architecture:



Every time the PC is started up, the database is checked to ensure data integrity.

- If the database is healthy, the 'AMI' software is automatically launched.
- If the database is corrupted, a message informs the user that the database must be repaired. Click on **[OK]** to validate the message then on **[Repair database]** to launch database repair. This operation can take a few minutes.
 - If the repair is successful, a message informs the user that the database has been repaired. Click on **[OK]** to validate the message and restart the PC. The 'AMI' software then automatically launches.
 - If the repair fails, contact the manufacturer.

6.12 Reports

Access authorization

(See chapter "Access authorization")

6.12.1 Creation of a report

Every time a batch test, calibration or UUT creation is closed, this generates the creation of a report.

- Complete the information requested.

The information is filled in automatically or by the user upon opening the batch test, during the batch test (for comments). Only the End Comment (END COMMENT) is filled in at the end of the report or a calibration.

The information to be entered varies according to the type of report.

Type	Type of report
Report name	Name of the report ¹⁾
Batch number	UUT batch number from which the UUT samples were collected ^{2) 3)}
Comment	The comment entered by the user during the operation
Sample Information ⁴⁾	Origin of the sample ³⁾
Recipe	Recipe associated with the UUT and version of the recipe
Report Generated	Date and time of creation of the report
Closed By	The user who closed the report (name of the user connected to the equipment)
Order Number ⁴⁾	Number of the UUT batch order from which the UUTs have been taken for the test ^{2) 3)}
Product Number ⁴⁾	Reference of the UUT collected ^{2) 3)} The display of order number/product number and Sample Information can be set in Configuration.
Status	Calibration status ^{1) 3)}
UUT	Name of the UUT associated with the recipe and version of the UUT.
Last Calibration	Name of the last calibration carried out on the recipe.
Last Calibration Date	Date and time of the last calibration carried out on the recipe
Average Standard Deviation Mini- mum Maximum	Test statistics: results obtained following the UUT tests carried out during the test ³⁾ • Mean: mean of the measurements for all the tests carried out • Standard deviation • Minimum: minimum leak rate measured over all the tests carried out • Maximum: maximum leak rate measured over all the tests carried out. Blank tests ([Blank]) are not taken into account in the statistics.
Threshold (mbar.l/s)	Reject threshold set in the recipe ³⁾
Warning threshold (mbar.l/s)	Warning threshold set in the recipe ³⁾
Software PLC Sensor	Give the software version: • Software: the version of the equipment system software. • PLC: version of the PLC software. • Sensor: version of the ALPS 120 software.
End Comment	Final comment put by the user on the report before its closing.
List of operation	List of operations performed in the report (see chapter "Details of an operation").

1) Does not appear in a batch test report

2) Does not appear in a calibration report

3) The value does not appear in a UUT creation report

4) Display can be set in **[Configuration]**

6.12.2 Details of an operation

Information for each operation carried out

User	Name of the user connected to the equipment
Date	Date the operation was carried out
Time	Time the operation was carried out
Duration	Duration of the operation

Test Name	Name of the UUT or operation carried out
Leak rate (mbar.l/s)	Measured leak rate
Test Result	Result of the operation
Test Comment	Comment entered by the user during the operation

6.12.3 History

- On the home page, click on **[Reports History]**.

Last 7 days	If checked, the reports created over the last 7 days are displayed
All	If checked, all the reports created are displayed
Report Date	Date and time of creation of the report
Report Type	Type of report: type of sensor + type of operation - Type of sensor: 'Air': ALPS sensor 'Air + Massive': ALPS sensor + Massive Leak Detection 'Air + Vacuum': ALPS sensor + Vacuum Decay
Report Name	Name of the report entered when the report was created
Recipe	Name of the recipe or 'Recipe UUT creation' for a UUT creation report
Calibration Report	Name of the calibration report
Status	Report status: in progress or closed
Comments	Final comment added to the report by the user
[Export selected reports]	Export of reports (see chapter "Report export")

Filters

Several filters are available to facilitate report searches. These filters are accessible by clicking on .

- Click on  to hide the filters.

Last 7 days	If checked, the reports created over the last 7 days are displayed.
All	If checked, all the reports created are displayed.
Report Name search	Search in the content of the 'Report name' area of the report
Report Name	Search in the content of the 'Report name' area of the report
Recipe	Filter according to the recipe. Select the desired recipe in the drop-down menu.
Measurement	Filter according to the type of sensor used
Report type	Filter according to the type of report Select the type of report desired in the drop-down menu.
Start Time	Filter based on the selected time and date If checked, the filter is enabled.
End Time	Filter up to the selected time and date. If checked, the filter is enabled.
Msg Type	Filter according to the type of message (info/fault/alarm) Select the type of message desired in the drop-down menu.
[Search]	The search is launched.

6.12.4 Opening a current report

The current report can be consulted at any time by clicking on **[Current Report]**.

The information in the report varies according to the type of report (see chapter "Creation of a report").

6.12.5 Report export

A copy of the list of reports can be exported in pdf format.

It is also possible to export the reports in pdf and/or csv format (see chapter “Files Transfer’ menu”).

1. On the home page, click on **[Reports History]**.
2. Click on the report(s) to be exported.
3. Click on **[Export selected reports]** and follow the instructions given.

7 Advanced settings



This chapter describes the available functions and how they work. This chapter helps the user to set the product parameters according to the use requirements.

7.1 Access authorization

The functions available from the 'Advanced' screen depend on the user's access authorization level.

- On the home page, click on **[Advanced]**.

Function	Level			
	Operator	Advanced	Maintenance	Administrator
[Exit]	-	✓	✓	✓
[Users Manager]	✓	✓	✓	✓
[Files Transfer]	-	✓	✓	✓
[Configuration]	-	✓	✓	✓
[Events]	✓	✓	✓	✓
[Maintenance]	-	✓	✓	✓
[Leak Signal Monitoring]	✓	✓	-	-
[Recipe Manager]	-	✓	-	✓
[UUTs Manager]	-	✓	-	-
[Air Sensor Spectra]	-	✓	✓	-
[Buzzer Manager]	-	✓	✓	✓
[Capillaries Manager]	-	✓ ¹⁾	✓	✓ ¹⁾
[ALPS Manager]	-	✓	✓	✓

1) Viewing only

These authorizations are the default ones for each user level. It is possible to customize the rights for each user by granting/withdrawing privileges (see chapter "Administrator level user").

7.2 'Exit' menu

This menu is used to shut down the pumps and compressed dry air circuit and to close the 'AMI' software and the Windows session



Equipment shutdown is a privilege which can be granted to a user (see chapter "Administrator level user").

Access authorization

(See chapter "Access authorization")

Home page for the menu

1. On the home page, click on **[Advanced]**.
2. Click on **[Exit]**.

[Shutdown System]	Equipment shutdown (pumps and compressed dry air circuit). The equipment is still live. Click on [Shutdown System] and follow the instructions.
[Exit Software]	The 'AMI' software is closed and return to the Windows session. Click on [Exit Software] and follow the instructions.
[Log Off]	The 'AMI' software and the Windows session are closed. Click on [Log Off] and follow the instructions.
[Run]	Use reserved for the manufacturer for appraisal.

3. Shutdown procedure: see chapter "Shutting down the equipment"

Changing Windows session

1. Launch the 'AMI' software and connect.
2. On the home page, click on **[Advanced]**.
3. Click on **[Exit]**.
4. Press and hold the **[Shift]** key and click on **[Log Off]** until the Logon screen appears.
5. Connect to Windows.

7.3 'Users Manager' menu

This menu is used to manage user accounts. Access rights and usage rights vary according to the user's level.

Access authorization

(See chapter "Access authorization")

Home page for the menu

1. On the home page, click on **[Advanced]**.
2. Click on **[User Manager]**.

7.3.1 Operator/Advanced/Maintenance user level

Users with Operator/Advanced/Maintenance level are only authorized to change their password and language.

[Change my Password]	Change of password (see chapter "Password modification")
Language	Choice of display language Select the language in the drop-down menu. Click on [Apply] to validate the modification. The functions accessible from the 'Advanced' screen will always be displayed in English, whatever language is set.

7.3.2 Administrator level user

Only Administrator level users are authorized to create user accounts.

Users editor	List of users created in alphabetical order: • Login • Access level • Comments: comment entered in the [User Information] tab • Domain: Local (outside domain) or LDAP (domain) • Removed: 'X' indicates that the user no longer has any access rights for the application (line greyed out in italics) Double-click on a user or click on [Edit User] to view the configuration of the selected user. Details of the configuration of the user in the [User information] and [Main Privileges] tabs: see below.
[Add User]	Creation of a new user (see chapter "Creation of a user account").
[Edit User]	Display of the configuration of the selected user and modification (see chapter "Modification of a user account"). Same effect as double-clicking on a user.
[Remove User]	Disabling of a user's rights. Validate the confirmation message. Any user created will remain in the list but their access rights can be disabled and then re-enabled at a later date.

[User information] tab

1. Complete the information requested.

Login	User's login. This name will be saved for all operations carried out by the user.
Full Name	User's full name. This name will be displayed on the home page.

Password	Password created by the administrator and sent to the user (see chapter "Password modification").
Access level	4 possible user levels: Operator - Advanced - Maintenance - Administrator Select the user level in the drop-down menu.
Comments	Comments area.
Logout delay	Setting of the period of non-use after which the user will be logged off. Default value: 9999 s
Language	Choice of display language Select the language in the drop-down menu. Click on [Apply] to confirm the modification. The functions accessible from the 'Advanced' screen will always be displayed in English, whatever language is set.
User must change password at next login.	(User must change his/her password at next login) If checked, the user must change his/her password the next time he/she logs in.
User cannot change password	(User cannot change password) If checked, the user is prohibited from change his/her password.
Password never expires	(Password never expires) If checked, the function asking the user to change his/her password every 60 days is disabled.
Account is disabled	(Account is disabled) If checked, the user account is disabled.
Account is locked out	(Account is locked out) If checked the account will automatically be locked out if the user enters 3 wrong passwords.
	The changes made are saved. The changes will only come into effect the next time the user logs on.
	Cancellation of the changes made.

[Main Privileges] tab

Independently of the level of authorization which gives a user rights (see chapter "Access authorization"), it is possible to customize the rights for each user by granting/withdrawing privileges.

A privilege is a right granted to a user, who does not have access to a function due to his/her authorization level.

