Dansensor®
Lippke® 5000
User Guide EN

AMETEK® | mocon®

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Lippke® 5000
User Guide

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Table of Contents

1. Introduction

Important!

Safety and Use

WARNING! Personnel operating and maintaining the device must be familiar with all aspects of its operation and be proficient in maintenance.
Such personnel should review the information in *"Safety and Handling Instructions" on page 129* to promote safety awareness.
Failure to follow the safety instructions could result in fire, electric shock, injury, or damage to the Dansensor® Lippke® 5000 or other property.

- Prior to using the equipment it is assumed that it has been properly installed and configured as described in this manual.
- Always refer to this manual before operating or maintaining the device.
- Observe all NOTES, CAUTIONS and WARNINGS - see *page 8* for details.

About this Manual

Intended Use of this Manual

- This manual describes the common use and maintenance procedures of the **Dansensor® Lippke® 5000** device.
  It is intended for the daily users and should be kept with the equipment for reference at all times.

Reservations

- This manual was written and illustrated using the best possible information available at the time of publication.
- Any differences between this manual and the equipment reflect improvements introduced after the publication of the manual.
- Changes, technical inaccuracies and typographic errors will be corrected in subsequent editions.
- As a part of our policy of continuous improvement, we reserve the right to alter design and specifications without further notice.

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Notes, cautions, warnings and tips!

Throughout the manual notes, cautions, and warnings are indicated with various icons and written in bold like the example below:

CAUTION! Never use hard tools or abrasive materials when cleaning any part of the device.

Explanation

NOTE! The operator should observe and/or act according to the information in order to obtain the best possible function of the equipment.

CAUTION! The operator must observe and/or act according to the information in order to avoid any mechanical or electrical damage to the equipment.

WARNING! The operator must observe and/or act according to the information in order to avoid any personnel injury.

Tips and recommendations

Tips, recommendations and “best practice” advises are indicated as shown in the example below:

TIP! You can choose not to use the rubber mat, as cleaning of the base plate is easier without it.

General description

The **Dansensor® Lippke® 5000** is an integrated package test system that measures the seal strength and integrity of flexible, rigid or semi-rigid packages. The seal strength and integrity of the package is measured by inflating it using compressed air.

The system consists of a console and one or more accessory kits, each of which is used to test the most commonly used types of packages such as closed packages, open packages, screw top tubes, and IV bags - see *"Accessories" on page 13* for details.

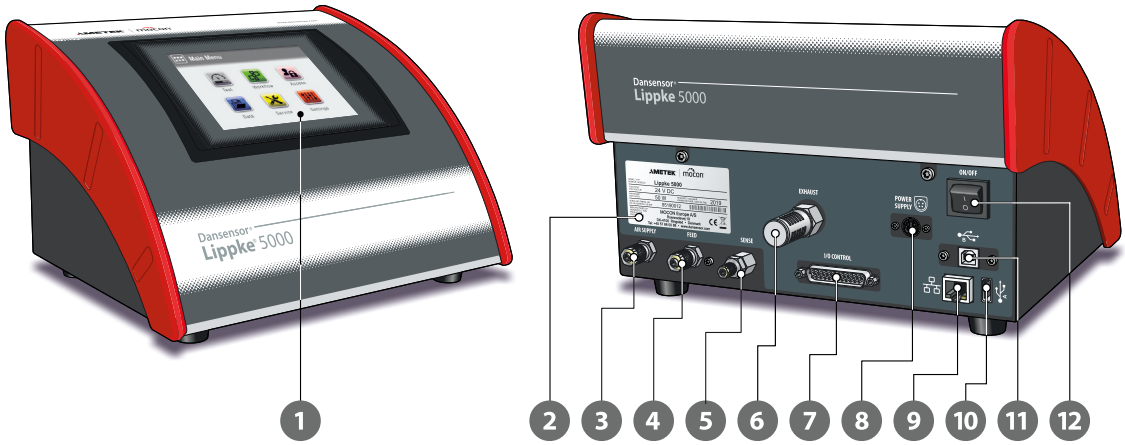
Fig. 1. Dansensor® Lippke® 5000 Package Test System

On stand-alone models setting up and testing is done using the display on the instrument whereas the PC-enabled models use a PC-based software application.
The entry, selection and management of all test parameters is easily and quickly accomplished and multiple test configurations can easily be created and recalled.

Test Capabilities

The system can perform a variety of seal strength and package integrity tests.
See *"2. Tests" on page 37* for detailed descriptions of each test procedure.

Overview



1. **5.7" colour touch display**
   For intuitive operation of the device by use of explanatory icons and easy understandable text messages and buttons.

2. **Device name plate**
   Holds device information such as device model, voltage, manufacturing date and serial number.

3. **"AIR SUPPLY" connector**
   Connector for the device's compressed air supply.

   CAUTION! The supply pressure must not exceed the max. pressure as specified in *"Compressed air supply" on page 124*.

4. **"FEED" connector**
   Connector for the measurement accessory air supply outlet.

5. **"SENSE" connector**
   Pressure measurement inlet connector.

6. **"EXHAUST" outlet**
   Package pressure exhaust outlet. The outlet is fitted with a noise filter.

7. **"I/O CONTROL" connector**
   (Not used)

8. **"POWER SUPPLY"**
   For connection of the power supply delivered with the device.

9. **LAN/Ethernet port**
   For connection to local computer network for external data collection (LAN Data dump). The port has 2 built-in status indicator LED's.

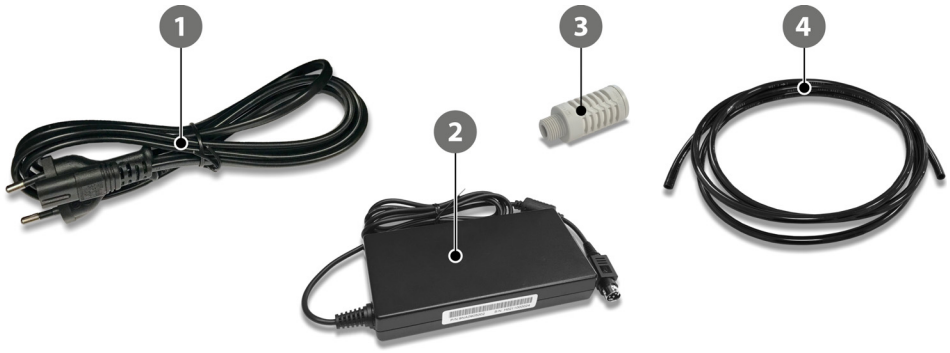
10. **USB (2.0 - Type A) connector**
    For connection of a USB memory stick for exporting/importing of files and updating of firmware or for auxiliary equipment such as a bar-code scanner, an external keyboard and/or a printer.

11 **USB (2.0 - Type B) connector**
Connects the device to a PC (when using the PC Software).

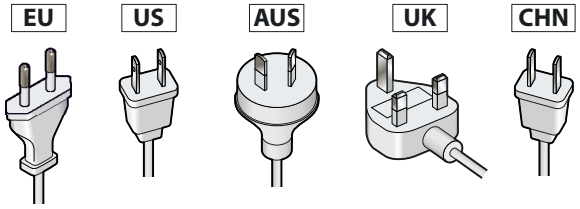
12 **On/Off switch**

Supplied Parts

The following items are included with the device:



1 Power supply cable
For connecting the power supply 2 to a main power outlet.
Below is an overview of which cable is to be used in which countries/areas*:



EU type:	Europe
US type:	North America, Thailand, Taiwan
AUS type:	Australia, New Zealand
UK type:	United Kingdom, Singapore, Malaysia
CHN type:	China

* Compatibility is not limited to the indicated countries/areas.

2 Power Supply
Supplies the appropriate supply voltage to the device. Use appropriate cable 1 to connect the power supply to the main power outlet.

3 Noise filter
For the package pressure exhaust outlet.

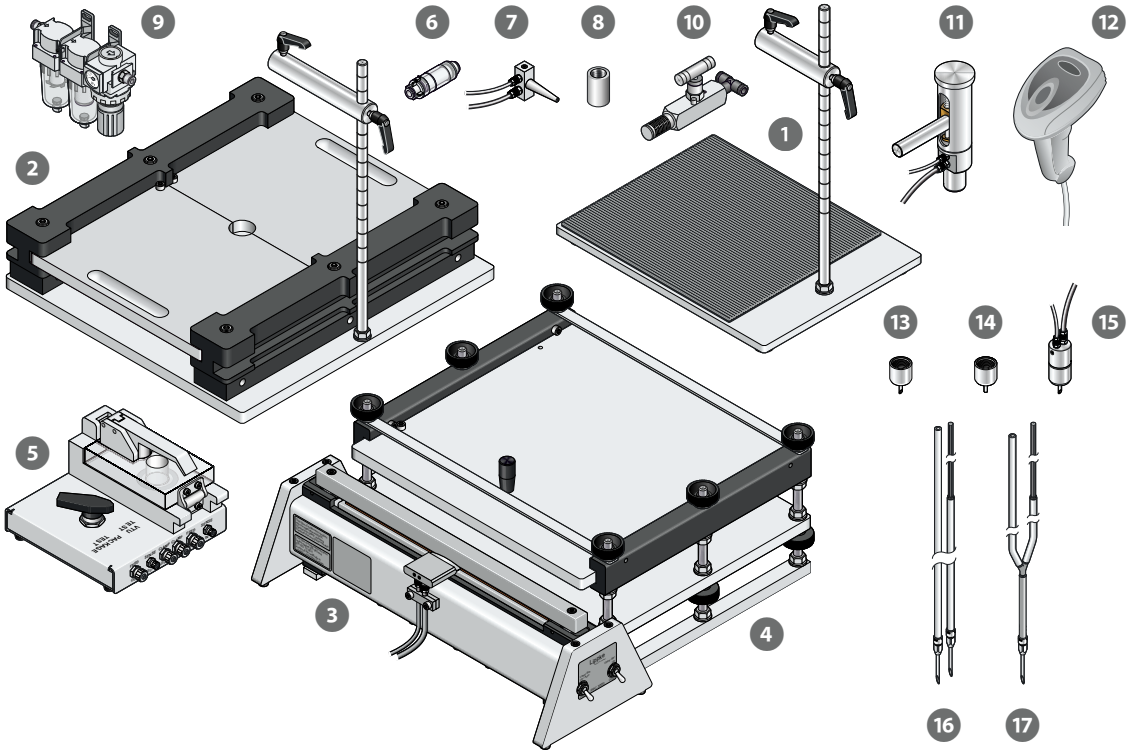
4 Air supply hose
For connection of compressed air.

Accessories

A variety of accessory kits are available for the **Dansensor® Lippke® 5000** test system.

See *"8. Consumables, accessories and options" on page 127* for details.

In addition to the selection of measurement accessory kits specially designed for testing of the most commonly used package types, the accessory list also includes other accessories that can be used separately or together with one or more of the measurement accessory kits.



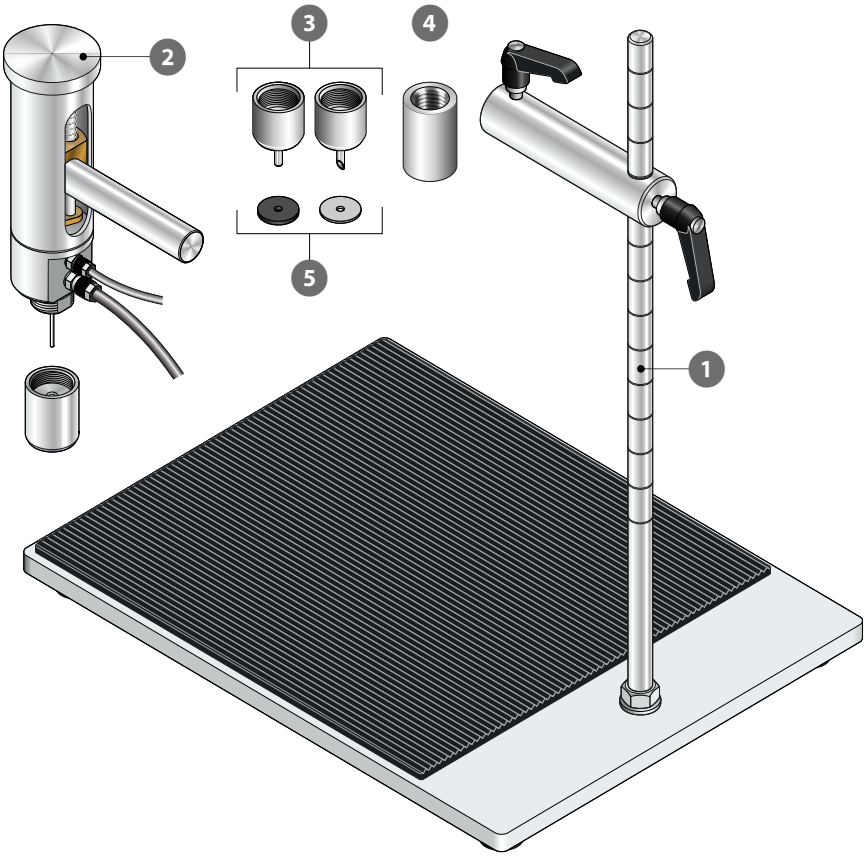
1	**Stand, basic**	(see *page 15* for details)
2	**Fixture f. ASTM restraining**	(see *page 18* for details)
3	**PPC 300 II**	(see *page 23* for details)
4	**Package fixture f. PPC 300 II**	(see *page 23* for details)
5	**Valve Test Unit (VTU)**	(see *page 27* for details)
6	**Filter for feed hose**	(see *page 29* for details)
7	**Tube adapter**	(see *page 31* for details)
8	**IV-Bag adapter**	(see *page 29* for details)
9	**Pressure Regulator with filters**	(see *page 30* for details)
10	**Package pressure release valve**	(see *page 30* for details)
11	**Test head without needle**	(see *page 22* for details)
12	**Bar-code scanner**	(see *page 70* for details)
13	**Sharp needle**	(see *page 32* for details)

14 **Blunt needle** (see *page 32* for details)
15 **Hand-held needle, combined** (see *page 32* for details)
16 **Hand-held needle, separate Feed/Sense** (see *page 32* for details)
17 **Hand-held needle, mono (with Y-piece)** (see *page 32* for details)

Basic Stand

The basic stand is used to test fully sealed (closed) rigid and semi rigid packages.
The stand 1 can be used together with various accessories and consumables depending on the application:

2 **Test head** (see *page 22* for details)
3 **Needle** (see *page 32* for details)
4 **Tube Adapter** (see *page 30* for details)
5 **Septa** (see *page 35* for details)



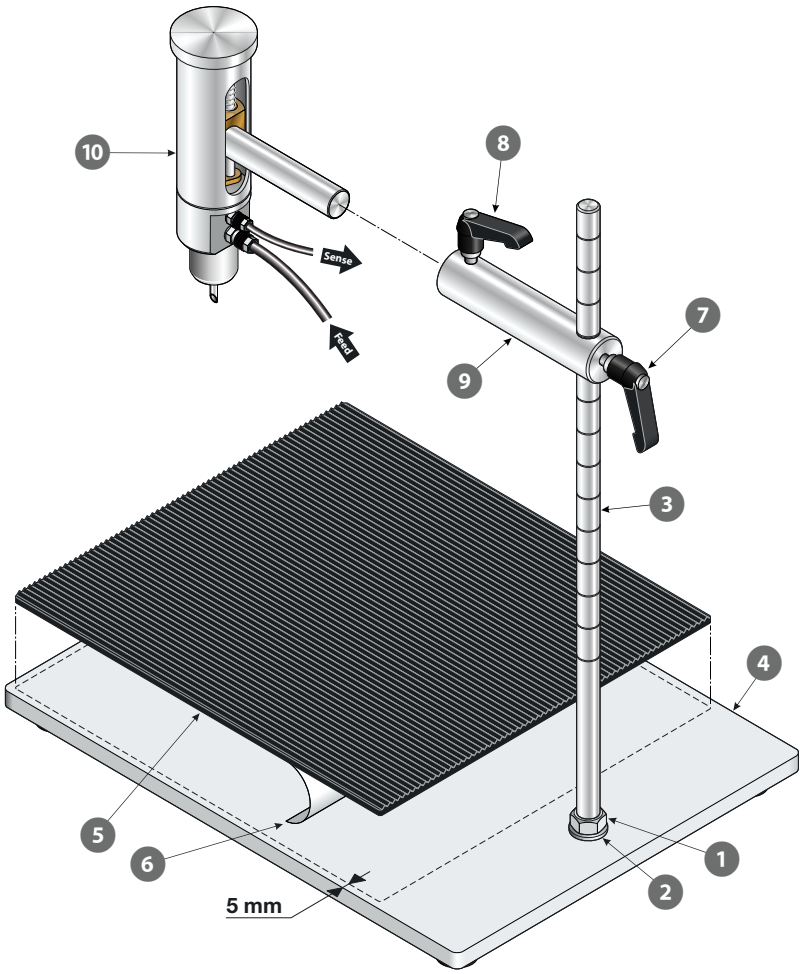
Setting Up

NOTE! The equipment must be placed on an even, steady, and horizontal surface with sufficient working area for the type of packages to be tested.