1. Check the privilege to grant it to the user.
2. Uncheck the privilege to withdraw it from the user.

Alarm Acknowledge	Authorises the user to validate alarms. ^{1) 2) 3)}
Configuration Modification	Authorises the user to modify the configuration of the equipment. ^{1) 2) 3)}
Files Transfer	Authorises the user to export a file. ^{1) 2) 3)}
User can Shutdown tool	Authorises the user to shut down the equipment. ^{1) 2) 3)}
User can see recipes	Authorises the user to consult recipes. ^{1) 2)}
User can add/modify new recipes	Authorizes the user to create/modify new recipes. ^{1) 2)}
User can see UUT	Authorizes the user to consult the validated UUTs. ¹⁾
User can add/modify UUT	Authorizes the user to create/modify the validated UUTs. ¹⁾
User can perform calibration without automatic sequence	Authorises the user to carry out a manual calibration. ¹⁾
User can do capillaries maintenance	Authorises the user to configure the capillaries. ³⁾
User can force close batch	Authorizes the user to force the closure of a batch test. ¹⁾
User can see real time spectra	Authorizes the user to see real time spectra. ^{1) 3)}

1) This privilege is authorized by default for Advanced level users.

2) This privilege is authorized by default for Administrator level users.

3) This privilege is authorized by default for Maintenance level users.

	The changes made are saved.
	Cancellation of the changes made.
1) This privilege is authorized by default for Advanced level users. 2) This privilege is authorized by default for Administrator level users. 3) This privilege is authorized by default for Maintenance level users.	

7.3.3 Password modification

Password modification is only possible if the user has been created for local use of the equipment.
It is also possible to update the password managed by the LDAP (domain).

1. Click on **[Change Password]**.
2. Validate the confirmation message and enter the new password.
3. Click on **[OK]** to confirm the modification.
4. Click on **[Cancel]** to cancel the modification.

The password management in place asks users to create complex passwords in order to improve security. Follow the instructions given.

7.3.4 Creation of a user account

Creation of a user account is only possible if the equipment is used locally.
Only an Administrator level user can create a user account.

1. Click on **[Add User]**.
2. Click on **[User Information]**.
3. Configure the user account.
4. Click on **[Main Privileges]**.
5. Configure the user account.
6. Click on  to validate the creation.
7. Click on  to abort the creation.

7.3.5 Modification of a user account

Modification of a user account is only possible if the user has been created for local use of the equipment.

Only an Administrator level user can edit a user account.

1. Select the desired user in the list.
2. Click on **[Edit user]** to display the account.
3. Click on **[User Information]** and/or **[Main Privileges]** to modify the account.
4. Click on  to confirm the modification.
5. Click on  to abort the modification.

7.4 'Files Transfer' menu

This menu is used to export files.



File transfer is a privilege which can be granted to a user (see chapter "Administrator level user").

Access authorization

(See chapter "Access authorization")

Home page for the menu

1. On the home page, click on **[Advanced]**.
2. Click on **[Files Transfer]**.

Reports	If checked, export of all the test reports, calibrations and UUT creations in pdf format It is possible to export reports in CSV format: see below.
Advanced Data	If checked, export of advanced data. Use reserved for the manufacturer for appraisal.
All logs Data	If checked, export of the full history of the events on the machine.
[Zip data before export]	If checked the selected data will be compressed before export.
[Start Exporting]	Used to export the selected data (see below).

Export of reports in CSV format

By default, only an Administrator level user can perform this operation.

1. On the home page, click on **[Advanced]**.
2. Click on **[Configuration]**.
3. In the 'Presets' list, click on **[Reports]**.
4. Click on **[Generate CSV]**.
5. Modify the parameter.

[Preset value]	Setting of 'Generate CSV' • If 'True' is checked, the CSV file is generated. • If 'False' is checked, the CSV file is not generated. By default the CSV file is not generated.
[Explain this setting]	Explanation of the parameter

File export

1. Select the type(s) of data to export (Reports - Advanced Data - All Logs Data).
2. Zip the data selected if necessary by checking **[Zip data before export]**.
3. Click on **[Start Exporting]** to start exporting.

7.5 'Configuration' menu

This menu lists the equipment configuration parameters and is used to modify them. The configuration is identical for all the operations of the same type (e.g. batch test) carried out on the equipment.

By default, only an Administrator level user can configure the settings.

Modifying the configuration parameters can have consequences for the correct use of the equipment. Unless otherwise stated in this manual, never modify these parameters without first consulting the manufacturer.

To modify a configuration, there must be no test or calibration in progress.



Access to the configuration is a privilege which can be granted to a user (see chapter "Administrator level user").

Access authorization

(See chapter "Access authorization")

Home page for the menu

1. On the home screen, click on **[Advanced]**.
2. Click on **[Configuration]**.

Opening configuration does not modify the current setting.

Presets	List of all the parameters which can be configured by the user. The list of the configurable parameters depends on the level of the user. Double-click on the parameter or click on [Edit Value] to view the configuration of the selected parameter.
Setting	Selected parameter
Value / Unit	Current value for the selected parameter and its unit
Type	Use restricted to the manufacturer
Information	Description of the selected parameter

Min / Max	Setting range for the parameter
Default	Default value for the selected parameter
[Edit Value]	Display of the configuration of the selected parameter Same effect as double-clicking on a parameter
[Restore Default Value]	Reconfiguration of a parameter with its default value
[Save Default Value]	Saving of the current value of the parameter as the default value
[Restore Factory Value]	Restoration of the default value of a parameter
[Load Preset]	Loading of a parameter configuration from a file
[Save Preset]	Saving of parameters
[Save All Default Value]	Saving of the default values of the parameters
[Restore All Factory Value]	Reconfiguration of all parameters with their factory configuration
[Restore All Default Value]	Reconfiguration of all parameters with their default value

Default and factory settings

When the equipment is delivered, the factory settings and the default settings are supplied to the customer by the manufacturer.

1. Refer to the settings access procedure described in the specification reference 3882.

Restoring a default parameter

Some parameters have been modified by the manufacturer to meet the customer's specifications for the equipment. Restoring the default settings will erase the presettings carried out in the factory.

1. Select the parameter to update.
2. Click on **[Restore default value]**.
3. Validate the confirmation message to update the selected parameter.

7.6 'Events' menu

This menu displays all the events which have occurred on the equipment.



Equipment shutdown is a privilege which can be granted to a user (see chapter "Administrator level user").

Access authorization

(See chapter "Access authorization")

Home page for the menu

1. On the home page, click on **[Advanced]**.
2. Click on **[Events]**.

Text search	Search in the content of the 'Text' area for the event
[Export Events]	Export the list of events in a pdf file
[Acknowledge All Alarms]	Acknowledgement of all the current alarms (subject to the source of the fault having disappeared) Only an Advanced / Maintenance / Administrator level user can acknowledge a fault or an alarm.
[Display Last Messages]	Refreshes the list and displays the most recent events
[Display Warnings only]	Display of warnings only
[Display Alarms only]	Display of alarms only
[Previous Messages]	Display of the previous messages
[Next Messages]	Display of the next messages

	Access to filters (see chapter “Filters”)
Events list	(see chapter “Details of an event”)

7.6.1 Details of an event

The following information is saved for each event.

 1)  2)  3)	Type of message:
	1) Information
	2) Fault
	- The pictogram is displayed  . - Fault highlighted in yellow: fault to be acknowledged (fault no longer highlighted after acknowledgement)
	3) Alarm
	- The pictogram is displayed  . - Alarm highlighted in red: alarm to be acknowledged. - Alarm highlighted in green: alarm which has been acknowledged.
SRC	Source of the message
User	User connected to the equipment when the event occurred
Time	Date and time of the event
EvtID	ID number of the equipment. Use restricted to the manufacturer
Text	Description of the event
Time Ack	Date and time of acknowledgment of the fault or the alarm by a user
User Ack	User connected when the alarm was acknowledged

7.6.2 Filters

Several filters are available to facilitate event searches. These filters are accessible by clicking on  .

Text search	Search in the content of the 'Text' area for the event.
Text content	Search in the content of the 'Text' area for the event.
Source	Filter according to the source. Select the desired source in the drop-down menu.
Start Time	Filter based on the selected time and date. If checked, the filter is enabled.
End Time	Filter up to the selected time and date. If checked, the filter is enabled.
Msg Type	Filter according to the type of message (info/fault/alarm). Select the type of message desired in the drop-down menu.
[Search]	The search is launched.

7.7 'Maintenance' menu

This menu is used to dynamically monitor the status of the components of the equipment. It gives general information concerning the equipment (see details in the tabs).

Access authorization

(See chapter “Access authorization”)

Home page for the menu

1. On the home page, click on **[Advanced]**.
2. Click on **[Maintenance]**.

Dynamic synoptic of the equipment.	Dynamically displays the status of the components (green = enabled/open; grayed out = disabled/closed) and various measurements made on the equipment.
Maintenance information	[General] tab (see chapter “‘Maintenance’ menu”) [Air Sensor] tab (see chapter “‘Maintenance’ menu”)
Tool Status	Information concerning the equipment • ‘Tool Status’: current status of the equipment • ‘Software version’: version of the ‘AMI’ software • ‘Air Sensor Version’: version of the ALPS sensor software • ‘PLC Version’ version of the PLC software
[Maintenance Tools Launcher]	See below.

[Maintenance Tools Launcher]

Only a Maintenance level user can view this window.

Provision of diagnostic aid tools.

[ALPS 120 Remote]	Launch of the ALPS 120 software. Please refer to the ALPS/ALPC 120 operating instructions.
[VNC Viewer]	Launch of the VNC Viewer application.
[PLC Maintenance]	Launch of the PLC maintenance application. Refer to the ‘PLC Maintenance’ operating procedure, reference 3923.

7.7.1 [General] tab

Time counters for the pumps and gauges

Time Turbo Pump	Number of operating hours for the Turbo pump • Turbo pump = HiPace 80 Click on [Reset] to reset the counter after maintenance or after changing the component.
Time Gauge 1 Time Gauge 2	Number of operating hours for the gauges. • Gauge 1 = chamber gauge 1 • Gauge 2 = chamber gauge 2 Click on [Reset] to reset the counter after maintenance or after changing the component.

7.7.2 [Air Sensor] tab

Information relative to the ALPS sensor.

ALPS 120 Power ON	Number of operating hours for the ALPS 120 sensor
ALPS 120 Plasma ON	Number of hours the ALPS 120 plasma has been on
ALPS Plasma current set-point	Current setpoint configured for the ALPS 120
ALPS capillaries pressure	Pressure in the ALPS 120 capillaries
ALPS controller pressure	Pressure in the ALPS 120 controller
ALPS capillaries gauge	Number of operating hours for the gauge of ALPS sensor Click on [Reset] to reset the counter after maintenance or after changing the component.
ALPS Cycles Counter	Number of cycles carried out by the ALPS 120 Click on [Reset] to reset the counter after maintenance or after changing the component.