1. Mount the nut 1 and the washer 2 on the vertical rod 3, then screw the rod into the base plate 4 as far as it goes. Tighten assembly by screwing the nut 1 against the base plate 4.
2. Apply the self-adhesive rubber mat 5 by removing the protective paper 6 and position the mat approx. **5 mm** from the front and side edges of the base plate 4.

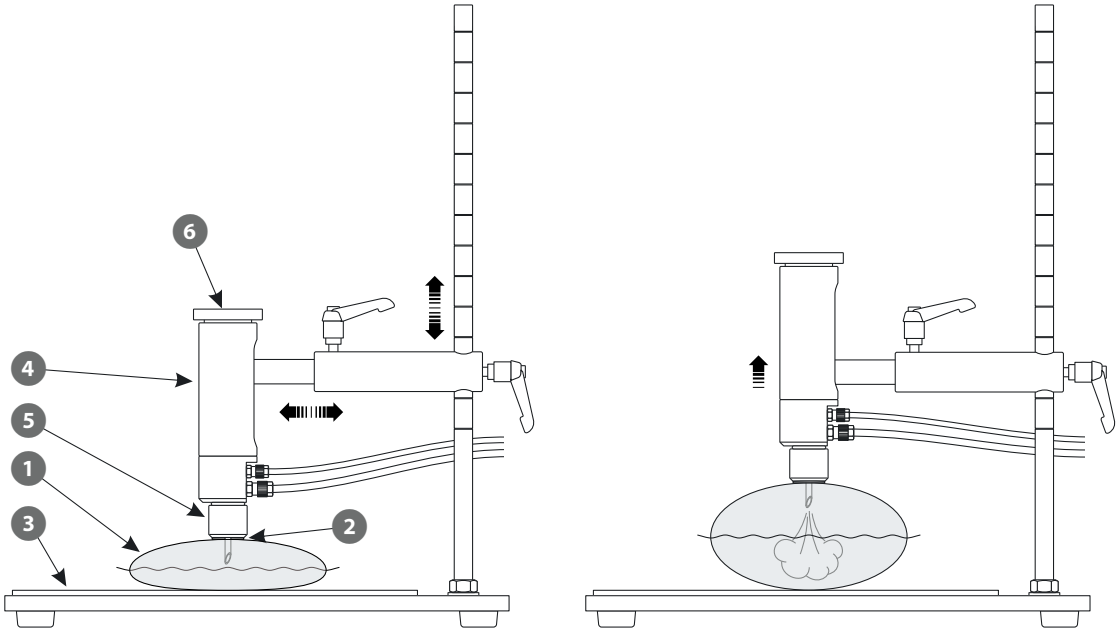
   NOTE! You can choose not to use the rubber mat, as cleaning of the base plate is easier without it. Still we recommend to use it, as it provides better friction for the test items.

3. Fit the two handles 7 and 8 to the connector rod 9 and slide it onto the vertical rod 3. Tighten the handle 7 to position the connector rod 9 on the vertical rod 3.
4. Prepare the test head 10 - see *page 22* for details - then insert it into the connector rod 9 and tighten handle 8 to keep it in position.



How does it work?

1. Prepare the package ❶ with a septum ❷ and place it on the base plate ❸.
2. Move the test head ❹ downwards to penetrate the package ❶ making sure that the needle ❺ is fully seated onto the septum ❷. Lock the test head in this position taking into consideration that the test head should be allowed to move upwards as the package inflates.
   If, for some reason, you want to restrict the test head movement, you can do this by means of the knob ❻.
3. Perform the test.



Fixture for ASTM restraining

This fixture is used to perform restrained tests on closed packages compliant with ASTM F2054. As the name says they restrain the package to ensure that the pressure affects the package sealings in the correct way.

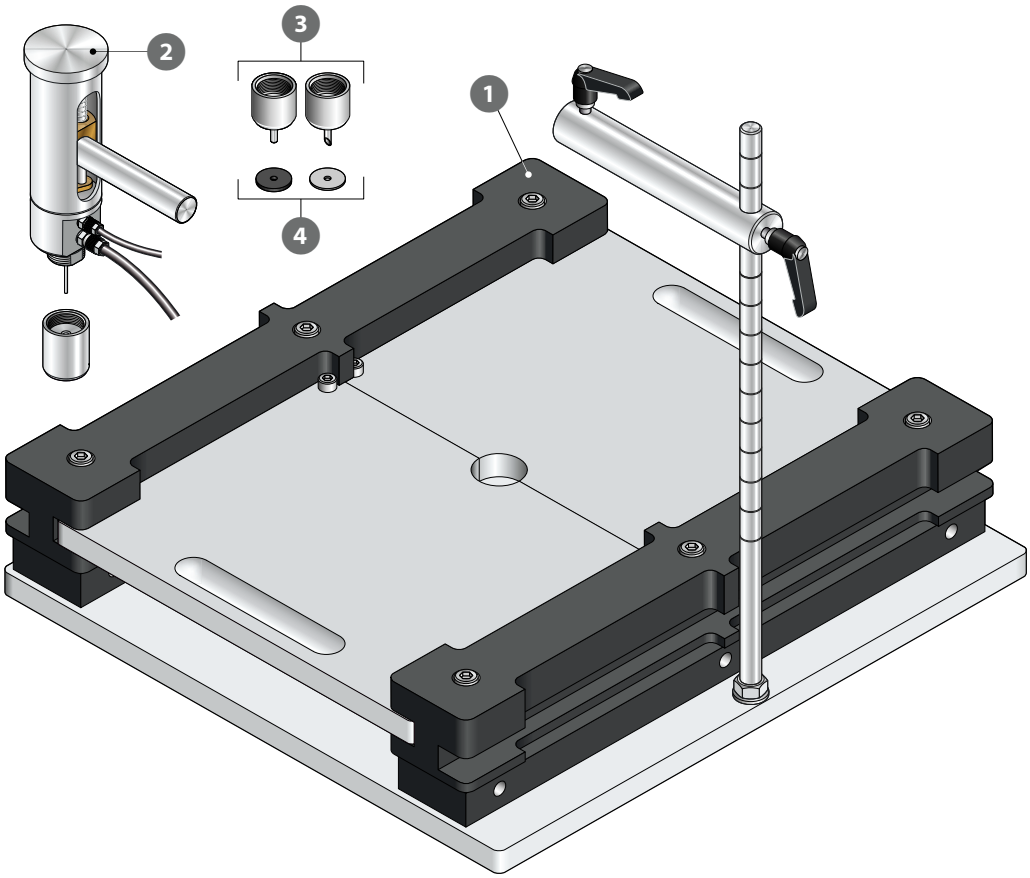
The device is mostly used for burst tests, but it can also be used for testing leaks in the package sealing. If device is used for a full leak test of a package, a Tyvek foil can be placed below and above the package to enable leaked gas to escape from the top and bottom area of the package as well.

The fixture ❶ can be used together with various accessories and consumables depending on the application:

❷ **Test head** (see *page 22* for details)

❸ **Needle** (see *page 32* for details)

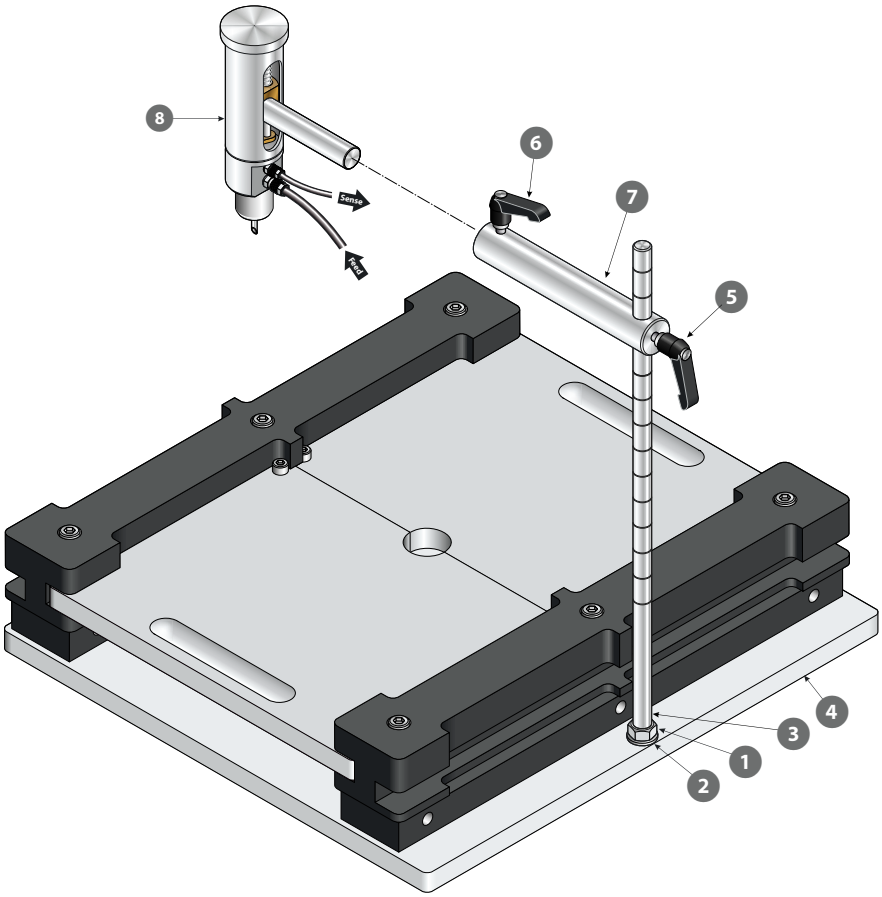
❹ **Septa** (see *page 35* for details)



Setting Up

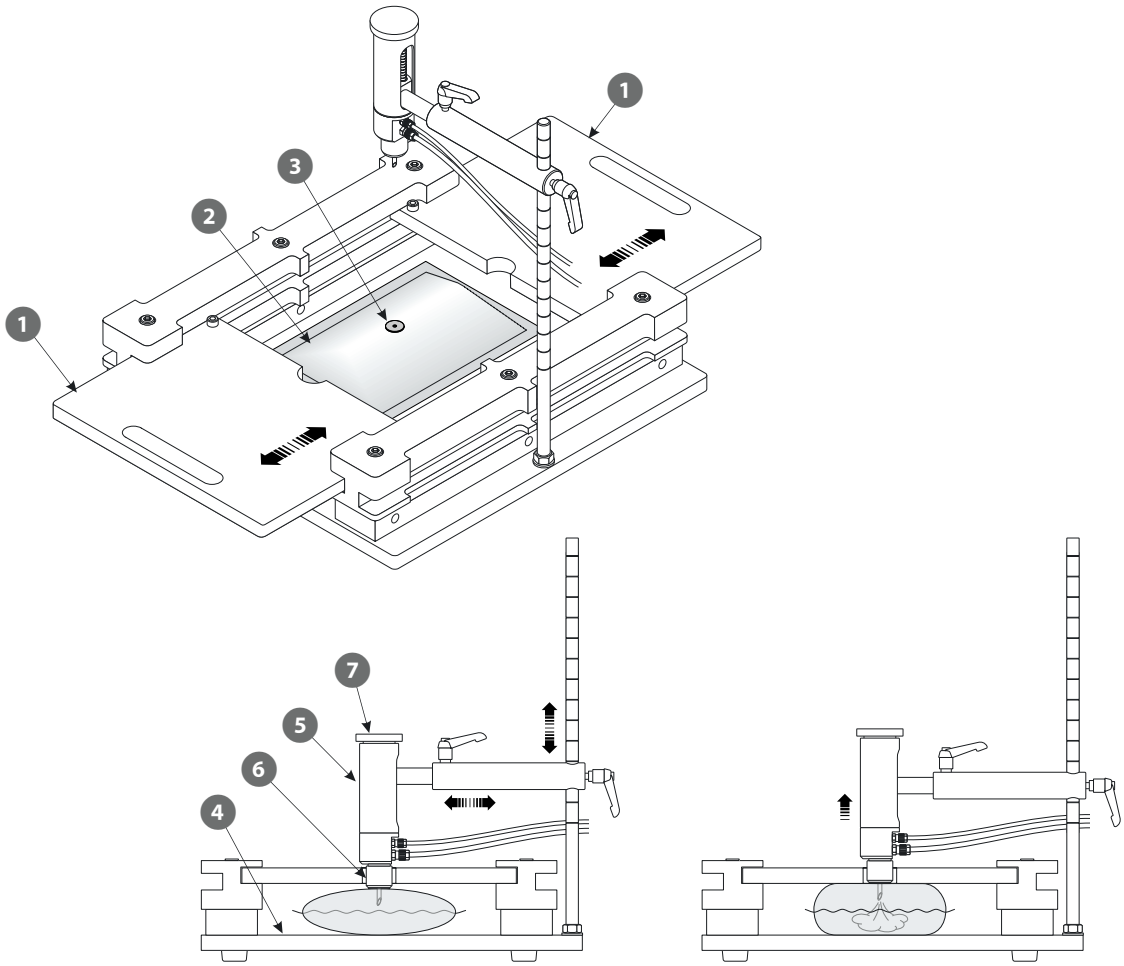
NOTE! The equipment must be placed on an even, steady, and horizontal surface with sufficient working area for the type of packages to be tested.

1. Mount the nut 1 and the washer 2 on the vertical rod 3, then screw the rod into the base plate 4 as far as it goes. Tighten assembly by screwing the nut 1 against the base plate 4.
2. Fit the two handles 5 and 6 to the connector rod 7 and slide it onto the vertical rod 3. Tighten the handle 5 to position the connector rod 7 on the vertical rod 3.
3. Prepare the test head 8 - see *page 22* for details - then insert it into the connector rod 7 and tighten handle 6 to keep it in position.



How does it work?

1. Adjust the restraining height - see *"Adjusting the restraining height (ASTM)" on page 21* for details.
2. Open the restraining plates 1 by sliding them away from each other.
3. Prepare the package 2 with a septum 3 and place it on the base plate 4.
4. Move the test head 5 downwards to penetrate the package 2 making sure that the needle 6 is fully seated onto the septum 3.
5. Close the restraining plates 1. Lock the test head in the current position taking into consideration that it should be allowed to move upwards as the package inflates.
   If, for some reason, you want to restrict the test head movement, you can do this by means of the knob 7.
6. Perform the test.

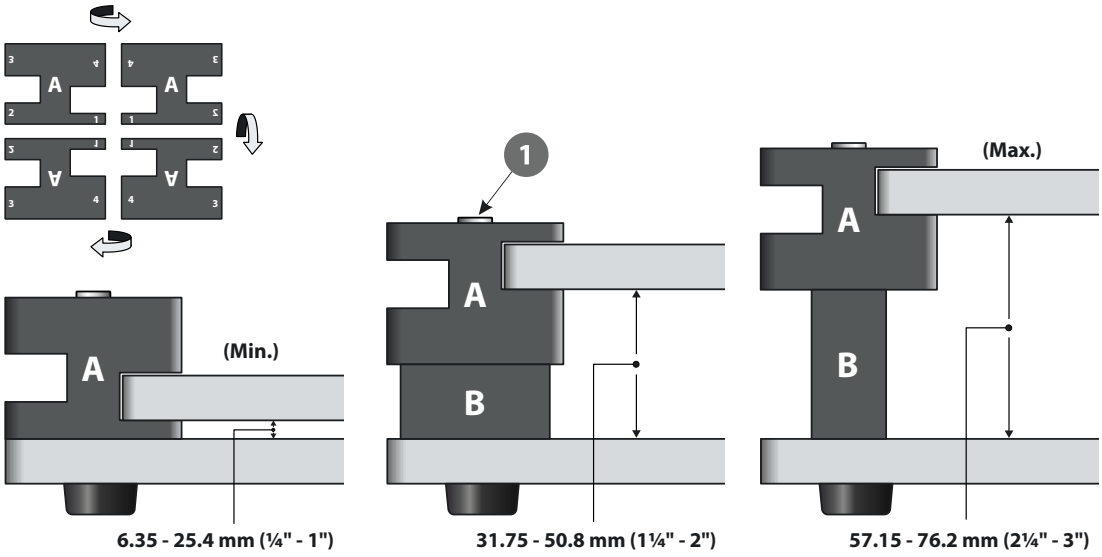


Adjusting the restraining height (ASTM)

The ASTM restraining fixture can be adjusted to various package restraining heights from 6.35 to 76.2 mm (¼" to 3") in steps of 6.35 mm (¼").

The 12 different height settings are achieved by combining the side bars **(A)** and **(B)** as illustrated below.

For each of the 3 combinations of the bar **(B)** (none, lying or standing) there is a matching set of screws 1.



Test head

The test head should be used together with the "Basic Stand" and the "Fixture for ASTM restraining" measurement accessories.

The test head can be fitted with two different needles - see *page 32* for details.

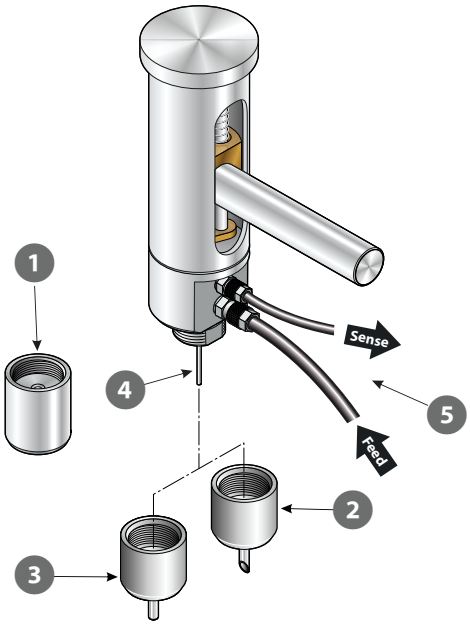
The "Blind" plug ❶ that comes with the test head can be used for testing if there are internal leaks in the system.

To prepare the test head do the following:

1. Remove the "Blind" plug ❶, then fit the appropriate needle ❷ or ❸ on the test head. The needles fit on the outside of the small needle ❹.

   CAUTION! Needles should only be hand tightened - do not use any tools.

2. Connect air supply (Feed) and pressure measurement (Sense) hoses ❺ to the device - see *page 55* for details.



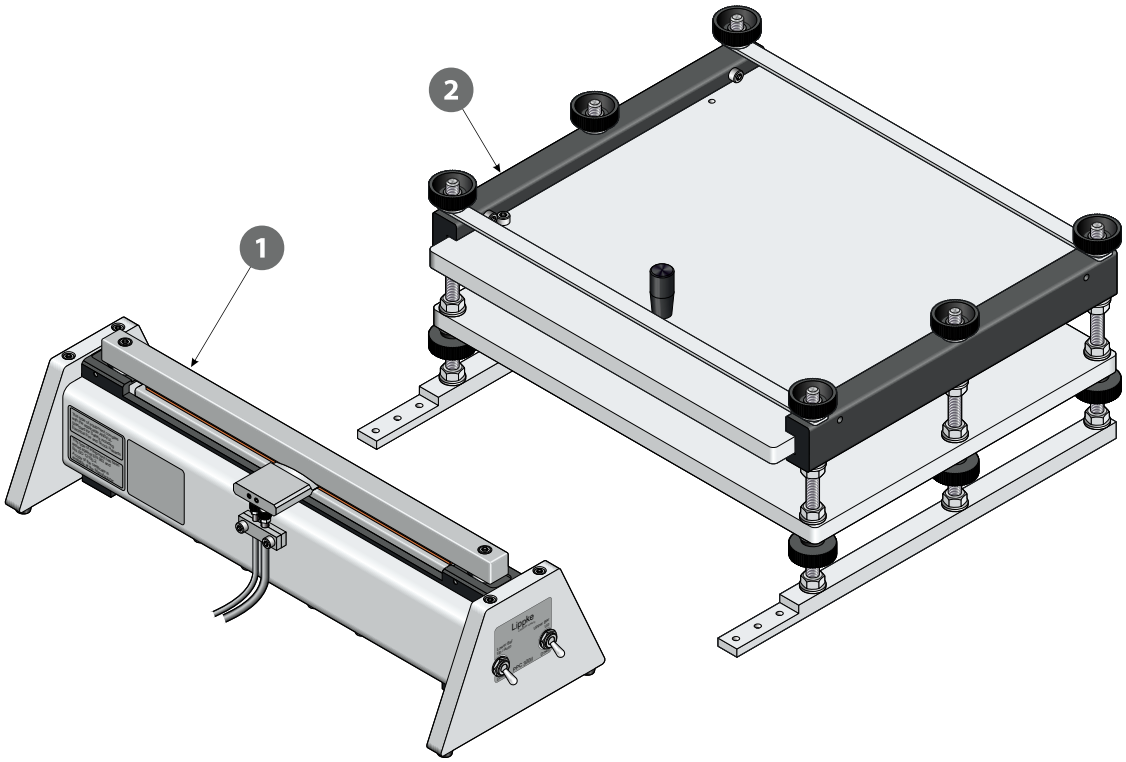
PPC 300 II

The PPC 300 II device is designed for performing burst tests on most types of packages, bags or pouches that are open on one side.

The device seals the open side of the package, enabling a test to be performed according to the ASTM F1140 standard.

The PPC 300 II unit ❶ can be used with or without the optional fixture for package restraining ❷.

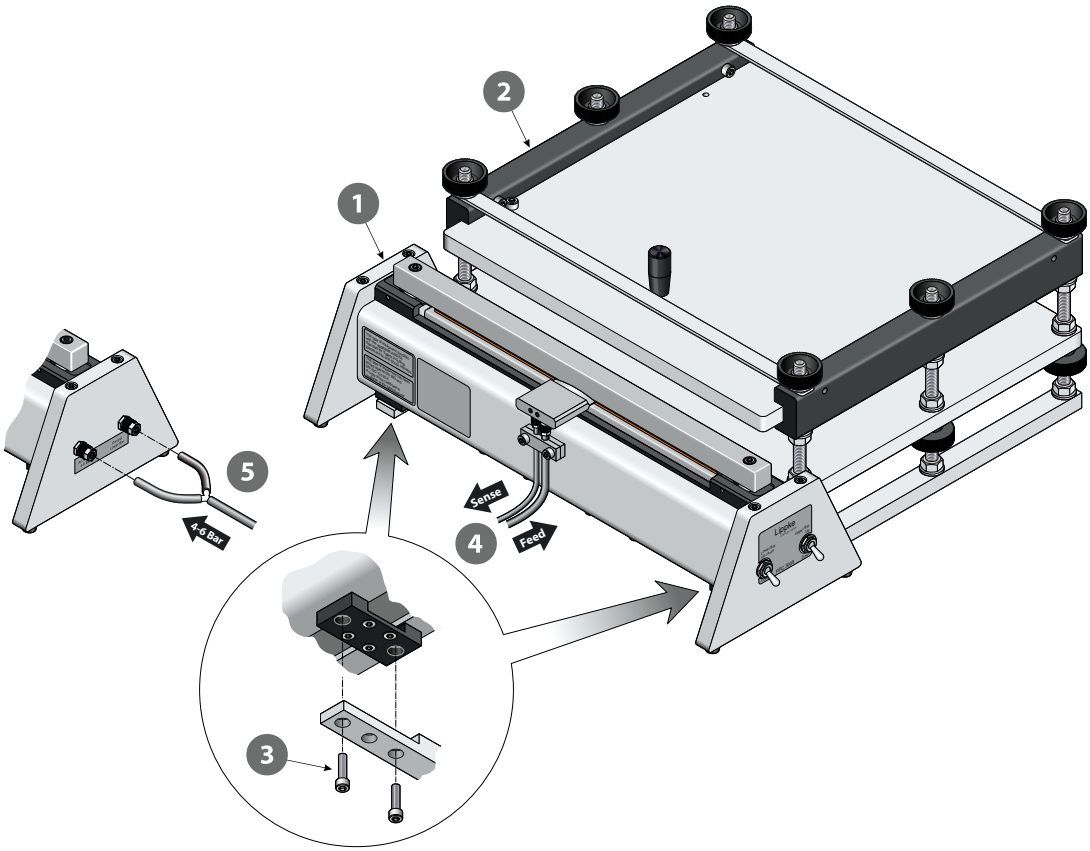
WARNING! The device should only be operated by one person at a time.



Setting Up

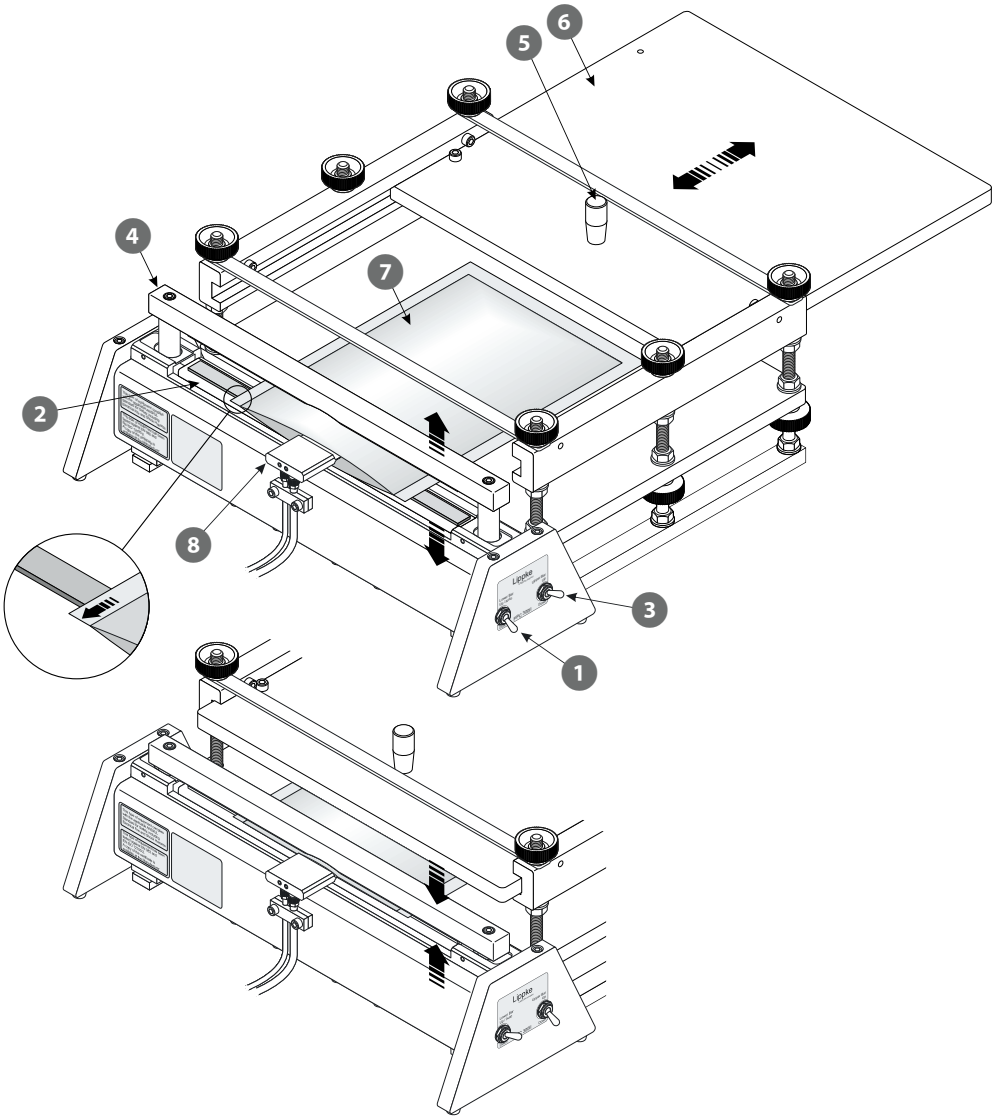
NOTE! The equipment must be placed on an even, steady, and horizontal surface with sufficient working area for the type of packages to be tested.

1. If the PPC 300 II 1 is to be used together with the fixture for package restraining 2 the two units must be assembled using the screws 3.
2. Connect the unit's air supply (Feed) and pressure measurement (Sense) hoses 4 to the device.
3. Connect external air supply hose(s) 5 (4-6 Bar) to each of the "Air Supply 4-6 Bar" and "Control Lower Bar" inlets.



How does it work?