7.8 ‘Leak Signal Monitoring’ menu

This menu displays the various signals measured in real time during the test or the calibration if a measurement is made.

Access authorization

(See chapter "Access authorization")

Home page for the menu

1. On the home page, click on **[Advanced]**.
2. Click on **[Leak Signal Monitoring]**.
3. To display the results of a particular point, click on the point on the graph: all the measurements for this point are displayed.

Pressure (mbar)	Pressure in the test chamber ¹⁾ If checked, the curve is displayed.
Voltage (V)	Voltage in the ALPS sensor ¹⁾ If checked, the curve is displayed.
Current (µA)	Current in the ALPS sensor ¹⁾ If checked, the curve is displayed.
Raw Leak/Ref. (a.u.)	Raw report for Leak value/Ref. value in arbitrary units ¹⁾ If checked, the curve is displayed.
RT Leak Signal (mbar.l/s)	Leak signal in real time If checked, the curve is displayed.
Pressure Signal (mbar)	Pressure used for the gross leak cycle (Massive Leak Detection or Vacuum Decay)

1) Only an Advanced level user can view this curve.

7.9 'Recipe Manager' menu

This menu is used to manage recipes.



Creation and viewing of a recipe are privileges which can be granted to a user (see chapter "Administrator level user").

Access authorization

(See chapter "Access authorization")

Only Advanced and Administrator level users can view the parameters of the 2 capillaries.

Home page for the menu

1. On the home page, click on **[Advanced]**.
2. Click on **[Recipe Manager]**.

List of recipes	List in alphabetical order (see chapter "Details of a recipe"). Double-click on the recipe or click on [Show Recipe] to view the selected recipe.
[Show all recipes] / [Hide disabled recipes]	Used to display all the recipes (valid and invalid) or to hide the invalid recipes.
[Show Recipe]	Used to display and modify the selected recipe (see chapter "Modification of a recipe"). Same effect as double-clicking on the recipe.
[Create Recipe]	Used to create a new recipe (see chapter "Creation of a recipe").

7.9.1 Details of a recipe

The following information is saved for each recipe.

Name	Name of the recipe.
Version	Version of the recipe. Only the latest version is valid.

Sensor type	Type of sensor used for the tests: • 'Air': ALPS sensor • 'Air + Massive': ALPS sensor + Massive Leak Detection • 'Air + Vacuum': ALPS sensor + Vacuum Decay
Enabled in production	A recipe can be valid (a batch test can be carried out with this recipe) or invalid (impossible to carry out a batch test with this recipe). If checked, the recipe will be available and can be selected from the list of recipes that will appear on launching the test. An invalid recipe is no longer offered in the list of recipes available to carry out a batch test but it can be re-enabled by checking [Enabled] .
Enabled in calibration	If checked, the recipe will be available and can be selected from the list of recipes that will appear on launching a calibration.

7.9.2 Creation of a recipe

A recipe is used to define the parameters of a UUT test.

- A UUT can be used for several recipes.
- A recipe only uses one UUT.

1. Click on **[Create Recipe]**.
2. Complete the parameters requested.

Recipe Name	Name of the recipe.
Version	Version 1 upon creation
Sensor Type	To be able to detect all types of leaks, the gross leak test is always performed with the ALPS sensor. • The ALPS sensor is always selected by default. It is used to carry out tests of small leaks. • 2 methods for gross leak tests: — Massive Leak Detection — Vacuum Decay 3 types of methods available: • ALPS sensor • ALPS sensor + Massive Leak Detection • ALPS sensor + Vacuum Decay
UUT	Selection of the UUT which will be tested based on this recipe. Select the desired UUT in the drop-down menu.
	The recipe is saved.
	Creation is aborted.
	Setting the recipe configuration in the [Threshold] , [Accuracy] , [Calibration] , [Advanced] + [Vacuum Decay] or [Advanced] + [Massive Leak detection] tabs: see below.

A message is displayed when the blank test comparison presets (**[Blank]**) are disabled in the **[Accuracy]** and **[Calibration]** tabs.

3. Click on  to validate the creation.
 - The new recipe is added to the list of recipes created.
 - By default, the recipe is displayed in the list of recipes when it is created, and is therefore available for a batch test.
4. Click on  to cancel the creation.
5. To disable a recipe from the calibration and/or batch test menu, uncheck the box **[Enabled in production]** and/or **[Enabled in calibration]** corresponding to the recipe (see chapter "Details of a recipe").
6. Calibrate the recipe (see chapter "Calibration of a recipe").

[Threshold] tab

Information relating to the test thresholds.

- Complete the information requested.

Maximum leak value	Setting of the maximum leak value for a test. - Measurement > maximum leak value: display and record the maximum leak value - Measurement < maximum leak value: display and record actual measured value The default maximum leak value is 0.005 mbar.l/s.
Reject Threshold	Setting of the reject threshold for the UUT test: the reject threshold is used to define the threshold above which the UUT will be deemed to be rejected. - Measurement > Reject threshold: UUT rejected. - Measurement < Reject threshold: UUT accepted. The default threshold is 0.0001 mbar.l/s.
Warning Threshold	Setting of the warning threshold for the measurement: the warning threshold warns the operator that a UUT that has been accepted (measured leak rate < reject threshold) does however have a measured leak rate close to the reject threshold. - Measurement < Reject threshold + Measurement > Warning threshold: UUT accepted but measured leak rate close to the reject threshold. - Measurement < Warning threshold: UUT accepted. The default threshold is 0.00001 mbar.l/s.
Minimum leak value	Setting of the minimum leak value for a test. - Measurement < minimum leak value: display and record the minimum leak value - Measurement > minimum leak value: display and record actual measured value The default minimum leak value is 0.00002 mbar.l/s.
Gross leak slope	Setting of the Gross Leak slope by the ALPS sensor This curve is used to define a gross leak. - Dx: number of points between 2 reference measurements (M_n and M_{n+Dx}) - Dy: difference between 2 reference measurements defining a gross leak 'N2/H' or 'mbar.l/s': calculation based on raw data (N2/H ratio) or calculated data (mbar.l/s). - If $(M_{n+Dx} - M_n) < Dy$, the leak is classed as a gross leak. By default, $Dx = 4$, $Dy = -2 \cdot 10^{-4}$ and mbar.l/s is selected. Example: $Dx = 4$, $Dy = -2 \cdot 10^{-4}$, mbar.l/s is selected - The 2 reference measurements correspond to the 1st/5th point or 2nd/6th point or M_n/M_{n+4} point. - If the difference $(M_1 - M_5)$ or $(M_2 - M_6)$ or $(M_n - M_{n+4}) < -2 \cdot 10^{-4}$, a gross leak is detected and the piece is rejected.

[Accuracy] tab

Information relating to the measurement accuracy

- Complete the information requested.

UUT	Selection of the UUT which will be tested based on this recipe. Select the desired UUT in the drop-down menu.
Leak name: Blank	Setting the threshold for the UUT blank test: the blank test threshold is used to define the threshold below which the UUT will be accepted and considered to be sealed. - Measurement < blank threshold: UUT accepted and sealed. - Measurement > blank threshold: UUT neither accepted/rejected nor sealed. The default threshold is 0.00005 mbar.l/s. Time: time measured during the creation of the UUT and necessary for complying with the required threshold criteria.
-	List of leaks used to create the UUT (see chapter "Creation of a new UUT").
Leak name	List of leaks used during the creation of the UUT.
Leak rate (mbar.l/s)	Value of the leak rate of the leak.
Tolerance (%)	Setting of the measurement accuracy of the leak (%). The greater the required accuracy, the longer the measuring time is.
Time (s)	Estimate of the leak measuring time with the required accuracy.
Estimated total time	Estimate of test time needed to comply with required accuracy criteria.

[Calibration] tab

Information relating to checks during the calibration of a recipe (see chapter "Calibration of a recipe").

- Complete the information requested.

Verification point	
Active	Activation/deactivation of a test during calibration by an Operator level user. If checked, the test is carried out during automatic calibration (by default, the test is carried out). If unchecked, the test is not carried out during the automatic calibration (except with the Advanced user level). Any deactivated test cannot be launched manually.
Verifica- tion	List of available tests.
Leak rate	Setting of the leak rate of leaks used for verification The verification will be considered satisfactory if the measured leak rate corresponds to the value of the leak rate entered with the corresponding accuracy: Leak rate - accuracy < Measurement < Leak rate + accuracy Default leak rate of each leak: - Leak for 'Upper Point Verification': 0.0005 mbar.l/s - Leak for 'Blank': corresponds to the value entered for Minimum Leak Value in the [Threshold] tab (0.000001 mbar.l/s) - Leak for 'Lower Point Verification': 0.00005 mbar.l/s - Leak for 'Calibration Point Verification': corresponds to the Reject Threshold value of the [Threshold] tab (0.0001 mbar.l/s)
Preci- sion/ Unit	Setting of the accuracy of the leaks used for the test. Default accuracy of each leak: - Accuracy for 'Upper Point Verification': 20 % - Accuracy for 'Blank': $3 \cdot 10^{-5}$ mbar.l/s - Accuracy for 'Lower Point Verification': 20 % - Accuracy for 'Calibration Point Verification': 20 %

Adjustment	
Measurement Time	Use reserved for the manufacturer.
Offset	Use reserved for the manufacturer.
Span	Use reserved for the manufacturer.

[Advanced] tab

Use reserved for the manufacturer.

[Massive Leak Detection] tab

Information on gross leak mode configuration with the Massive Leak Detection method.

Tab only available with the 'ALPS + Massive Leak Detection' sensor.

- Complete the information requested.

Max Cycle Time	Measurement time (acquisition time)
Sample Valve Open- ing Time	Opening time of the sample valve
Sampling step	Frequency of pressure acquisition
Number of Offset Points	Number of points at the beginning of the acquisition that will not be taken into account to calculate the slope
DeltaP Sens	Minimum pressure difference required between the 2 'Pressure Adjustment' step measurements during calibration
DeltaP Sampling	Maximum difference between sampling tank pressure and test chamber pressure at the end of sampling
Delta Secure Pres- sure	Percentage to be added to or removed from 'Pressure Adjustment' pressure measurements to set alarm thresholds when a problem occurs during measurement
Max Slope Tight	Maximum slope when measuring the sealed UUT
Min Slope Tight	Minimum slope when measuring the sealed UUT
PMax Calibration	Maximum pressure during daily calibration measurement
Coef Big Leak Pres- sure	Coefficient taken into account on calculating the 'Big Leak Pressure' discharge pressure of very big leaks

Unmodifiable (grayed out) parameters measured/calculated during calibration

Big Leak pressure	Discharge pressure for very big leaks Big Leak pressure = Sealed pressure + [Coef Big Leak Pressure x (Open pressure - Sealed pressure)] Sealed pressure = pressure measured in step 1/2 of 'Pressure adjustment' Open pressure = pressure measured in step 2/2 of 'Pressure adjustment'
Real cycle time	Actual measurement/acquisition time

[Vacuum Decay] tab

Information on gross leak mode configuration with the Vacuum Decay method.