1. If necessary adjust the restraining height - see *"Adjusting the restraining height (PPC 300 II)" on page 26* for details.
2. Use the switch ❶ to lower the bottom bar ❷, then use the switch ❸ to move the upper bar ❹ upwards.
3. Use knob ❺ to slide the upper plate ❻ away to open the restraining device.
4. Place the pouch ❼ around the air block ❽ as shown. Make sure that the whole front edge of the pouch extends past the front edge of the rubber band on the lower bar ❷ (see detail).
5. Close the restraining device.
6. Use switch ❸ to move the upper bar ❹ down.
7. Use the switch ❶ to move the bottom bar ❷ upwards to close the clamp around the pouch ❼ and air block ❽ when you start the test.
8. Perform the test.

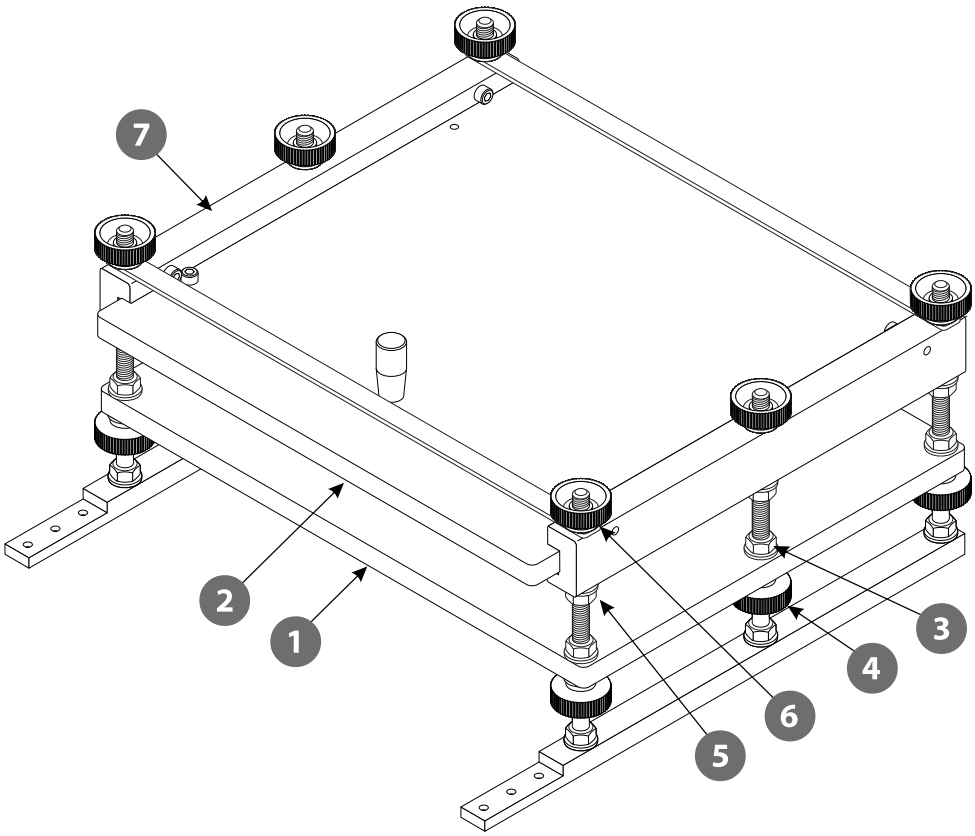


Adjusting the restraining height (PPC 300 II)

The package restraining fixture for the PPC 300 II can be adjusted to various package restraining heights.

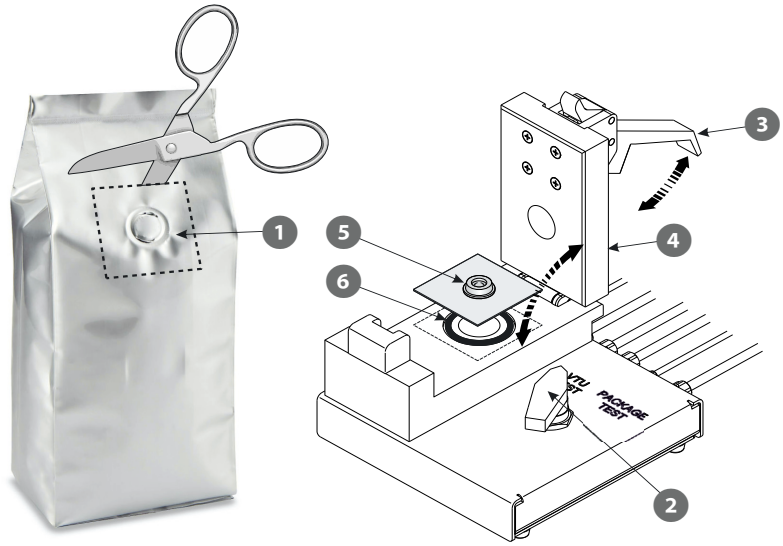
The restraining height is achieved by adjusting the distance between the two plates 1 and 2.
Use the nuts 3 and finger nuts 4 to adjust the position of the lower plate 1, then use the nuts 5 and finger nuts 6 to adjust and lock the position of the side bars 7 and thereby the position of the upper plate 2.

NOTE! Make sure to adjust the side bars 7 to the same height so that the upper plate 2 can move freely.



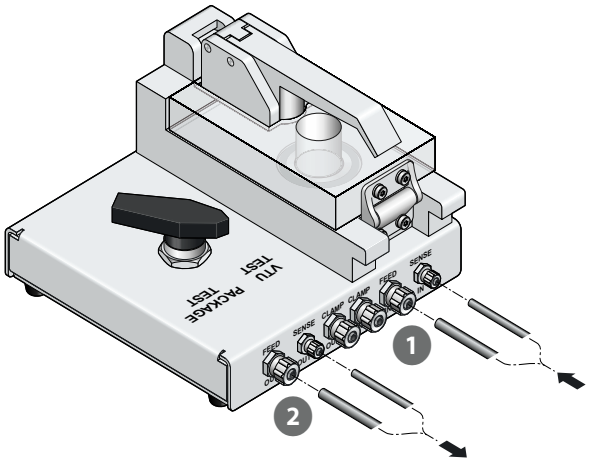
Valve Test Unit (VTU)

The Valve Test Unit (VTU) can be used to perform tests on “Degassing Valves”.
Degassing valves are used on some coffee and food products to prevent a pressure build-up inside the product packaging.
The VTU can be used either to test the cracking or burst pressure of the valve or to verify that there is no “reverse leakage”.



Setting Up

1. Connect the supplied hoses between the “FEED” and “SENSE” connectors on the device to the corresponding IN connectors 1 on the VTU.
2. Connect the hoses from the measurement accessory f.ex. test head on the Stand for Closed Packages to the “FEED” and “SENSE” OUT connectors 2 on the VTU.

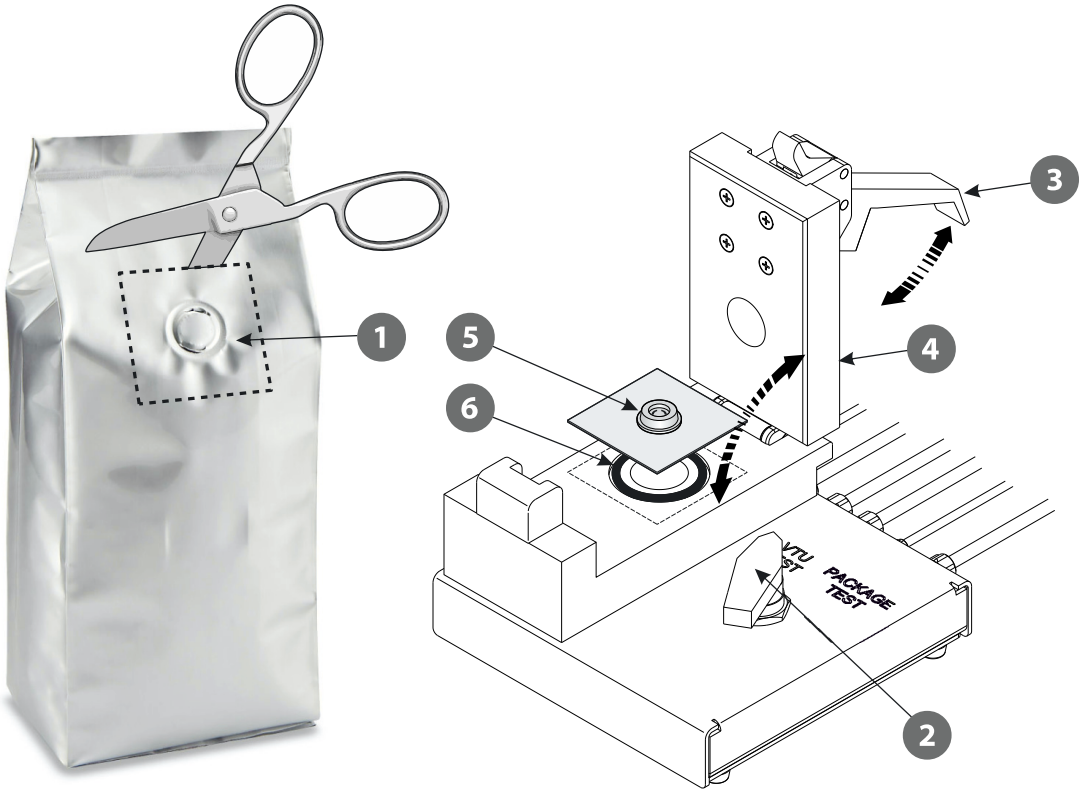


How does it work?

1. Cut out the sample 1 from the package. The sample should have a size of approx. 60 x 60 mm (must cover the O-ring 6) and the valve must be placed in the centre of the sample.
2. Turn the selector knob 2 to the "VTU TEST" position.
3. Release the handle 3 and open the transparent lid 4.
4. Place the sample in the device as shown making sure that the valve 5 is centred inside the O-ring 6:
   - To perform a valve "Burst" test, place the sample with the "outside" surface oriented up.
   - To perform a valve "Leak" test, place the sample with the "outside" surface oriented down.

NOTE! The "outside" surface of the sample is the side that was on the exterior surface of the package before cutting out the sample.

5. Close the lid 4 and lock the handle 3.
6. Perform the test.



When you need to bypass the VTU unit to perform tests on packages using the auxiliary connected equipment the selector knob 2 must be turned to the "PACKAGE TEST" position.

IV-Bag adapter

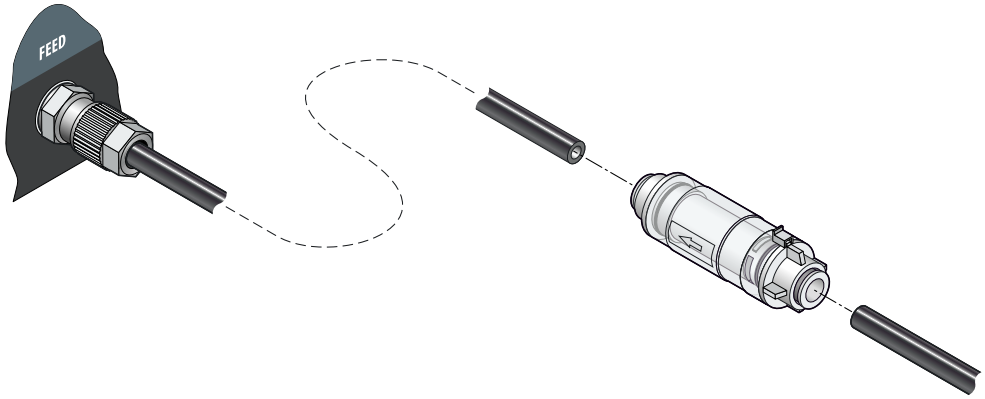
This is an adapter for testing of IV-bags. The conical shape of the adapter's mouthpiece allows for easy connection to most types of IV-bags.

Connect air supply (Feed) and pressure measurement (Sense) hoses to the adapter.

Filter

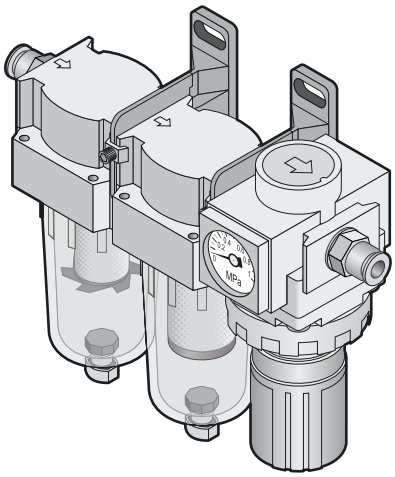
When testing and afterwards depressurizing packages filled with powder or liquid substances, there is a risk that particles or fluids can move backwards into the system potentially causing damage to the instrument.
In these cases it is highly recommended to install the filter in the "FEED" line between the package and the device.

NOTE! Place the filter as close to the test head or needle as possible to minimize soiling of the hose.



Pressure Regulator with filters

The optional pressure regulator/filter unit ensures that the supplied compressed air quality is compliant with DIN ISO 8573-1:2010 [4:4:3].



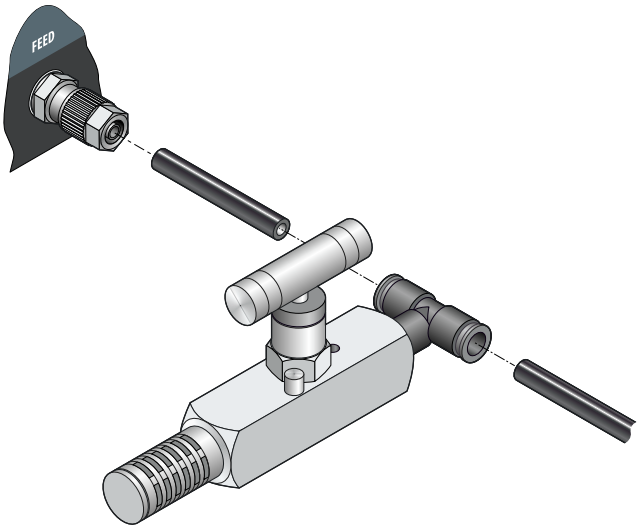
Package pressure release valve

When testing packages with very large volumes, it can be very time consuming to ventilate the package through the device after the test. In these cases, we recommend using the pressure release valve, which must be fitted in the "FEED" line between the package and the appliance.

The valve also makes it possible to ventilate packages that do not burst in connection with a "Burst"- or "Creep" test.

The valve is fitted with a noise filter.

NOTE! When using the pressure release valve, the "Ventilation" parameter must be set to "Off" or "Manual" in the appropriate test definition.



Tube adapter

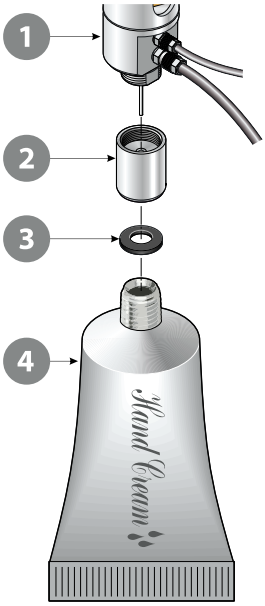
A tube adapter can be used to test tubes with threaded closures.

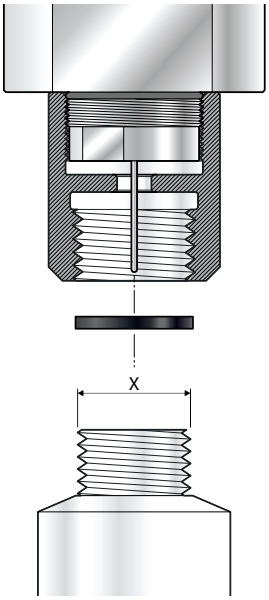
As there is a large number of tubes with different types of threads (X), the adapter should normally be custom made for the specific type of tube.

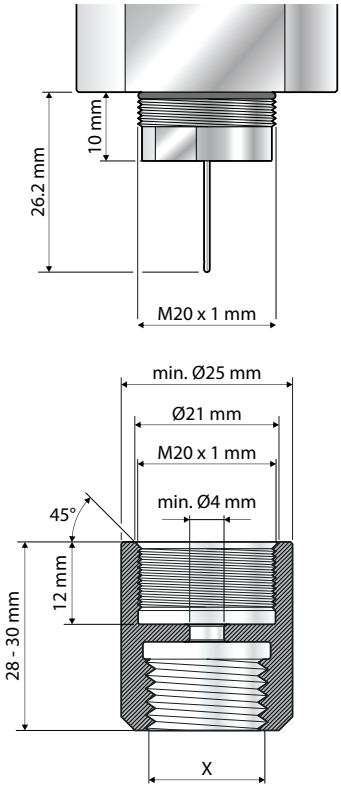
The illustration shows how an adapter ❶ can be used to connect the tube ❷ to the test head ❸. We recommend to use a rubber gasket ❹ (1.5 - 2 mm thick) to ensure optimal tightness.

The illustration shows the dimensions required for the adapter to fit on the test head.

If you need further information, do not hesitate to contact MOCON Europe A/S.







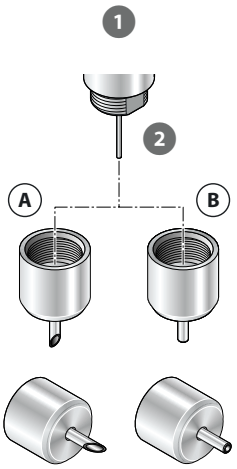
Needles

Needles are used to penetrate and inflate a package with compressed air to perform a test. There are two types of needles:

- Test head needles
- Hand-held needles

Test head needles

The test head needles are designed to be fitted either to the test head used together with the "Basic Stand" and the "Fixture for ASTM restraining" measurement accessories or to the hand-held "Combined" type needle - see *page 33* for details.



Two type of test head needles are available:

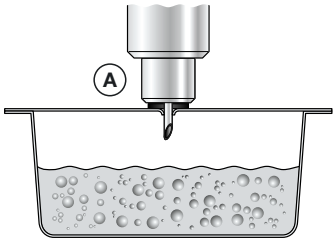
(A) "Sharp" needle

(B) "Blunt" needle

These needles are suitable for almost all types of packages and should be used together with septa (see *page 35*).

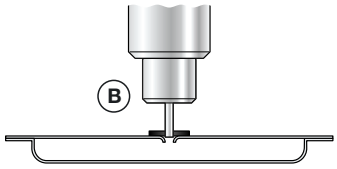
When fitted to the test head 1 the needles fit on the outside of the small needle 2 which is used for pressure measurement.

The "Sharp" needle **(A)** can pierce the package by itself and is primarily used for packages providing enough headspace to pierce the package without damaging the bottom of the package or touching any product that might be present in the package.



Press the needle through the hole in the septum and into the package making sure that the needle is fully seated onto the septum.

The "Blunt" needle **(B)** is recommended for slim packages in order to avoid undesired damage to the underside of the package.

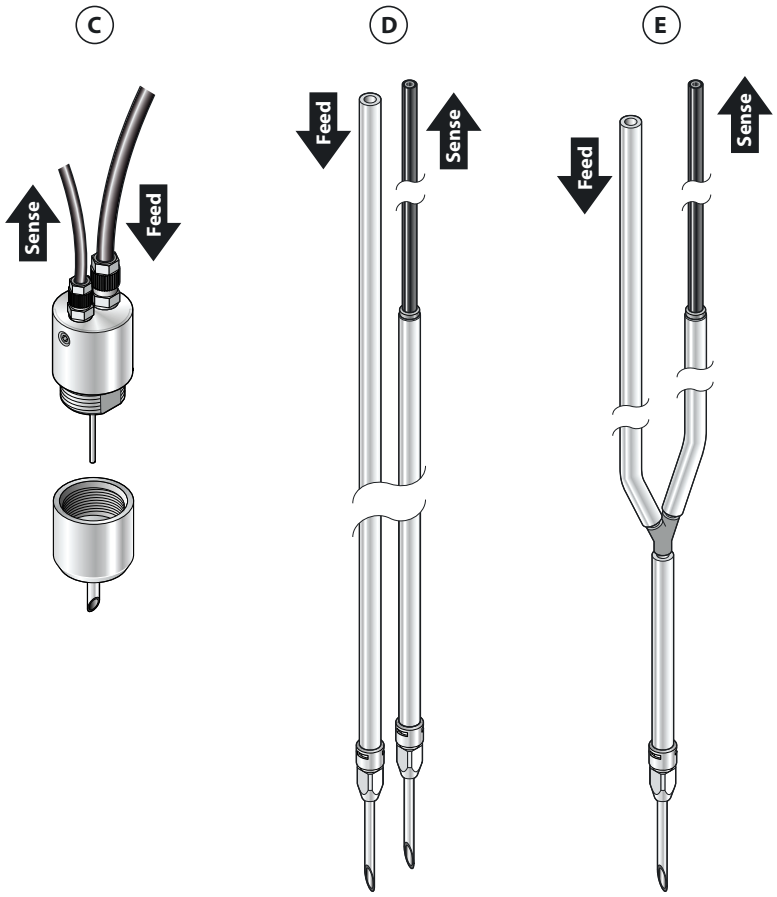


When using the "Blunt" needle **(B)**, first make a small hole with ex. a knife. Hole must be large enough to let air move freely into the package. Place a black septum over the hole and insert the needle into the septum. Preferably the needle should be slightly inside the package.

Hand-held needles

The hand-held needles can be used independently of any other accessory and are connected directly to the device.

The hand-held needles are used for the same applications as the corresponding test head needles as described on *page 32*.



There are 4 types of hand-held needles:

(C) Combined

The most versatile type of needle for most applications, where a hand-held needle is to be used.

This option gives you more control when placing the needle into the package, but provides the same precise measurements as the stand-mounted test head, as the sensor measures inside the package.

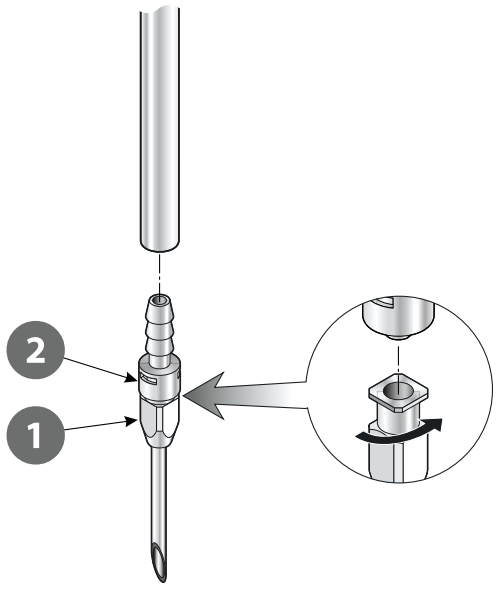
NOTE! <u>Not</u> recommended for Bubble test (submersion) or high pressure tests.

If it turns out that this type of needle cannot provide enough air to perform a test, you can use the needle type **(D)** instead.

(D)	**Separate Feed and Sense**	Ideal for very large packages, large packages with multi-compartment designs and multi-port IV bags. Recommended for Bubble tests on large packages.
(E)	**Mono (with Y-piece)**	Ideal for small packages where there is no room for dual needles or a bulky test head. Can be combined with different size needle-heads (incl. smaller than 4 mm) and hose lengths. **NOTE! Recommended for Bubble tests but <u>not</u> recommended for fast fill or high accuracy measurements.**

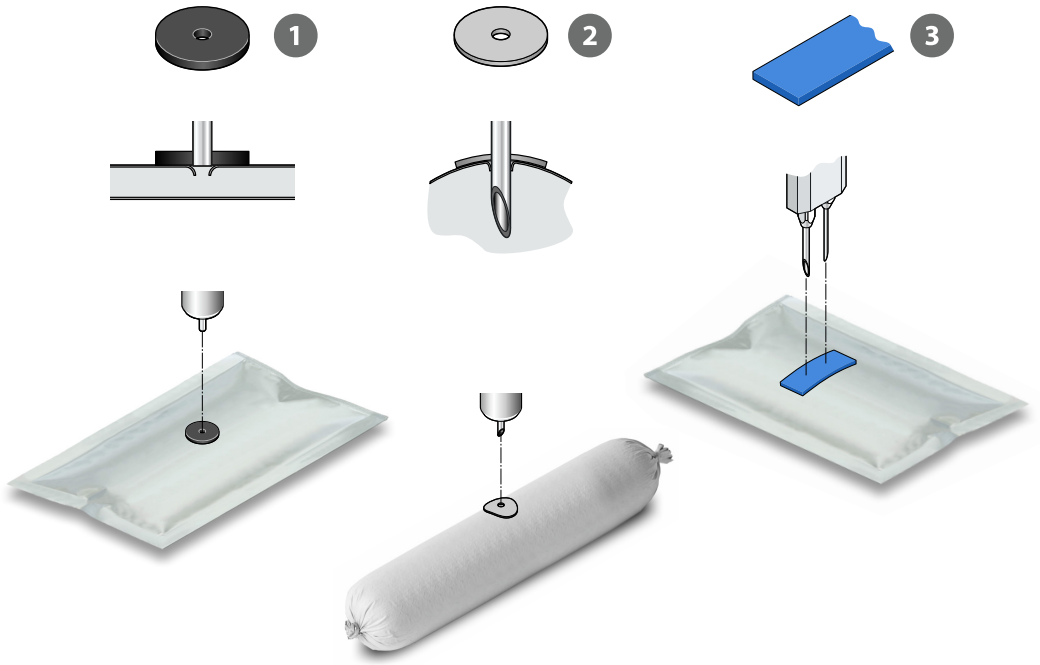
NOTE! Contact your application specialist for correct selection of needles.

A needle ❶ is assembled with a hose connector ❷ by pushing the needle into the connector while turning it approx. 1/3 of a round.



Septa

In order to ensure a linear pressure increase in the package and to avoid unnecessarily high consumption of air it is necessary to seal the package's piercing point with a septum.
A septum also protects the package from tearing at the piercing point.



Three types of septa are available:

1	**Ø21/Ø3x3 mm, black**	Besides being the most all-round septa, it is especially recommended for testing flat packages, as the thicker rubber material allows for the **Blunt** mono needle to be used. This needle head provides good sealing without requiring penetration of the needle tip into the interior of the package - see *"Needles" on page 32* for details.
2	**Ø21/Ø3x1 mm, grey**	As this septum is only 1 mm thick it is very flexible, which makes it especially suited for packages that become round when inflated.
3	**20x1 mm, blue (roll)**	The blue septum is used for needles with other diameters than 4 mm, e.g. for small packages that can't fit a regular black 1 or grey 2 septum or with twin head needles. It comes in a roll and you cut off the length you need.

When choosing a piercing point on a package you should avoid seams and areas with labels and adhesives. The package should, if anyway possible, be pierced in the middle in order to ensure that the package inflates evenly.

2. Tests

Test types

Standard tests

The following standard tests can be performed:

- **Burst Test/Seal Strength (ASTM F2054) – see *page 39***
- **Leak Test/Pressure Loss (ASTM F2095) – see *page 43***

NOTE! If you want to upgrade your device with one or more of the test options below, please contact your service provider.

Creep tests

When the **Creep Test** option has been purchased, a **Creep** test or a **Creep2Fail** test can be performed according to ASTM F1140. The creep test evaluates the strength of the seal on a package.

- **Creep test – see *page 45***
- **Creep2Fail test – see *page 48***

Combined testing

(Only available with the PC Software)

When the **Combined Tests** option has been purchased (requires the **Creep Test** option), the **Creep**, **Leak** and **Burst** tests can be combined in various ways and performed as a single test. The results of each individual test will be reported at the end of the test sequence. Combined testing can simplify operator setup and reduce the number test samples required.

The following combined tests can be performed:

- **Combined Leak/Creep**
- **Combined Leak/Burst**
- **Combined Creep/Burst**
- **Combined Leak/Creep/Burst**

Bubble test

When the **Bubble Test** option has been purchased a bubble test can be performed according to ASTM 2096.
The test can be used to see where a leak is placed or to check the barrier of for example a Tyvek package - see *page 51* for details.

Test values

Testing of a new type of package always starts with finding the approximate “Burst” pressure of the package as this pressure is the basis for all other tests.
The “Burst” reference pressure is found by trial and error and when an approximate reference value has been found, the test is repeated 10-15 times to check whether stable test results are achieved using this value.

Burst test

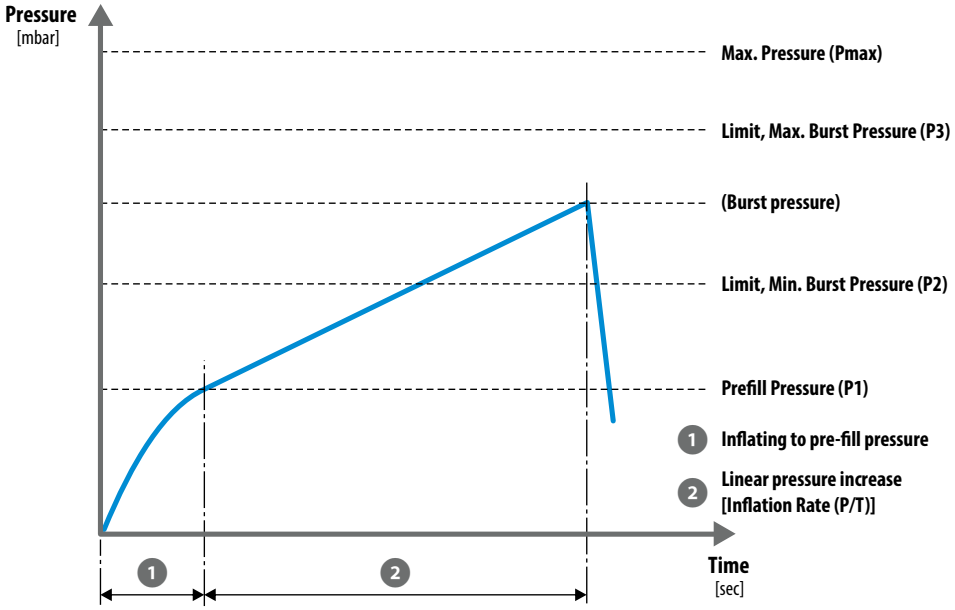
A **Burst** test checks the strength of a package sealing by increasing the pressure in the package until it bursts. The **Burst** test is compliant with ASTM F2054.