Tab only available with the 'ALPS + Vacuum Decay' sensor.

- Complete the information requested.

Pressure Setpoint	Target pressure to be reached during pumping
Pumping Time	Maximum pumping time before reporting a very large leak
Sampling Step	Frequency of acquisition
Number of Offset Points	Number of points at the beginning of the acquisition that will not be taken into account to calculate the slope
Slope Threshold	Slope above which a UUT will be rejected
Measurement Offset Time	Time added to the sampling time determined during the 'Calibration Big Leak' step in calibration
Measurement Offset Percent	Percentage added to the sampling time determined during the 'Calibration Big Leak' step in calibration
Measurement Time	Duration of acquisition/measurement
Max Measurement Pressure	Maximum pressure during measurement
Max Slope Tight	Maximum slope when measuring the sealed UUT
Min Slope Tight	Minimum slope when measuring the sealed UUT

Unmodifiable (grayed out) parameters measured/calculated during calibration

Tight Sampling Time	Time required to reach the target pressure measured during the 'Calibration Big Leak' step in calibration
Tight Slope	Slope measured during the 'Calibration Big Leak' step in calibration

7.9.3 Modification of a recipe

You cannot modify an existing V_n recipe if a batch test or calibration is opened.

Any modification of a recipe in version V_n will generate a new recipe in version V_{n+1} , whilst keeping its name. Version V_n will automatically be invalidated.

1. Select the recipe to be modified.
2. Click on **[Show Recipe]**.
3. Modify the desired parameters: see the table in the chapter entitled "Creation of a recipe".
 - The name of the recipe cannot be modified.
 - The version automatically increments.
4. Click on  to validate the modification (recipe V_{n+1}).
 - The new recipe is added to the list of recipes created.

The previous version is shown as expired.
5. Click on  to abort the modification.

7.10 'UTT Manager' menu

This menu is used to manage UUTs.

A calibration must be carried out for each type of UUT: each UUT has specific degassing according to its surface condition and the types of materials used.



Viewing the UUT configuration is a privilege that can be granted to a user (see chapter “User Administrator level”).

Access authorization

(See chapter “Access authorization”)

Specific feature of the home page (Area 2, mark 6, see chapter “Home page”)

[Conditioning]	Performance of a test to calibrate the equipment.
[Blank]	Performance of a blank test with a sealed UUT
[Leak 5.0E-5 mbar.l/s]	Calibration with a leak of 5.10^{-5} mbar.l/s
[Leak 8.0E-5 mbar.l/s]	Calibration with a leak of 8.10^{-5} mbar.l/s
[Leak 2.0E-4 mbar.l/s]	Calibration with a leak of 2.10^{-4} mbar.l/s
[Leak 8.0E-4 mbar.l/s]	Calibration with a leak of 8.10^{-4} mbar.l/s
[Abort]	The current operation is aborted.

Home page for the menu

1. On the home screen, click on **[Advanced]**.
2. Click on **[UUT Manager]**.

Name	List of UUTs created in alphabetical order. Double-click on a UUT or click on [Show UUT settings] to view the full configuration of the selected UUT.
Enabled	Enable/disable a UUT creation. If a UUT creation has been disabled, it is no longer offered in the list of UUTs available (enabled) for the creation of the recipe. If checked, the UUT is enabled.
[Show all UUT]/[Hide disabled UUT]	Display of all the UUTs (enabled and disabled) or disabled UUTs hidden.
[Show UUT settings]	Display and modification of the configuration of the selected UUT (see chapter “Display and modification of a UUT”). Same effect as double-clicking on the UUT.
[Create new UUT]	Creation of a new UUT (see chapter “Creation of a new UUT”).

7.10.1 Display and modification of a UUT

1. Click on **[Show UUT settings]** or double-click on the selected UUT to view the configuration details.
2. Modify the required parameters.

UUT History	History of all the operations carried out on the selected UUT. Only the latest operation carried out is valid. The last operation automatically causes the previous one to expire. • ‘Date’: date and time of the operation • ‘Version’: version of the UUT • ‘Modified by’: name of the user who carried out this operation. • ‘Valid’: status of the operation – ‘Yes’: creation of the blister has gone to the end. The operation is valid. – ‘No’: Creation of the UUT has been interrupted. The operation is invalid. Double-click on an operation to view the details of the selected operation (see chapter “Details of an operation”).
[Load config]	Loading of a configuration among the saved configurations (see chapter “Loading a configuration”).
[Save config]	Saving of the current configuration. ¹⁾

¹⁾ Modifying the parameters can have consequences for the correct use of the equipment. Never modify these parameters without first consulting the manufacturer.

[Replace config]	Replacement of the configuration of the selected UUT. This operation consists of redoing the entire validation procedure for the selected UUT: follow the instructions given.
	Operation aborted.

1) Modifying the parameters can have consequences for the correct use of the equipment. Never modify these parameters without first consulting the manufacturer.

- To record modifications, click on **[Replace Config.]** and follow the procedure for validating a UUT on the screen.
- Click on  to abort the modification.

7.10.2 Loading a configuration

- Click on **[Load config]**.
- Select the configuration to be loaded and validate.
- Click on **[Cancel]** to cancel the modification.
- To record modifications, click on **[Replace Config.]** and follow the procedure for validating a UUT.

7.10.3 Details of an operation

The following information is saved for each operation selected.

UUT	Name of the selected UUT
Version	Version of the UUT selected in the history
Initial Calibration Time	Use reserved for the manufacturer for appraisal
Signal Formula	Signal used to calibrate and extrapolate leaks

7.10.4 Creation of a new UUT

To create a new UUT, there must be no test or calibration in progress.

- The current report can be consulted at any time by clicking on **[Current report]**.
- Click on **[Create new UUT]**.
- Complete the parameters requested.

UUT Name	Name the UUT
UUT Calibration duration	Duration of each step of the calibration Default value: 120 s
Creation batch name	Name of the report created. This report is added as an operation in the history (UUT History). The name is generated automatically: UUT creation - Date - Time. This name can be modified by the user.
Comment	Comments area. This comment will be included in the report.
	List of leaks available for the creation of the UUT: - The value of the leak is the default defined value. The value can be modified, if necessary. - The number of iterations must be defined (from 0 to 100). Double-click on the leak value to be modified. Click on [OK] to confirm the modification. - A leak with a value of 0 will not be used in the creation of the UUT. - The 'Tight' leak refers to the leak for the blank test: its value cannot be modified. Double-click on the number of iterations to be modified. Click on [OK] to confirm the modification. - A leak with iteration at 0 will not be used in the creation of the UUT.
Leak Source	Source of leaks used to create the UUT. - Capillaries: leaks are generated by the two internal capillaries of the device. - Orifice: external calibrated leaks are connected to VERIFY ORIFICE by the user.

Signal Formula	Signal used to calibrate and extrapolate leaks. To change it, click on [Edit] . The default formula is N2/H. Click on [Clear] to clear it. Write the desired formula with the tools available: • Variables: N2 / H / O2 / OH • Operands: + - * / () • Position: ABS
[Create New Config.] / [Create New UUT]	Continue the procedure below.
[Cancel]	Operation aborted.

4. Click on **[Create New Config.]/[Create New UUT]** to start creation.
5. Click on **[Open Chamber]** to exit standby mode.
6. Validate the UUT: follow the instructions given.
 - The total duration of the creation of a UUT depends on the number of steps (iterations) defined previously during the creation of the UUT. The total duration is therefore the duration of each step configured during creation (120 s by default) multiplied by the number of steps. To know the number of steps, consult the home page where the steps are numbered (1/x, 2/x, etc., x being the total number of steps).
 - Click on  to view the measured signal.
The current operation is indicated on an orange background.
 - Follow the instructions given.
For each step:
 1. Manually open the test chamber.
 2. Insert a sealed UTT.
 3. Manually close the test chamber.
 4. Press the (flashing green) **START** button.
 5. When the step is complete, the orange **ABORT/VENT** button will flash.
Press it for the chamber to return to atmospheric pressure in order to open it and change the UUT to perform the next step. To perform this operation, it is also possible to press **[Open Chamber]** on the man/machine interface.
7. Click on **[Close UUT Creation]** after the last step.
8. Complete the report which is automatically generated if the validation procedure is successful (see chapter "Creation of a report").
9. Close the creation of the UUT:
 - Click on **[Close]**: the creation is closed and validated.
The new UUT is added to the list of UUTs created.
The UUT is enabled upon creation by default, and therefore available for a recipe.
 - Click on **[Cancel]**: the creation is not validated. Return to the 'UUT Manager' menu.
 - Click on **[Abort UUT creation]**: the creation is aborted.
A message is displayed indicating that the creation of the UUT is invalid. Return to the 'UUT Manager' menu.

7.11 'Air Sensor Spectra' menu

This menu displays the spectrum of the raw signal of the ALPS sensor in real time.

Access authorization

(See chapter "Access authorization")

Home page for the menu

1. On the home page, click on **[Advanced]**.
2. Click on **[Air Sensor Spectra]**.

The species searched (Leak) and the reference species (Ref) are indicated on the spectrum

7.12 'Buzzer Manager' menu

This menu is used to manage the buzzer.

Access authorization

(See chapter “Access authorization”)

Home page for the menu

1. On the home page, click on **[Advanced]**.
2. Click on **[Buzzer Manager]**.

	List of alarms for which the buzzer may or may not be enabled.
Enable buzzer on test result	Enables/disables buzzer at the end of a measurement. If checked, the buzzer sounds at the end of the test if the test is rejected (the buzzer is disabled by default).
Enable buzzer on chamber open	Enables/disables buzzer when the test chamber remains open beyond the authorized period. If checked, the buzzer sounds when the test chamber remains open for too long (the buzzer is disabled by default).
Check all alarms / Uncheck all alarms	Enables/disables buzzer for all listed alarms. If checked, the buzzer is enabled for each alarm (the buzzer is disabled by default).
ID	Alarm code
Text	Alarm name
Buzzer enabled	Enables/disables buzzer for the selected alarm. For each alarm listed, the buzzer can be enabled (buzzer sounds) or disabled (buzzer does not sound). If checked, the buzzer sounds if the alarm is triggered.

7.13 'Capillaries Manager' menu

This menu is used to configure the 2 capillaries after they are replaced during maintenance work.



The setting of the capillaries is a privilege which can be granted to a user (see chapter “Administrator level user”).

Access authorization

(See chapter “Access authorization”)

By default, the settings for the 2 capillaries are only displayed for Advanced and Administrator level users.

Home page for the menu

1. On the home page, click on **[Advanced]**.
2. Click on **[Capillaries Manager]**.

	Information for each capillary
Cal Gas	Gas calibrated. ⁽¹⁾
Serial No	Serial number. ⁽¹⁾
Pressure (abs)	Absolute pressure. ⁽¹⁾
Flowrate into vac. (mbar.l/s)	Leak Rate. ⁽¹⁾
Maintenance date	Maintenance date = date capillary fitted on the equipment.
[Modify]	Modification of the settings for the 2 capillaries

⁽¹⁾ Information contained in the capillary's calibration certificate.

Procedure

- The Air test (ALPS N2) cannot be performed if the procedure has not been correctly completed.
- An authorized user must be involved in this procedure. In order to ensure the reliability of the settings entered, the same settings will be entered twice by the user.
- Have the certificate available for each of the 2 capillaries fitted on the equipment.

1. Click on **[Modify]**: a message is displayed.
The message informs the user that once the procedure has begun, no operations will be permitted.
2. Confirm the message to launch the procedure.
A message asks the user to verify the consistency between the serial numbers indicated on the capillaries fitted in the equipment and those indicated on the certificates.
The steps of the modification procedure can be followed in the synoptic:
 - current step: orange background
 - completed step: green background
 - next step: blue background
3. Enter the parameters for capillaries 1 and 2 and the date fitted on the equipment.
 - Refer to the certificates provided with the capillaries for the parameters.
4. Click on **[Next]**.
5. Enter the parameters for capillaries 1 and 2 and the date fitted on the equipment again.
 - Refer to the certificates provided with the capillaries for the parameters.
6. Click on **[Validate]**.
 - The settings entered twice by the user are identical: the settings for the 2 capillaries are stored and the procedure is completed. The equipment can work in Air mode (ALPS N2).
 - The settings entered twice by the user are different: the settings for the 2 capillaries are not stored and the user returns to the 1st screen for entering the settings. A message informs the user that there was an error in entering the settings. The equipment can still work in Air mode (ALPS N2).

8 Decommissioning

8.1 Shutting down for longer periods

1. Follow specification 4333 (Shutdown SOP).
2. Stop the equipment.
3. Close the backing pump valve (see chapter "Man/machine interface").
4. Disconnect all the facilities (main power supply, CDA, venting gas, tracer gas) to the equipment.
5. Disconnect the interseal pumping if specific tool used.
6. Disconnect the equipment mains power cable from any power sources (see chapter "Storage").
7. Store the equipment in accordance with storage instructions (see chapter "Technical characteristics").

8.2 Recommissioning

No special precautions

- Follow the installation procedure (see chapter "Commissioning").

8.3 Disposal

In accordance with Directive on the treatment of waste electrical and electronic equipment, and Directive on the restriction of hazardous substances, end-of-life products can be returned to the manufacturer for decontamination and recovery.

Any obligation of the manufacturer to take back such equipment shall apply only to complete, unmodified, equipment, using Pfeiffer Vacuum SAS original spare parts, sold by Pfeiffer Vacuum and including all assemblies and sub-assemblies.

This obligation does not cover the shipping cost to a reclamation facility or services provided, for which the customer will be invoiced.

Familiarize yourself with the service request procedure and fill in the declaration of contamination when returning products to our service centers (see chapter "Service solutions by Pfeiffer Vacuum", page 70).



Environmental protection

The product and its components **must be disposed of in accordance with the applicable regulations relating to environmental protection and human health**, with a view to reducing natural resource wastage and preventing pollution.

Our products contain different materials which must be recycled (see chapter "Environmental conditions").

9 Malfunctions

9.1 What happens in the event of a defect



Management of warnings, alarms

The management of warnings and alarms as defined in this manual must allow the monitoring of the operation of the product according to the following principle:

- a warning indicates a malfunction of the product: the current sequence continues. The user is warned and if necessary, stops the product.
 - an alarm signals a major malfunction that engages the user's safety and / or property damage: the alarm stops the product.
- A message indicating the nature of the fault is displayed in the 'Status' window (test result, warning or alarm).
 - If the fault is a warning or an alarm, a pictogram is displayed on the screen.
 - a warning does not block the user.
 - an alarm blocks the user: the equipment cannot be used until the source of the alarm has been processed.
 - If the fault is an alarm, the 'Status' window is red.
 - For some alarms, the buzzer may sound according to its settings (see chapter “Buzzer”).

9.2 Display and acknowledgement of messages.

To display the current message(s), click on **[yellow icon]** or **[red icon]** depending on the type of message to be displayed.

Message	Time and date of the message
	Message code Use reserved for the manufacturer.
	Title of the message. Diagnosis and solution (see chapter “Troubleshooting guide”).
	Source of the message.
[Acknowledge All]	Acknowledgement of all the current faults. A fault cannot be acknowledged until it has been processed. Only Advanced / Maintenance / Administrator level users can acknowledge fault messages or alarm messages. Acknowledged and current faults/alarms can be consulted in events (see chapter “Events’ menu”). Once the acknowledgment has been launched, follow the instructions of the device reset program until the device is in use or in standby mode.
[Refresh]	List of current alarm messages is updated.
[Close]	Window closes.

9.3 Troubleshooting guide

9.3.1 Test result messages

Message	Diagnosis	Solution
UUT Defect	Absence of UUT in the test chamber or UUT remeasured without waiting.	Check that there is a UUT in the test chamber. Check that the model of UUT corresponds to the selected recipe. Check that the UUT has not been tested successively without any waiting time between 2 tests. Redo a daily calibration.
Out Of Calibration	Voltage outside the calibration domain: absence of UUT, UUT remeasured without waiting, significant variation in humidity.	Redo the daily calibration if the problem persists. Recreate the UUT configuration.
Air Sensor Error	ALPS 120 sensor alarm during the measurement.	See the diagnosis of the errors linked to the ALPS 120.
Sensor Connection Lost	Loss of communication with the ALPS 120 sensor.	Check that the ALPS 120 sensor is live and that the cable is connected. Restart the equipment.
PLC Connection Lost	Connection not established with PLC.	Check the power supply to the PLC and the connection of its communication cable.

9.3.2 Warning messages

ID	Message	Solution
2011	Warning: Maintenance Secondary Pump	Carry out the maintenance of the pump then reset the maintenance counter.
2012	Warning: Maintenance Gauge 1	Carry out the maintenance of the gauge (zeroing, cleaning) then reset the maintenance counter.
2013	Warning: Maintenance Gauge 2	Carry out the maintenance of the gauge (zeroing, cleaning) then reset the maintenance counter.
2014	Warning: Maintenance Air Sensor	Carry out the maintenance of the ALPS 120 sensor.
2016	Warning: Maintenance Capillary 1	Replace the capillary with a capillary with an up-to-date certificate. Update capillary information in Capillaries Manager
2019	Warning: Maintenance Capillary 2	Replace the capillary with a capillary with an up-to-date certificate. Update capillary information in Capillaries Manager
2020	Chamber open too long. Reconditioning needed	Follow the instructions given.
2021	Warning: Maintenance Capillaries Gauge	Replace the capillaries gauge with a gauge having an up-to-date certificate.
2040	Calibration validity is expiring	Carry out a calibration.
2041	Calibration expired	Carry out a calibration.
2042	Warning: Hard drive nearly full	Contact our service center.
2043	Capillaries parameters are not set	Configure the capillaries.

9.3.3 Alarm Messages

ID	Message	Solution
3000	Alarm: PLC Connection Lost	Check the power supply to the PLC and the connection of its communication cable.
3002	Alarm: Air Sensor Connection Lost	Check that the ALPS 120 sensor is live and that the cable is connected. Restart the equipment.
3004	Alarm: Air Sensor Temperature	Check that the ALPS 120 sensor temperature is < 45 °C and that the ALPS 120 fan is operating correctly.

ID	Message	Solution
3005	Alarm: Air Sensor Overcurrent	Electrically restart the equipment.
3006	Alarm: Air Sensor Spectrometer	Electrically restart the equipment.
3007	Alarm: Air Sensor HV Module	Electrically restart the equipment.
3008	Alarm: Air Sensor configuration error	Restart the ALPS 120 sensor.
3009	Alarm: PLC Communication Timeout	Check the power supply to the PLC and the connection of its communication cable.
3011	Alarm: Air Sensor Communication Timeout	Check the power supply to the ALPS 120 sensor and the connection of its communication cable.
3012	Alarm: Air sensor pollution	Contact your service center.
3704	Alarm: Venting Timeout	Check the pneumatic and electrical connection of the VExhaust valve.
3706	Alarm: Secondary Pump Speed Not Reached	Check that the pump is correctly powered.
3707	Alarm: CDA pressure too low	Check that the main compressed dry air valve is open and that the pressure is correctly set (> 6 bar).
3716	Alarm: VTM valve opening	Check the pneumatic and electrical connection of the valve.
3718	Alarm: VCH valve opening	Check the pneumatic and electrical connection of the valve.
3720	Alarm: Capillaries pressure control	Check that the pressure regulator and capillary valves are operating correctly.
3744	Alarm: Capillaries pressure stability	Contact your service center.
3745	Alarm: Time out pumping of CH1	Check that the pump is correctly powered.
3748	Alarm: Primary pumping time out	Check that there are no leaks on the chamber. Check that the 'PMax Calibration' or 'Max measurement pressure' parameters are correctly filled in.
3749	Alarm: Secondary pumping time out	Contact your service center.
3750	Alarm: Default on Huba sensor of capillaries	Check that the Huba gauge of capillaries is correctly connected.
3751	Alarm: Default on Huba sensor of Massive leak detection	Check that the Huba gauge of the test chamber is correctly connected.
3752	Alarm: Tank gauge connection lost	Check that the sampling tank gauge is correctly connected.
3753	Alarm: Tank pressure too high	Check that there are no leaks on the sampling tank. Wait for the pressure to drop in the tank before starting a measurement.
3754	Alarm: Sampling pressure of chamber too low	Check that the 'DeltaP Sampling' parameter has been correctly entered in the recipe. Check that the 'VSample valve opening time' parameter has been correctly entered in the recipe. Check that there are no leaks on the chamber or sampling tank. Check the pneumatic and electrical connection of the V_VacD valve.
3755	Alarm: Calibration Gas Pressure too low	Check that the calibration valve is open.
3999	Alarm: EMO	Solve the problem and deactivate the safety mechanism.