CAUTION! As the bursting of the test package may lead to considerable noise, we recommend wearing hearing protection.

NOTE! When testing filled packages, precautions may be necessary to ensure that the product does not contaminate the operator or the system. Depending on the package contents, the use of safety glasses may be advisable. A protective hood placed over the package may offer additional protection.

A **Burst** test is divided into 2 phases:

1. The package is inflated to the set pre-fill pressure.
2. The pressure in the package is increased at the pre-set rate until the package bursts or until the maximum specified pressure is reached.



The results from the **Burst** test are:

- **Measured burst pressure** (if the package bursts).
- **PASS** - if the package bursts within the pre-set burst limits.
- **FAIL** - if the package bursts outside the pre-set burst limits or does not burst at all.

CAUTION! If the package did not burst, it is still under pressure! Stop the test and then remove the package carefully; a sudden pressure drop will occur when it is removed.

Measurement accessory kits

The following measurement accessory kits can be used for a **Burst** test:

- **Stand, basic** (with any test head and needle or tube adaptor, with or without filter)
- **Fixture f. ASTM restraining** (with any test head and needle or tube adaptor, with or without filter)
- **PPC 300 II** (with or without restraining plate)
- **Tube adapter**
- **IV-Bag adapter**
- **Valve Test Unit (VTU)**
- **Hand-held needle, combined**
- **Hand-held needle, mono**
- **Hand-held needle, separate Feed and Sense**

Burst test settings

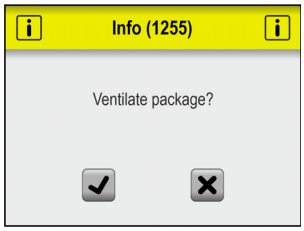
For remote controlled devices using the PC software, the test parameters are set in the PC program.

For a stand-alone device the parameters are set on the device itself - see *"Test Definitions" on page 88* for details.

A **Burst** test is defined using the following parameters:

Parameters marked with an asterisk (*) are the only parameters that can be changed, when test definition has already been used for testing and if the parameter ***Settings -> Device -> Lock Test*** *has been enabled.*

Name	A unique test definition name (up to 30 characters).
Product ID	Test definition identification code (up to 20 characters).
Standard Test *	If set to **No**, the test definition is not available for the **Standard Test Operator**. Test definition will still be available for an **Operator** and **Supervisor**.
State	Only used if **Use State Mark** is enabled in **Settings -> Device.** Can be used by a **Supervisor** to categorize the various test definitions in the test definition list: **New** — Automatically assigned to new test definitions. Can for example be used for test definitions where settings are still being considered/ tested. **Current** — Typically used for test definitions that have been approved for use. This category of test definitions are the only test definitions available to the **Standard Test Operator** (provided that the **Standard Test** option is set to **Yes**).

	Old	Can for example be used for discontinued test definitions or test definitions that should not be used for a period.
Ventilation *	This parameter defines how the pressure should be released from a package after a test:	
	Off	The package will not be ventilated through the device. Instead you should use the optional package pressure release valve - see *"Package pressure release valve" on page 30* for details.
	Auto	The package is always ventilated through the device. This setting should only be used for small packages as it will be very time consuming to ventilate larger packages this way. **CAUTION! Never use this setting for "Bubble" tests or when there is a product in the package.**
	Manual	After a test the following message appears:  Press ✓ to ventilate the package through the device or press ✗ to ventilate the package manually e.g. by pulling the needle out of the package. You can also ventilate the package by using the optional package pressure release valve - see *"Package pressure release valve" on page 30* for details. **CAUTION! "Bubble" test packages and large volume packages should always be ventilated manually.**
Package Type	Select the type of package to be tested: **Normal, Porous** (e.g. Tyvek) or **VTU.** The current setting is indicated with an icon on the test screen - see *"The Test screen" on page 61* for details.	

Package Connection	Select whether or not testing will be performed with combined or separate Feed- and Sense needles. - Select “Combined Feed/Sense” if you are using the test head or the “Combined” type hand-held needle. - Select “Separate Feed/Sense” for all other types of needles and accessories. The current setting is indicated with an icon on the test screen - see *"The Test screen" on page 61* for details.
Package Volume (Vol.)	Headspace volume for a filled package.
Prefill Pressure (P1)	If a package for example changes shape when it is filled, then set the pre-fill pressure so that this will happen during the pre-fill time. This avoids false burst detections.
Max. Pressure (Pmax)	The maximum pressure the package is filled to. If the package does not burst, the test is stopped when the max. pressure is reached.
Limit, Min. Burst Pressure (P2)	Lower limit for an approved test. The package should burst above this limit.
Limit, Max. Burst Pressure (P3)	Upper limit for an approved test. The package should burst below this limit.
Inflation Rate (P/T)	Linear pressure increase rate from when pre-fill pressure is reached until the package bursts or the max. pressure is reached.
Burst Detection Limit (L)	If a package for some reason expands suddenly during the test, this will result in a pressure drop that could be mistaken for a burst of the package. Use this parameter to specify the max. accepted pressure drop.
Custom Fields *	Select if one or more of the 4 custom fields are required for the current workflow - see *"Custom Fields" on page 95* for details.

Leak test

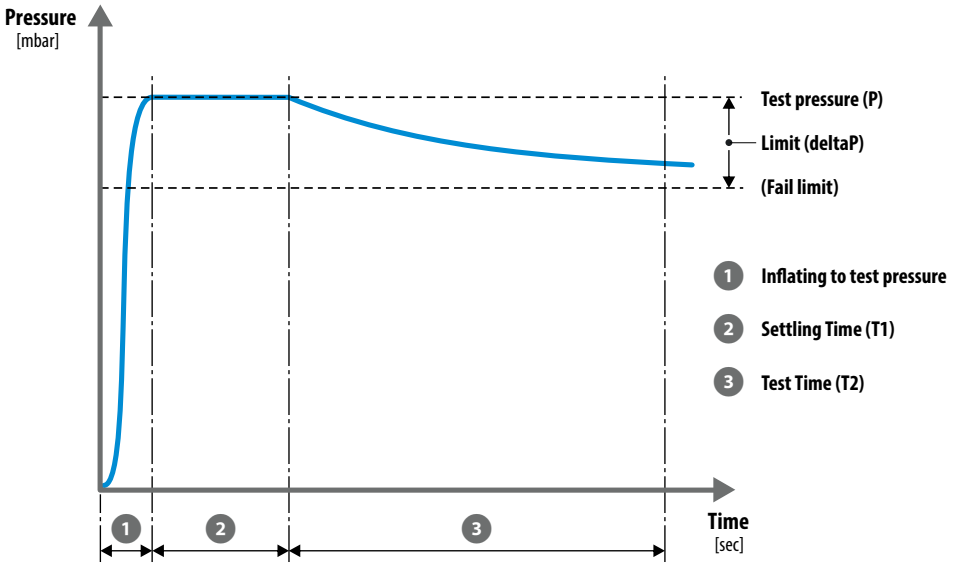
A **Leak** test checks a package for leaks. The package is inflated to a predetermined pressure (about 30-50% of the package's burst pressure) and then the pressure loss is monitored to determine whether or not there is a leak. The **Leak** test is compliant with ASTM F2095.

CAUTION! During a Leak test the package will normally not burst and so the pressure in the package may not drop to a low level immediately after the test.

NOTE! When testing filled packages, precautions may be necessary to ensure that the product does not contaminate the operator or the system. Depending on the package contents, the use of safety glasses may be advisable. A protective hood placed over the package may offer additional protection.

A **Leak** test is divided into 3 phases:

1. The package is inflated to the test pressure.
2. The test pressure is maintained and stabilised.
3. Pressure regulation stops and valves are closed. The pressure drop is measured during the test time. The test passes if the pressure drop is below setting and fails if pressure drop is larger than setting.



The results from the **Leak** test are:

- **Pressure drop**
- **PASS** - if the pressure drops less than allowed.
- **FAIL** - if the pressure drops more than allowed or if package bursts.

Measurement accessory kits

The following measurement accessory kits can be used for a **Leak** test:

- **Stand, basic** (with any test head and needle or tube adaptor, with or without filter)
- **Fixture f. ASTM restraining** (with any test head and needle or tube adaptor, with or without filter)
- **Tube adapter**
- **IV-Bag adapter**
- **Valve Test Unit (VTU)**
- **Hand-held needle, combined**
- **Hand-held needle, mono**
- **Hand-held needle, separate Feed and Sense**

Leak test settings

For remote controlled devices using the PC software, the test parameters are set in the PC program.

For a stand-alone device the parameters are set on the device itself - see *"Test Definitions" on page 88* for details.

A **Leak** test is defined using the following parameters:

Parameters marked with an asterisk (*) are the only parameters that can be changed, when test definition has already been used for testing and if the parameter ***Settings -> Device -> Lock Test*** *has been enabled.*

Name	See explanation in *"Burst test settings" on page 40*.
Product ID	
Standard Test *	
State	
Ventilation *	
Package Connection	
Package Volume (Vol.)	
Test Pressure (P)	Pressure at which the test is performed.
Settling Time (T1)	The period of time where test pressure is maintained and stabilised to ensure a stable start for the leak test.
Test Time (T2)	The period of time where the actual leak test is performed. The pressure is not regulated during the test time.
Limit (ΔP)	The maximum allowed pressure drop during the leak test.
Test Speed (S)	If for some reason a package is difficult to fill, you can lower the test speed to increase the fill time. Setting the test speed to 50% will double the total fill time.
Custom Fields *	Select if one or more of the 4 custom fields are required for the current workflow - see *"Custom Fields" on page 95* for details.

Creep test

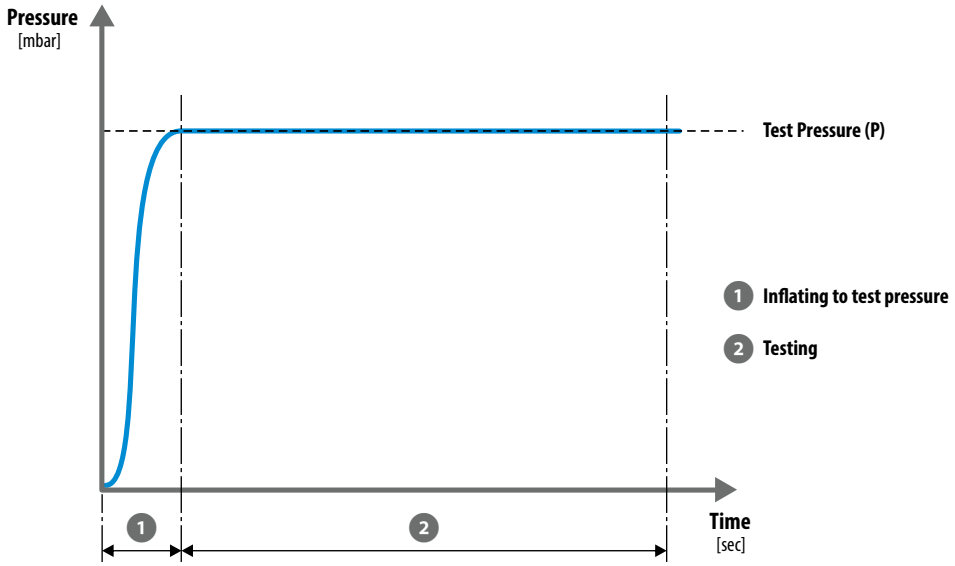
A **Creep** test can be used to identify the weakest area of a package and thereby the possible origination point of a package burst. A **Creep** test inflates the package to a specific pressure (typically approx. 80% of the burst pressure) and maintains this pressure for a specified time period. The package passes the test if it does not burst during the test. The **Creep** test complies with ASTM F1140.

CAUTION! It is possible that the package will burst during a Creep test. Please note that the pressure may not drop to a low level immediately after the test.

NOTE! When testing filled packages, precautions may be necessary to ensure that the product does not contaminate the operator or the system. Depending on the package contents, the use of safety glasses may be advisable. A protective hood placed over the package may offer additional protection.

A **Creep** test is divided into 2 phases:

1. The package is inflated to the test pressure.
2. The test pressure is maintained for a fixed period of time.



The results from the **Creep** test are:

- **PASS** - if the package does not burst.
- **FAIL** - if the package bursts.

CAUTION! If the package did not burst, it is still under pressure! Remove the package carefully; a sudden pressure drop will occur when it is removed.

Measurement accessory kits

The following measurement accessory kits can be used for a **Creep** test:

- **Stand, basic** (with any test head and needle or tube adaptor, with or without filter)
- **Fixture f. ASTM restraining** (with any test head and needle or tube adaptor, with or without filter)
- **PPC 300 II** (with or without restraining plate)
- **Tube adapter**
- **IV-Bag adapter**
- **Valve Test Unit (VTU)**
- **Hand-held needle, combined**
- **Hand-held needle, mono**
- **Hand-held needle, separate Feed and Sense**

Creep test settings

For remote controlled devices using the PC software, the test parameters are set in the PC program.

For a stand-alone device the parameters are set on the device itself - see *"Test Definitions" on page 88* for details.

A **Creep** test is defined using the following parameters:

Parameters marked with an asterisk (*) are the only parameters that can be changed, when test definition has already been used for testing and if the parameter ***Settings -> Device -> Lock Test*** *has been enabled.*

Name	See explanation in *"Burst test settings" on page 40*.
Product ID	
Standard Test *	
State	
Ventilation *	
Package Type	
Package Connection	
Package Volume (Vol.)	
Test Pressure (P)	Pressure at which the test is performed.
Test Time (T)	The period of time where the actual creep test is performed. The test pressure is maintained.
Burst Detection Limit (L)	If a package for some reason expands suddenly during the test, this will result in a pressure drop that could be mistaken for a burst of the package. Use this parameter to specify the max. accepted pressure drop.
Test Speed (S)	If for some reason a package is difficult to fill, you can lower the test speed to increase the fill time. Setting the test speed to 50% will double the total fill time.

Custom Fields *	Select if one or more of the 4 custom fields are required for the current workflow - see *"Custom Fields" on page 95* for details.

Creep2Fail test

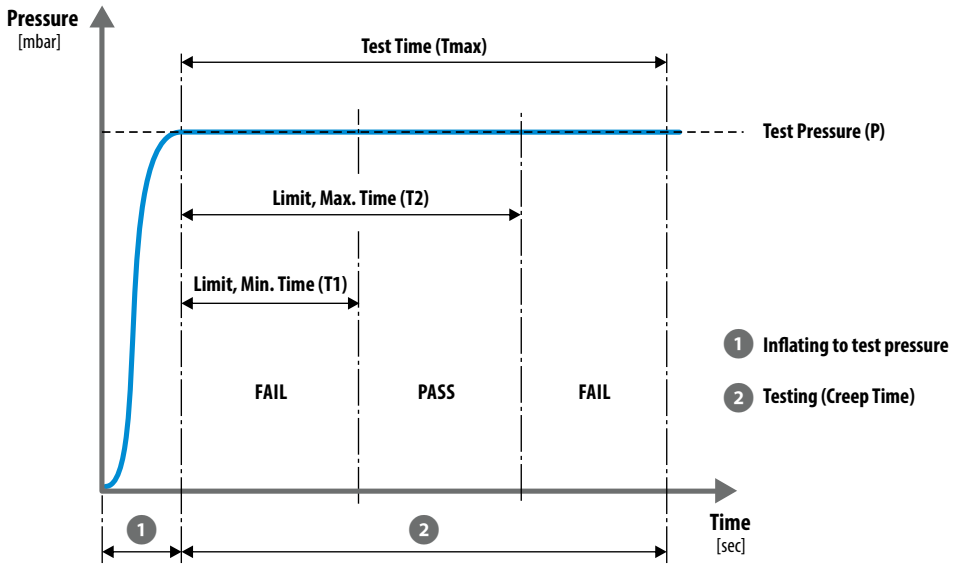
The **Creep2Fail** is test is similar to the **Creep** test, but it uses a test pressure between 95%-100% of the burst pressure. The test pressure should be high enough to cause a slow but progressive failure during the specified test time. The **Creep2Fail** test is compliant with ASTM F1140.

CAUTION! It is possible that the package will burst during a Creep2Fail test. Please note that the pressure may not drop to a low level immediately after the test.

NOTE! When testing filled packages, precautions may be necessary to ensure that the product does not contaminate the operator or the system. Depending on the package contents, the use of safety glasses may be advisable. A protective hood placed over the package may offer additional protection.

A **Creep2Fail** test is divided into 2 phases:

1. The package is inflated to the test pressure.
2. The test pressure is maintained for a fixed period of time.



The results from the **Creep2Fail** test are:

- **PASS** - if the package bursts within the set time limits.
- **FAIL** - if the package bursts outside the set time limits or does not burst at all.

CAUTION! If the package did not burst, it is still under pressure! Stop the test and then remove the package carefully; a sudden pressure drop will occur when it is removed.

Measurement accessory kits

The following measurement accessory kits can be used for a **Creep2Fail** test:

- **Stand, basic** (with any test head and needle or tube adaptor, with or without filter)
- **Fixture f. ASTM restraining** (with any test head and needle or tube adaptor, with or without filter)
- **PPC 300 II** (with or without restraining plate)
- **Tube adapter**
- **IV-Bag adapter**
- **Valve Test Unit (VTU)**
- **Hand-held needle, mono**
- **Hand-held needle, separate Feed and Sense**

Creep2Fail test settings

For remote controlled devices using the PC software, the test parameters are set in the PC program.

For a stand-alone device the parameters are set on the device itself - see *"Test Definitions" on page 88* for details.

A **Creep2Fail** test is defined using the following parameters:

Parameters marked with an asterisk (*) are the only parameters that can be changed, when test definition has already been used for testing and if the parameter ***Settings -> Device -> Lock Test*** *has been enabled.*

Name	See explanation in *"Burst test settings" on page 40*.
Product ID	
Standard Test *	
State	
Ventilation *	
Package Type	
Package Connection	
Package Volume (Vol.)	
Test Pressure (P)	Pressure at which the test is performed.
Test Time (Tmax)	The period of time where the actual creep test is performed. The test pressure is maintained.
Limit, Min. Time (T1)	Lower time limit. The package should burst after this time.
Limit, Max. Time (T2)	Upper time limit. The package should burst before this time.
Burst Detection Limit (L)	If a package for some reason expands suddenly during the test, this will result in a pressure drop that could be mistaken for a burst of the package. Use this parameter to specify the max. accepted pressure drop.

Test Speed (S)	If for some reason a package is difficult to fill, you can lower the test speed to increase the fill time. Setting the test speed to 50% will double the total fill time.
Custom Fields *	Select if one or more of the 4 custom fields are required for the current workflow - see *"Custom Fields" on page 95* for details.

Bubble test

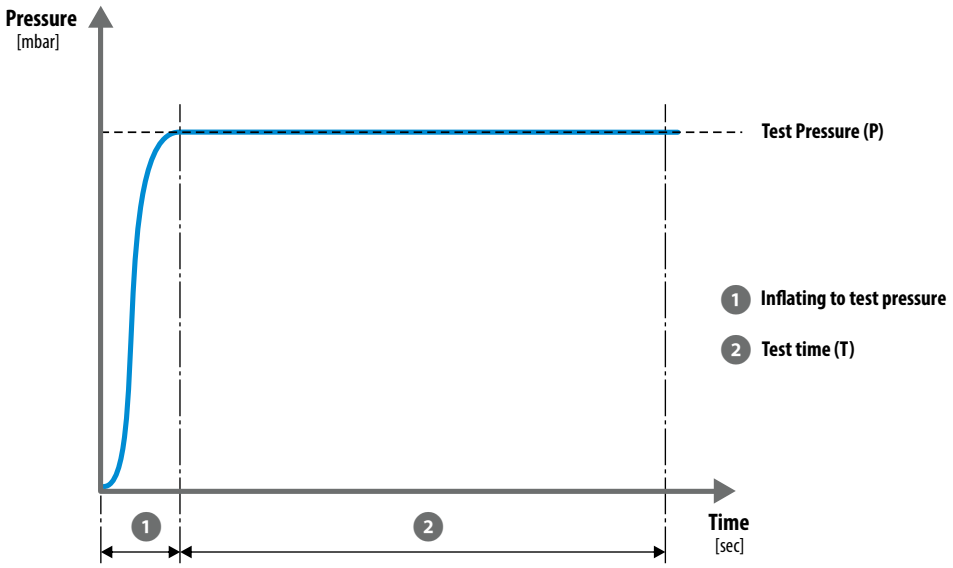
The **Bubble** test has two purposes; one is to locate the placement of a hole in a package. To do this place the package (with septum and needle) under water.
Secondly you can test for example that a Tyvek package functions as intended, meaning that it only leaks within a specific pressure range. This test also requires for the package to be under water.
A **Bubble** test inflates the package to a specific pressure and maintains this pressure for a specified time period. The **Bubble** test is compliant with ASTM F2096.

CAUTION! It is possible that the package will burst during a Bubble test. Please note that the pressure may not drop to a low level immediately after the test.

NOTE! When testing filled packages, precautions may be necessary to ensure that the product does not contaminate the operator or the system. Depending on the package contents, the use of safety glasses may be advisable. A protective hood placed over the package may offer additional protection.

A **Bubble** test is divided into 2 phases:

1. The package is inflated to the test pressure.
2. The test pressure is maintained for a fixed period of time.



When test ends you must select whether the test was passed or not.

CAUTION! If the package did not burst, it is still under pressure! Remove the package carefully; a sudden pressure drop will occur when it is removed.

Measurement accessory kits

The following measurement accessory kits can be used for a **Bubble** test:

- **Stand, basic** (with any test head and needle or tube adaptor, with or without filter)
- **Tube adapter**
- **IV-Bag adapter**
- **Hand-held, needle, mono**
- **Hand-held needle, separate Feed and Sense**

Bubble test settings

For remote controlled devices using the PC software, the test parameters are set in the PC program.

For a stand-alone device the parameters are set on the device itself - see *"Test Definitions" on page 88* for details.

A **Bubble** test is defined using the following parameters:

Parameters marked with an asterisk (*) are the only parameters that can be changed, when test definition has already been used for testing and if the parameter ***Settings -> Device -> Lock Test*** *has been enabled.*

Name **Product ID** **Standard Test** * **State** **Ventilation** * **Package Type** **Package Connection** **Package Volume (Vol.)**	See explanation in *"Burst test settings" on page 40*.
Test Pressure (P)	Pressure at which the test is performed.
Test Time (T)	The period of time where the actual test is performed. The test pressure is maintained.
Burst Detection Limit (L)	If a package for some reason expands suddenly during a test, this will result in a pressure drop that could be mistaken for a burst of the package. Use this parameter to specify the max. accepted pressure drop.
Test Speed (S)	If for some reason a package is difficult to fill, you can lower the test speed to increase the fill time. Setting the test speed to e.g. 50% will double the total fill time.
Custom Fields *	Select if one or more of the 4 custom fields are required for the current workflow - see *"Custom Fields" on page 95* for details.

3. Setting Up

NOTE! The device and the various accessories must be placed on an even, steady, and horizontal surface with sufficient working area for the type of packages to be tested.

Compressed air connections

Compressed air supply requirements

The compressed air supply must be dry, clean and free from oil - see specifications in *"Compressed air supply" on page 124*.

We recommend to use our optional pressure regulator/filter unit which ensures that the air quality fulfills the required specifications - see *"Pressure Regulator with filters" on page 30* for details.

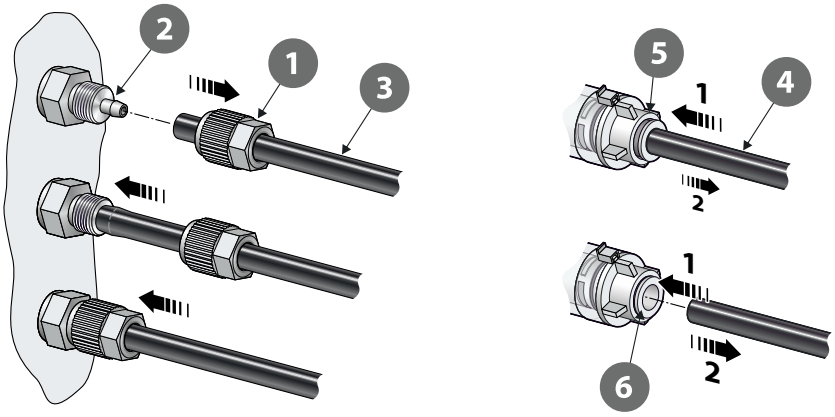
NOTE! The above regulator/filter unit does not ensure that the air is dry and therefore it is recommended to install a type of air-drying unit as well.

NOTE! If the air supply pressure is below or above the specified input pressure, the system may not function as intended.

CAUTION! If the specified maximum pressure is exceeded, there is a danger of bursting of tubing and other components.

Correct use of hose connectors

Follow procedures below to ensure correct and tight hose connections:



Connectors with union nut

1. Unscrew the union nut 1 from the hose connector 2 and slide it onto the hose 3.
2. Press the hose 3 onto the hose connector 2 as far as it goes.
3. Finally slide the union nut 1 onto the hose connector 2 and tighten properly.

Push-in connectors

1. Push the hose 4 into the fitting 5 as far as it goes. Check the connection by pulling the hose slightly outwards.
2. To disconnect the hose, push down on the sleeve 6 to release the hose, then pull the hose out of the connector.

Connecting hoses and cables

CAUTION! Make sure to place the device so that it is possible to easily switch off the power to the unit, either by means of the ON/OFF switch or by disconnecting the power supply from the device.

1. Connect the compressed air supply 1 to the "AIR SUPPLY" inlet connector - see *"Compressed air supply" on page 124* for details.

   NOTE! Make sure that the hose between the device and the pressure regulator is max. 1m, otherwise you must compensate for the pressure drop in the hose.

   CAUTION! When connecting the hose, make sure that it can not be squeezed or blocked in any way.

2. Connect the Ø6/4 mm hose 2 from the accessory to the "FEED" outlet connector.
3. Connect the Ø4/2.7 mm hose 3 from the accessory to the "SENSE" inlet connector.

NOTE! The hoses from the connected accessory should be used as they are at delivery and thus neither be shortened nor lengthened.

NOTE! Check to ensure that all hoses are firmly and tightly connected. Please use the union nuts provided with the system. This will help ensure that all the connections are safe and leak free - see *"Correct use of hose connectors" on page 54*.

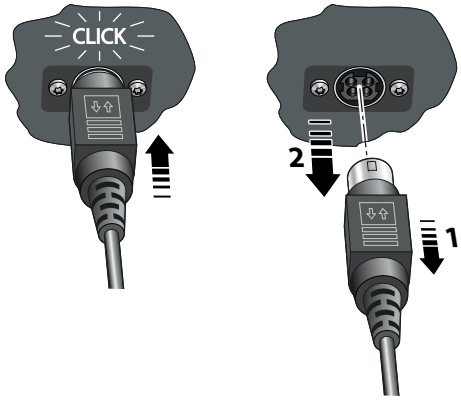
4. Connect the noise filter (4) to the "EXHAUST" outlet connector.

CAUTION! Filter should only be hand tightened - do not use any tools.

5. Connect the power cable (5) with the provided power supply between a suitable power outlet and the device's "POWER SUPPLY" connector.

CAUTION! Always use the power supply that comes with the device.

Make sure that the connector clicks into the socket. When disconnecting the cable, pull the collar backwards to unlock the plug, then disconnect it.



6. If you plan on using network data logging, you should connect a LAN/Ethernet cable (6) from the LAN connector (labelled) to a connector on your local area network. This cable is not delivered with the device.

NOTE! Use shielded cables for optimal noise immunity.

NOTE! Always consult your network administrator before making network settings, as incorrect settings can result in reduced or no network activity.

7. If you will be using the device together with the PC Software you should connect a USB cable (7) from the USB connector (labelled) to a USB connector on the PC. This cable is not delivered with the device.
8. The USB connector (labelled) can be used for connecting a USB memory stick (8) for exporting/importing log data, device settings etc. and for connection of a bar-code scanner, a printer or a keyboard - see also *"Connecting multiple USB devices" on page 71*.

4. Operating

Basics

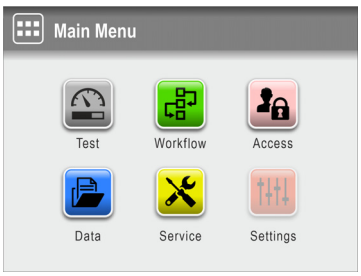
CAUTION! If the device has been stored in a cold location and then moved to a warmer location then at least one hour of acclimatization is required before switching on the unit.
If operated in a cold and high humidity environment it is advisable to let the device heat up for 30 minutes after is has been switched on.

NOTE! Up to 10 minutes of heating time after power on is required before measurements can be performed.

Switching on/off

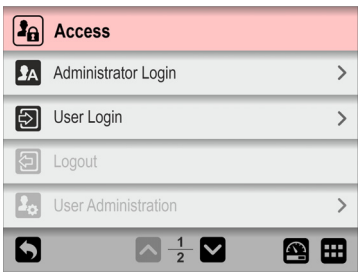
1. Use the "ON/OFF" button on the back of the device to switch the device on and off.
2. When the device is switched on, the display will show the start-up screen, indicating the device model and the currently installed firmware version (1).

3. When the device is ready and if no login is required, the display will show the **Main Menu**:

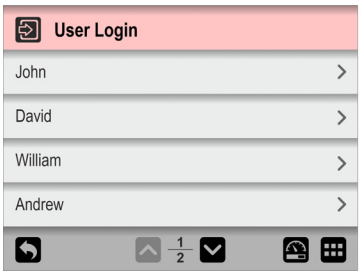


Current user is the default **Operator**.

4. If, however, login is required the **Access** menu appears.

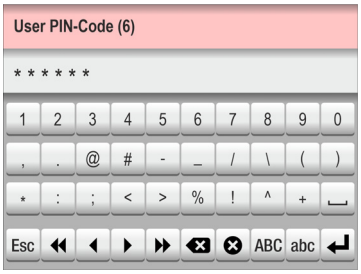


5. Select **User Login**...

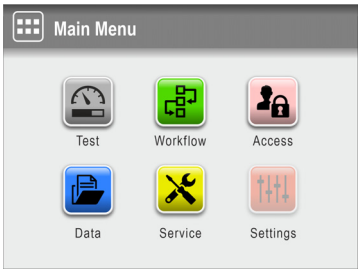


...and then either select a user from the **User Login** list or enter a valid **User ID** whatever is required.