9.4 Migration procedure

This procedure allows to migrate the data from the equipment computer to a new computer, to guarantee that the data recovered is compliant with the original data and that the equipment is operational.

- Refer to the migration procedure described in the specification reference 3880.

9.5 Recovery procedure in case of failure

This procedure guarantees that the data recovered is compliant with the original data and that the equipment is operational.

- Refer to the recovery procedure in case of failure described in the specification reference 4296.

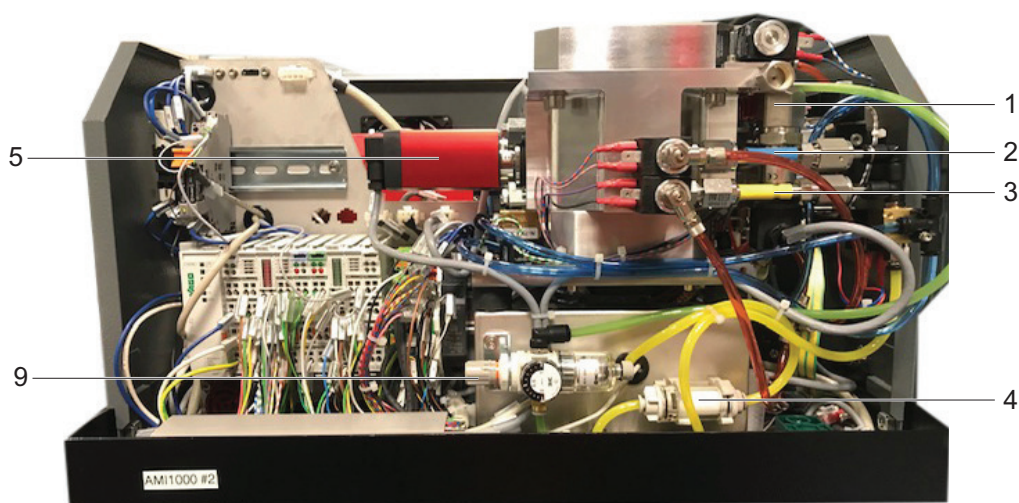
10 Maintenance

10.1 Maintenance frequency

Item: see chapter "Location of the components"

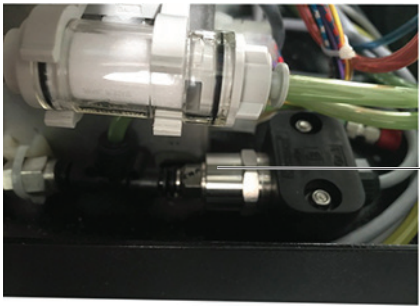
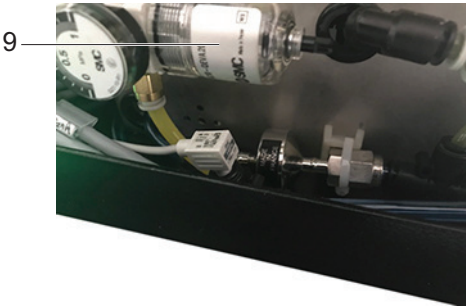
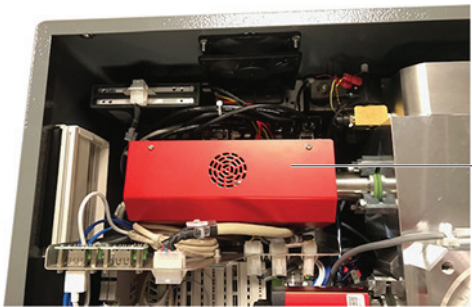
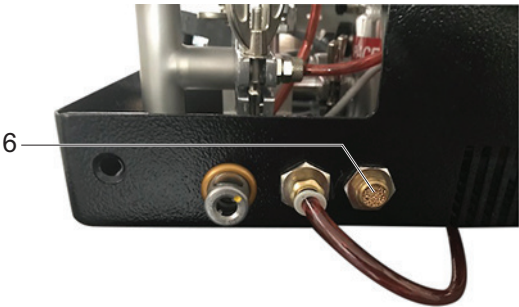
Component	Item	Maintenance operation	Time interval
MVP-070 diaphragm pump	11	Change of diaphragms	2 years
		Standard exchange	4 years if necessary
HiPace 80 secondary pump	12	Change of fluid tank	2 years
		Standard exchange	4 years
Filters	4	Change of two compressed dry air filters	2 years
	6	Change of venting exhaust filter	2 years
	9	Change of venting regulator	2 years
Gauges	1	Change of the "Delta P" gauge measuring chamber (M2) (contact us)	2 years
	1	Verification of the "Delta P" gauge indication (M3)	2 years
	5	Change of the PKR 360 gauge (M2)	4 years if necessary
	8	Change of the capillary gauge (M1)	2 years
	10	Verification of the "PTank" gauge indication	1 year
Capillaries	2	Change of capillary 1 and its seals	2 years
	3	Change of capillary 2 and its seals	2 years
ALPS 120 sensor	7	Standard exchange	1 year or 8760 hours
Valves	-	Change of O-ring sets	2 years
DN 16/25 ISO-KF seals	-	Change of O-rings	2 years
DN 100 ISO-K seals	-	Change of O-rings	2 years
1/8 IN seals	-	Change of O-rings	2 years

10.2 Location of the components

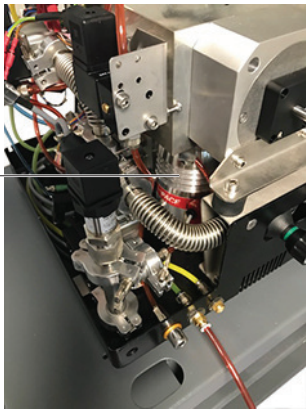
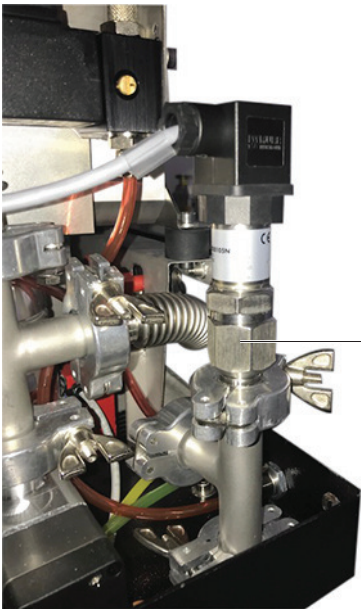


Item	Description
1	Delta P gauge
2	Capillary 1 lower range (blue in standard)
3	Capillary 2 higher range (yellow in standard)
4	Calibration gas inlet filter

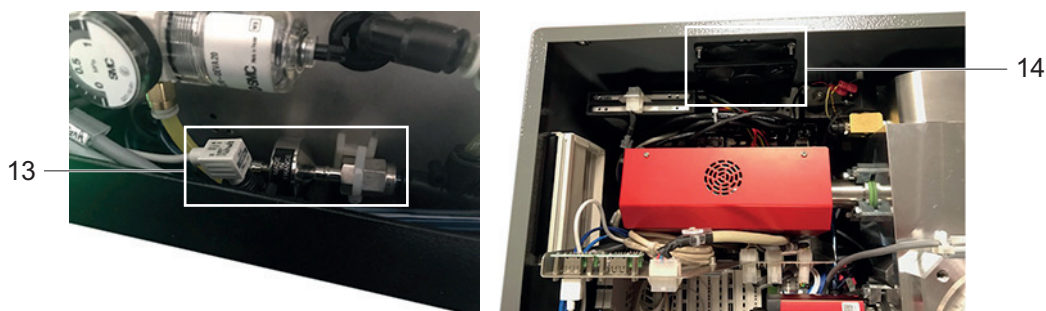
Item	Description
5	PKR 360 gauge (M2)
9	Venting regulator



Item	Description
6	Venting exhaust silencer
7	ALPS 120 sensor
8	Capillary pressure gauge (PCapi)



Item	Description
10	PTank gauge
11	Backing pump (MVP-070)
12	HiPace 80 secondary pump



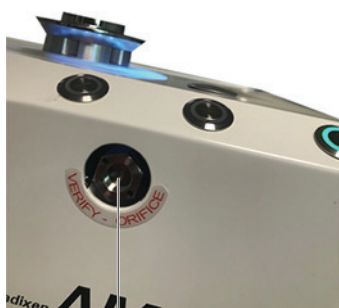
Item	Description
13	Stainless steel capillary filter
14	Electrical box fan

10.3 Access to internal components

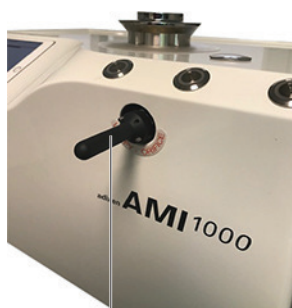
10.3.1 Disassembly/Reassembly of the front panel

Tool(s)

- 4-mm Allen key



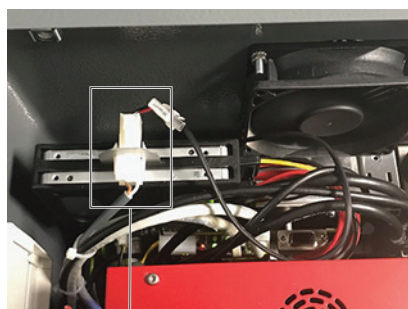
1



2



3



6



5



4

1 VERIFY ORIFICE port / calibrated leak orifice

2 Gripping handle

3 Plastic flange

4 Touch screen supply cable connector

5 **START**, **ABORT/VENT** and **VERIFY** button cable connector

6 Fan cable connector

1. Remove the magnetic cap from the VERIFY ORIFICE port.
2. Attach the gripping handle to the calibrated leak orifice.
3. Unscrew the gripping handle to remove the calibrated leak orifice.
4. On the home page, click on **[Open chamber]**.

5. Depending on the equipment, remove the blanking plate or test chamber connected to the test input.
6. Remove the plastic flange placed on the panel.
7. Disconnect the touch screen.
8. Remove the 4 fixing screws from the panel:
 - 2 at the top of the back
 - 1 on the bottom of each side.
9. Turn the panel forward and hold it to release the inner top part of the equipment.
10. Unplug the fan cable.
11. Unplug the cable from **START**, **ABORT/VENT** and **VERIFY** buttons.
12. Unplug the touch screen supply cable.
13. Remove the panel.

Reassembly

- Follow the disassembly steps in reverse.

Reassemble the blanking plate or the test chamber to make tests with the equipment without the panel.

- After reassembly, put the equipment back in stand-by mode.

10.3.2 Disassembly/Reassembly of the rear panel

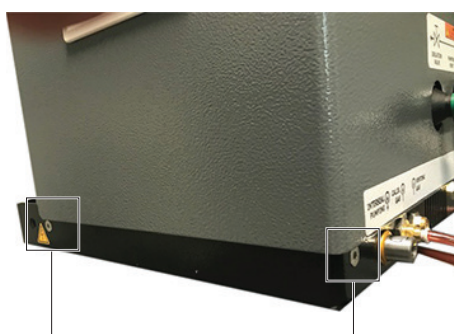
Tool(s)

- 4-mm Allen key
- 7-mm Allen key

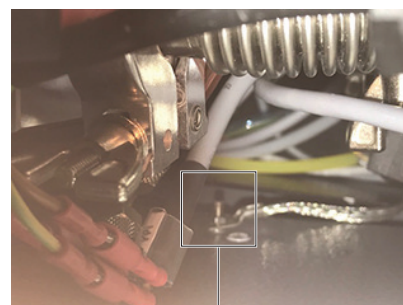


1

2



3



4

- 1 Manual backing pump isolation valve
- 2 Stainless steel flexible pipe

- 3 Fixing screws for the panel
- 4 Earthing braid

1. Remove the front panel.
2. Close the manual backing pump isolation valve.
3. Stop the equipment and turn it off.
4. Disconnect the stainless steel flexible pipe from PUMPING PORT.
5. Remove the 4 fixing screws from the panel:
 - 2 at the bottom of the back
 - 1 on each side of the front.
6. Rotate the panel towards the back and disconnect the earthing braid (on the right side of the panel).
7. Remove the panel.

Reassembly

- Follow the disassembly steps in reverse.

10.3.3 Dismantling/Reassembling of the upper rear panel of the trolley

Tool(s)

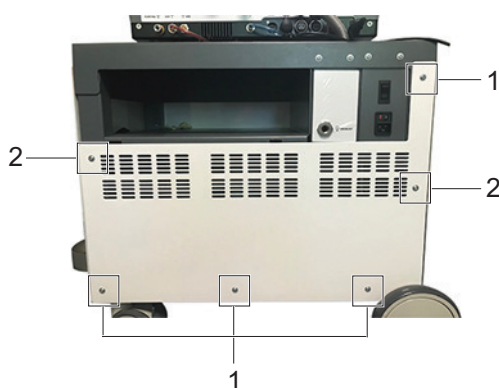
- Wrench supplied with the equipment



1 Lock

1. Unlock the 2 locks using the key provided with the equipment.
2. Press the locks to open them.
3. Flip the panel back and remove.
4. Proceed in reverse order to refit the panel.

10.3.4 Disassembly/Reassembly of the lower rear panel of the trolley



1 Fixing screw only

2 Fixing screw with shim washer

1. Unscrew the 5 fixing screws from the panel.
Keep the 2 shim washers.
2. Proceed in reverse order to refit the panel.
Do not forget to put back the 2 shim washers.

Consumables

- Lint-free cloth
- Alcohol
- Powder-free vinyl gloves

Spare part(s)

- Filters

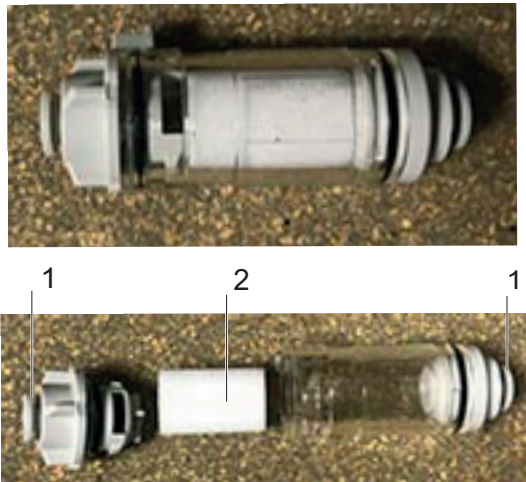
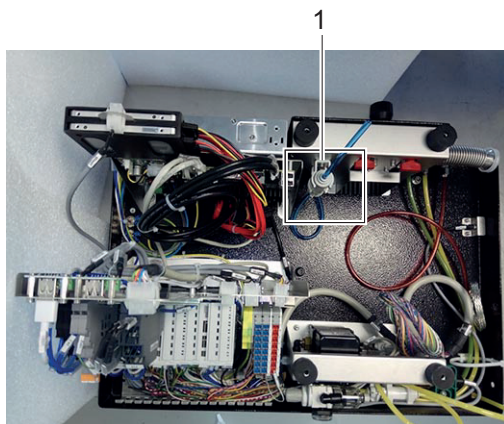


Fig. 2: Compressed dry air filter

- 1 Snap-in connector 2 Filter



- 1 Compressed dry air filter with the valve block removed

Preliminary conditions

- Front and/or rear panel removed (see chapter "Disassembly/Reassembly of the front panel") (see chapter "Disassembly/Reassembly of the rear panel").
- Manual pump isolation valve at the rear of the closed equipment (see chapter "Disassembly/Reassembly of the rear panel").
- Equipment shut down, disconnected from the main power supply (see procedure 4333 "AMI 1000 Shut down SOP").
- Compressed dry air cut.

Disassembly

1. Valve block removed for compressed dry air filter (see illustration for location).
2. Disconnect the filter (snap-in connector) and open it by turning the inlet part of the filter.
3. Replace the filter.

Reassembly

- Follow the disassembly steps in reverse. Note the filter installation direction: the air should flow in the direction of the arrow visible on the outside of the filter (transparent tube).

10.7 Replacement of vent expander

Expander location: mark 9 (see chapter "Location of the components")

Tools/Spare parts

- 14 mm open end wrench
- Latex gloves (unpowdered vinyl gloves (clean room gloves))
- Expander

Procedure

1. Remove the front cover.
2. Stop compressed dry air supply.
3. Disconnect the expander (Swagelock fitting).
4. Change the expander.
5. Put the front cover back on.

10.8 Spare parts

Item: see chapter "Location of the components"

Item	Component	Description	Part Number
1	"Delta P" gauge (M3)		128104
2	Capillary 1 (blue)		126225S ¹⁾
	SS4 VCR 2 o-ring		076705
	1/8 stainless steel seal		123890
3	Capillary 2 (yellow)		126226S ¹⁾
	SS4 VCR 2 o-ring		076705
	1/8 stainless steel seal		123890
4	Compressed dry air filter (SMC ZFCS4-B)		113079
5	PKR 360 (M2)	Gauge	PT T02 140 010
		Measurement chamber	PT 120 312 -T
		Incinerator holder	BN 845 995 -T
6	Venting exhaust filter (SMC AC10)		128585
7	ALPS 120 sensor	New sensor	200098
		Standard exchange	200098-A
8	Capillary pressure gauge (M1)		123623S
9	Venting regulator filter (TF25 0,55U SW6)		123869
10	"PTank" gauge		128105
11	Backing pump (MVP-070)	New pump	PK T01 310
		Standard exchange	PK T01 310 -A
		Diaphragm set	PU E22 014 -T
12	HiPace 80 secondary pump	New pump	PM P03 940 A
		Standard exchange	PM P03 940 AA
		Fluid tank	PM 143 740 -T
-	DN 25 ISO-KF O-ring (set of 5)		079292
-	DN 16 ISO-KF O-ring (set of 5)		079291
-	DN 100 ISO-K O-ring		079350
-	HV 63 ISO-K valve	New valve	31066B
		O-ring set	31136K

1) Standard capillary reference. If you would like a specific capillary (neither blue or yellow), please contact us.

11 Service solutions by Pfeiffer Vacuum

We offer first-class service

High vacuum component service life, in combination with low downtime, are clear expectations that you place on us. We meet your needs with efficient products and outstanding service.

We are always focused on perfecting our core competence – servicing of vacuum components. Once you have purchased a product from Pfeiffer Vacuum, our service is far from over. This is often exactly where service begins. Obviously, in proven Pfeiffer Vacuum quality.

Our professional sales and service employees are available to provide you with reliable assistance, worldwide. Pfeiffer Vacuum offers an entire range of services, from [original replacement parts](#) to [service contracts](#).

Make use of Pfeiffer Vacuum service

Whether preventive, on-site service carried out by our field service, fast replacement with mint condition replacement products, or repair carried out in a [Service Center](#) near you – you have various options for maintaining your equipment availability. You can find more detailed information and addresses on our homepage, in the [Pfeiffer Vacuum Service](#) section.

You can obtain advice on the optimal solution for you, from your [Pfeiffer Vacuum representative](#).

For fast and smooth service process handling, we recommend the following:



1. Download the up-to-date form templates.
 - [Explanations of service requests](#)
 - [Service requests](#)
 - [Contamination declaration](#)



- a) Remove and store all accessories (all external parts, such as valves, protective screens, etc.).
- b) If necessary, drain operating fluid/lubricant.
- c) If necessary, drain coolant.
2. Complete the service request and contamination declaration.



3. Send the forms by email, fax, or post to your local [Service Center](#).

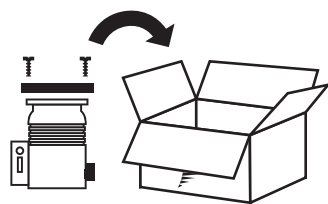


4. You will receive an acknowledgment from Pfeiffer Vacuum.

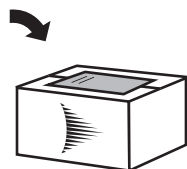
PFEIFFER VACUUM

Submission of contaminated products

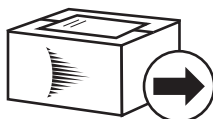
No microbiological, explosive, or radiologically contaminated products will be accepted. Where products are contaminated, or the contamination declaration is missing, Pfeiffer Vacuum will contact you before starting service work. Depending on the product and degree of pollution, **additional decontamination costs** may be incurred.



5. Prepare the product for transport in accordance with the provisions in the contamination declaration.
 - a) Neutralize the product with nitrogen or dry air.
 - b) Seal all openings with blind flanges, so that they are airtight.
 - c) Shrink-wrap the product in suitable protective foil.
 - d) Package the product in suitable, stable transport containers only.
 - e) Maintain applicable transport conditions.



6. Attach the contamination declaration to the **outside** of the packaging.



7. Now send your product to your local Service Center.



8. You will receive an acknowledgment/quotation, from Pfeiffer Vacuum.

PFEIFFER VACUUM

Our sales and delivery conditions and repair and maintenance conditions for vacuum devices and components apply to all service orders.

12 Accessories

Refer to the accessory operating instructions to install the accessory.

Accessory	Description	Model	Part Number
Verification orifice leak	Used to check the equipment	0.1 µm	127716S
		0.2 µm	127715S
		0.3 µm	127714S
		0.5 µm	127713S
		1 µm	127712S
		2 µm	127711S
		5 µm	127710S
		10 µm	127709S
		30 µm	127708S
VERIFY ORIFICE port plug	Used to seal the port when it is not fitted with a verification orifice leak		127707

13 Technical data and dimensions

13.1 Technical characteristics

Characteristics	Units	AMI 1000
Sensitivity (according to the type of UUT)	μm^2	< 0.2
	mbar.l/s	< $6 \cdot 10^{-6}$
Power consumption at ultimate pressure	W	330
Power supply ¹⁾ (according to ordering guide)	V	90-250 V AC - 50-60 Hz
Sound level (gas ballast and purge closed)	dB(A)	< 53
AMI 1000 weight	kg	36
AMI 1000 + cart (accessory) weight	kg	130
AMI 1000 dimensions	mm	H 362 x W 620 x D 443
AMI 1000 + cart (accessory) dimensions	mm	H 1075 x W 1409 x D 575

1) In accordance with EC regulations, the pumps can withstand a voltage variation of $\pm 10\%$.

2) Orifice as defined according to USP <1207>

Tbl. 3: Technical characteristics

Backing pump

- See the pump operating instructions delivered with the equipment.

	mbar	bar	Pa	hPa	kPa	Torr mm Hg
mbar	1	$1 \cdot 10^{-3}$	100	1	0.1	0.75
bar	1000	1	$1 \cdot 10^5$	1000	100	750
Pa	0.01	$1 \cdot 10^{-5}$	1	0.01	$1 \cdot 10^{-3}$	$7.5 \cdot 10^{-3}$
hPa	1	$1 \cdot 10^{-3}$	100	1	0.1	0.75
kPa	10	0.01	1000	10	1	7.5
Torr mm Hg	1.33	$1.33 \cdot 10^{-3}$	133.32	1.33	0.133	1

$$1 \text{ Pa} = 1 \text{ N/m}^2$$

Tbl. 4: Conversion table: Pressure units

	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	$1.69 \cdot 10^{-2}$	$1.69 \cdot 10^{-3}$	1	$1.27 \cdot 10^{-2}$	$1.67 \cdot 10^{-2}$
Torr l/s	1.33	0.133	78.9	1	1.32
atm cm ³ /s	1.01	0.101	59.8	0.76	1

Tbl. 5: Conversion table: Units for gas throughput

13.1.1 Environmental conditions

Use	Indoors, clean, dust-free room
Altitude	Up to 1000 m
Protection rating	IP20
Ambient operating temperature	20 to 25°C (stabilized temperature)
Storage temperature	10 to 45°C
Hygrometry	30 to 65% (relative humidity without condensation)

Transient overvoltage protection	Category II
Pollution degree	Level 2

Tbl. 6: Environmental conditions

The materials

Our products contain different materials which must be recycled:

- Steel
- Stainless steel
- Aluminum
- Copper (cable)
- Iron (magnet)
- Electronic boards
- Molybdenum
- Plastic
- FPM O-ring
- Ceramic
- Nickel
- Glass

13.1.2 Compressed dry air characteristics

Composition	$\approx 80\% \text{ N} + \approx 20\% \text{ O}_2$
Type	Quality 1.3.1. according to standard ISO 8573-1
Pressure	Minimum = $4.5 \cdot 10^3$ hPa (4.5 bar) relative (65 psig) Maximum = 10^4 hPa (10 bar) relative (145 psig)
Pipe diameter (bare pipe)	External = 6 mm Internal = 4 mm
Connector	G 1/8' female

Tbl. 7: Compressed dry air characteristics

13.1.3 Venting gas characteristics

Type	CDA - Air - Oxygen - Argon
Purity	$\geq$ Alphagaz 1 (Air Liquide) or N50
Residual concentration	< 5 ppm
Pressure	Minimum = 0 hPa relative Maximum = $1.5 \cdot 10^3$ hPa (1.5 bar) relative (22 psig)
Connector	G 1/8' female

Tbl. 8: Venting gas characteristics

13.1.4 Tracer gas characteristics

Type	CDA - Air - Oxygen - Nitrogen - Argon
Purity	$\geq$ Alphagaz 1 (Air Liquide) or N50
Residual concentration	< 5 ppm
Pressure	Minimum = $6.3 \cdot 10^3$ hPa (6.3 bar) relative (91 psig) Maximum = 10^4 hPa (10 bar) relative (145 psig)
Connector	G 1/8' female

Tbl. 9: Tracer gas characteristics

13.2 Dimensions

Dimensions in mm

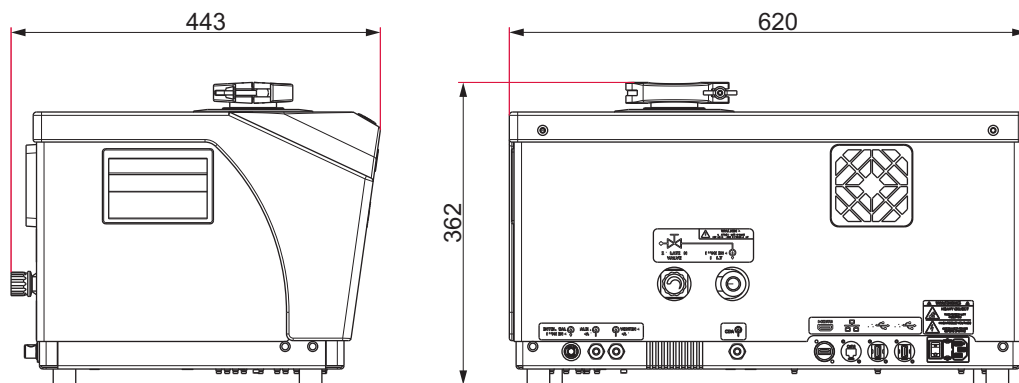


Fig. 3: AMI 1000 dimensions

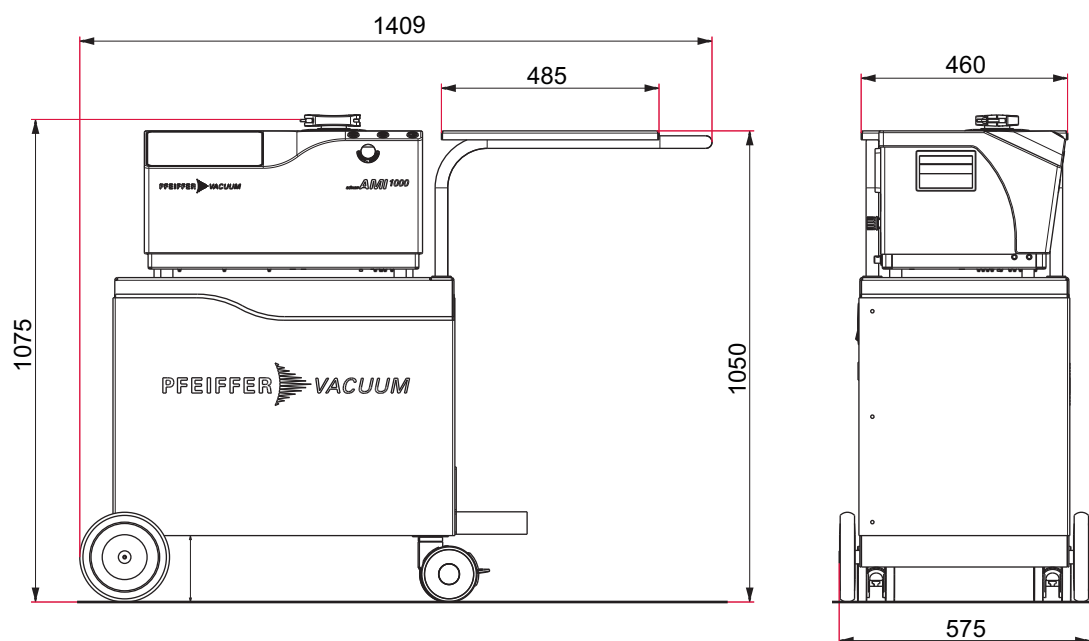


Fig. 4: AMI 1000 on-cart dimensions

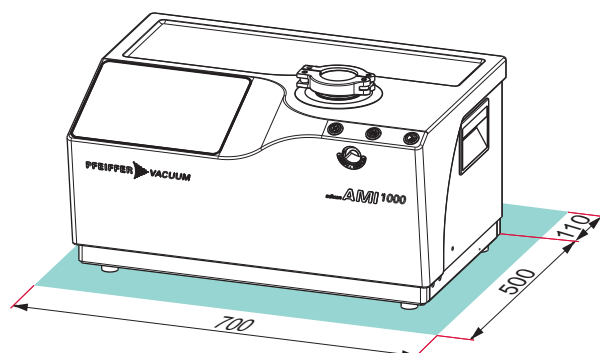


Fig. 5: Maintenance space required

Declaration of Conformity

Declaration for product(s) of the type:

Leak testing equipment
AMI 1000

We hereby declare that the listed product satisfies all relevant provisions of the following **European Directives**.

Machinery 2006/42/EC (Annex II, no. 1 A)
Electromagnetic compatibility 2014/30/EU
Radio systems 2014/53/EU
Restriction of the use of certain hazardous substances 2011/65/EU

Harmonized standards and national standards and specifications applied:

NF EN 61010-1: 2011
NF EN 61000-4-2: 2008
NF EN 61000-4-3: 2010
NF EN 61000-4-4: 2012
NF EN 61000-4-5: 2014
NF EN 61000-4-6: 2013
NF EN 61000-4-11: 2017
CISPR-11

The person authorized to compile the technical file is Ms Thovex Cindy Pfeiffer Vacuum SAS (Simplified joint stock company), 98, avenue de Brogny B.P. 2069, 74009 Annecy cedex.

Signature:



Pfeiffer Vacuum SAS
98, avenue de Brogny
74009 Annecy cedex
France
B.P. 2069

Arnaud Favre
Product Group Director Instrumentation and Systems
Pfeiffer Vacuum SAS

2019/02/21





VACUUM SOLUTIONS FROM A SINGLE SOURCE

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

COMPLETE RANGE OF PRODUCTS

From a single component to complex systems:

We are the only supplier of vacuum technology that provides a complete product portfolio.

COMPETENCE IN THEORY AND PRACTICE

Benefit from our know-how and our portfolio of training opportunities!

We support you with your plant layout and provide first-class on-site service worldwide.

Ed. 01 - Date 2022/05 - P/N:130361OEN



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

Pfeiffer Vacuum GmbH
Headquarters • Germany
T +49 6441 802-0
info@pfeiffer-vacuum.de

www.pfeiffer-vacuum.com