6. If login with PIN-code is required (see *page 120*), enter the **User PIN-Code** for the selected user or user associated with the **User ID**.



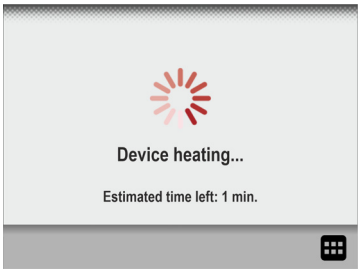
7. When you are properly logged in, the display will show the **Main Menu**:



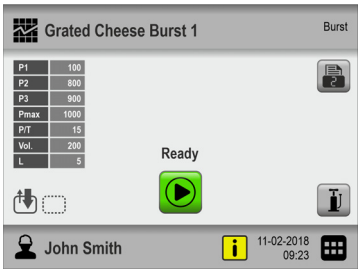
Current user is as selected during login with the access level as specified for this user.

8. To go to the test screen to start a test press **Test** button.

9. The device will start a warm-up cycle...



... and when finished the display changes to show the test screen.



10. Now the device is ready to start a test.

Touch screen

Except for the ON/OFF button on the back of the device, all the buttons you use are virtual ones on the touch screen.

CAUTION! The touch screen should only be finger touch operated. Pencils or metal tools can damage the touch sensitive film.

Login and access levels

Different levels of login can be selected, and all users can be assigned different levels of access, some of which only allow access to a limited number of the device's functions and menus - see *"Login" on page 120* and *"Access" on page 97* for details.

Restarting/resetting

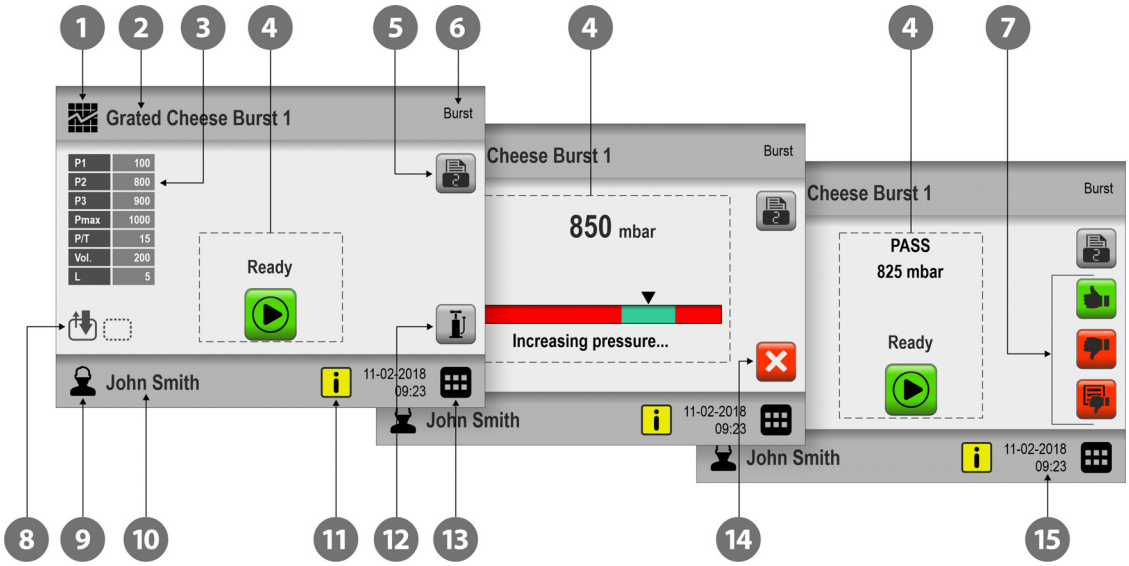
If device freezes or something is not working right, try switching the device off and then on again using the "ON/OFF" button on the back of the device.

Screen-shots

The device offers the ability to take screen-shots of current screens. This can be useful for example in connection with remote support. The screen-shots can be exported to a USB-stick - see *"Export" on page 107* for details.

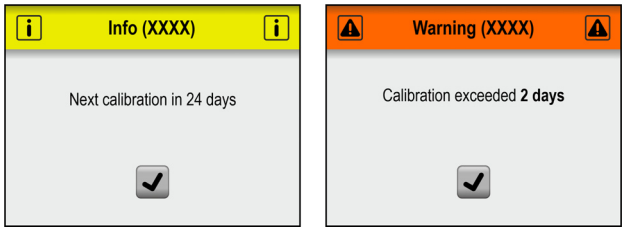
To make a screen-shot, tap 5 times in quick succession on the top part of the screen.

The Test screen



1	**Test Definitions icon**	Pressing this icon will take you to the **Test Definitions** menu for quick selection of a test definition. See *"Selecting a Test definition" on page 74* for details.
2	**Active Test Definition**	Currently selected test definition. To select another test definition, tap **Test Definitions** icon 1.
3	**Test definition settings**	Primary settings for the currently selected test definition.
4	**Status area**	In the status area the workflow status/progress is displayed. See *"Test screen progress bar" on page 64* and *"Display of test results" on page 65* for details.
5	**Print**	All measurement data can be printed continuously on a connected USB-printer - see *"Printer" on page 71* for details. Press the button to edit the required number of print-outs (0-9). The button shows the currently selected number of print-outs.
6	**Test Definition type**	The test definition type for the currently selected test definition.

7	**Acknowledge Measurement buttons**	The buttons appear on the test screen if **Acknowledge Measurement** is enabled in **Main Menu -> Workflow.** Press the appropriate button after performing a test to Validate test Mark test as invalid Mark test as invalid and apply additional comment The choice determines how the test is recorded in the collected data list - see *"Collected data" on page 106* for details.
8	**Icons for Package Connection and Package Type**	The icons show the settings for the **Package Connection** and **Package Type** parameters for the currently selected test definition. **Package Connection** **Separate Feed/Sense** **Combined Feed/Sense** "Combined Feed/Sense" applies if the test head or the "Combined" type hand-held needle is used. "Separate Feed/Sense" applies to all other types of needles and accessories. **Package Type** **Normal** **Porous** **VTU**
9	**User icon**	This icon shows the access level of the current user: **Standard Test Operator** **Operator** **Supervisor** **Administrator** **Service** See *"Access" on page 97* for details about users and access levels. Pressing this icon will log out the current user and take you to the **Access** screen from where you can select another user or login as **Administrator**.
10	**Current user**	Currently selected user. To select another user, press **User** icon 9.

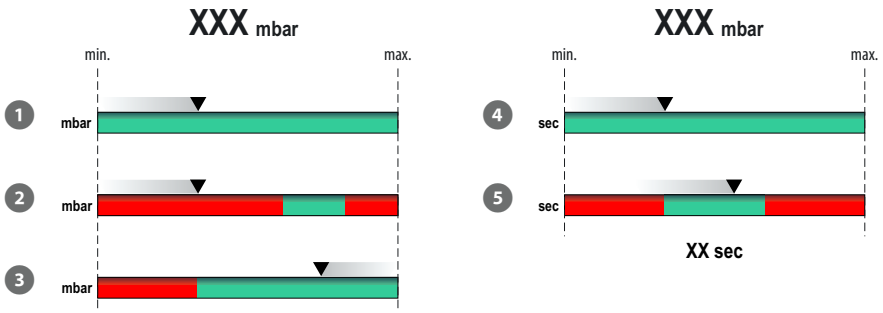
11	**Calibration alert**	Next calibration in 1 - 30 days Calibration period expired/exceeded Pressing the icon displays a pop-up window with information about the calibration alert: 
12	**Manual inflation**	The button only appears on the test screen if **Manual inflation** is enabled in **Main Menu** -> **Workflow** See *"Manual Inflation" on page 77* for details.
13	**Menu icon**	Pressing this icon will take you to the **Main Menu**. See *"Main menu" on page 87* for details.
14	**Abort**	A test can be aborted anytime by pressing this button.
15	**Date & Time**	Current date and time.

Test screen progress bar

The test screen uses a progress bar to offer a better view of the test progression.

The progress bar shows the area of a test definition's min. and max. settings of either pressure or time and a small arrow indicates the current pressure or time. Areas that in the test definition are defined as acceptable values are green and areas that will result in a failed test are red.

The various progress bars show the following:



The bar 1 is used for "Leak", "Creep" and "Bubble" tests and simply shows the pressure build-up in the package.

The bar 2 is used for "Burst" tests and shows the pressure build-up in the package. The green area illustrates the pressure range within which the package is expected to burst.

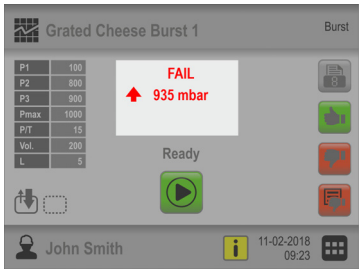
The bar 3 is used for "Leak" tests and shows the pressure loss in the package. If arrow reaches the red area, the leak limit has been exceeded.

The bar 4 is used for "Creep" tests and simply shows the duration of the actual testing.

The bar 5 is used for "Creep2Fail" tests and shows the duration of the actual testing. The green area illustrates the time range within which the package is expected to burst.

Display of test results

When a test terminates, the test result is displayed on the screen.



There are different possible test results depending on the type of test.

The various test results are described below.

Burst test

PASS **825 mbar**	**FAIL** **↓ 775 mbar** **23 sec**	**FAIL** **↑ 935 mbar**	**FAIL** **No Burst**
Package bursts within the specified pressure range	Package bursts below the specified pressure range. Package bursts after 23 sec.	Package bursts above the specified pressure range	Package does not burst

Leak test

PASS **1 mbar**	**FAIL** **↑ 13 mbar** **23 sec**	**FAIL** **Package Burst**
Pressure loss in the package is below the specified leak limit	Pressure loss in the package is above the specified leak limit. Limit is exceeded after 23 sec.	Package bursts

Creep test

PASS No Burst	FAIL ↓ 23 sec
Package does not burst at the specified pressure within the specified pressure test time	Package bursts at or below the specified pressure. Package bursts after 23 sec.

Creep2Fail test

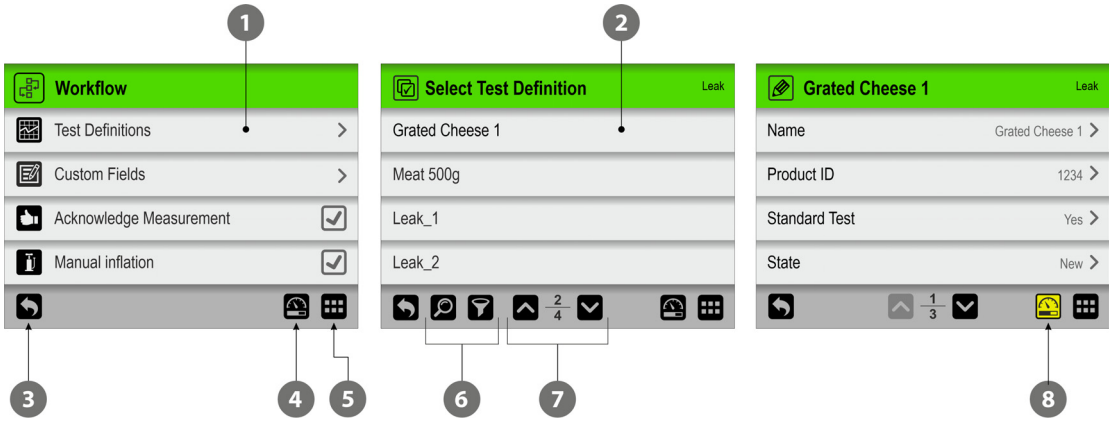
PASS 23 sec	FAIL ↓ 18 sec	FAIL ↑ 36 sec	FAIL No Burst
Package bursts at the specified pressure within the specified time range.	Package bursts at the specified pressure below the specified time range	Package bursts at the specified pressure above the specified time range	Package does not burst

Bubble test

The result of a bubble test is basically determined by seeing if bubbles come out of the package or not. If you want to save the test results in the **Test Log**, this can be achieved by enabling the parameter **Enter Test Result (Bubble Test)** in **Settings -> Device**.
Two buttons will now appear on the test screen with which you can select whether the test is approved or not. Thus, if you press the button, the test result will subsequently be indicated and registered as **PASS**, whereas pressing the button will indicate and register the result as **FAIL**.

Menu navigation

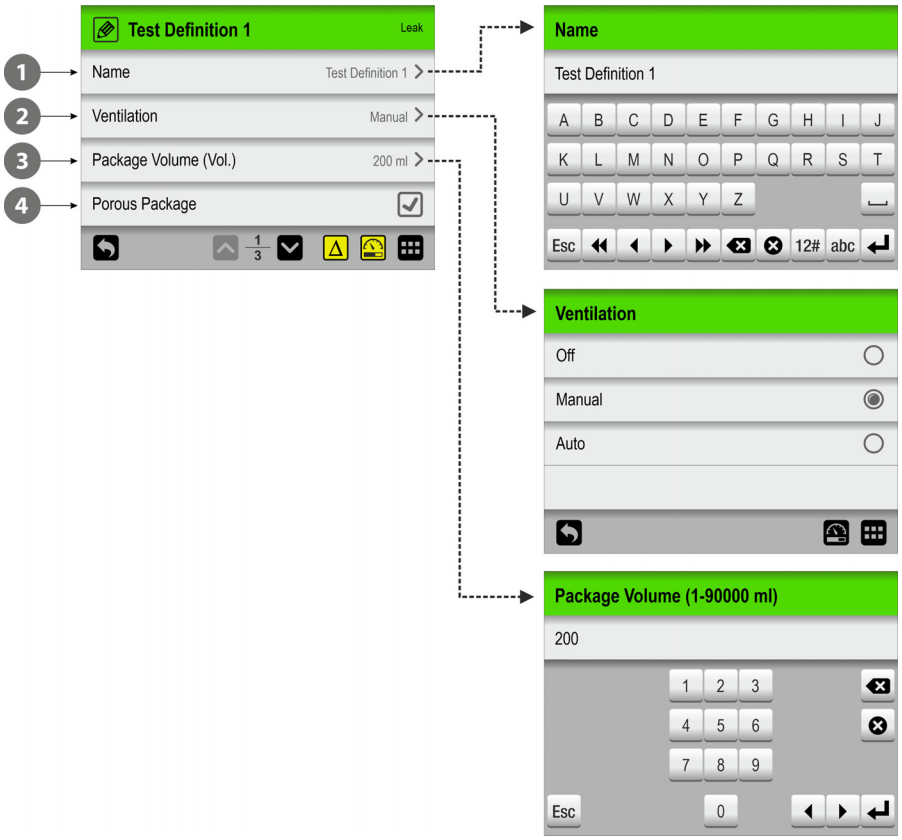
The graphic interface offers various elements for navigating through the menu structure:



1	**Sub-menu**	Open the associated sub-menu.
2	**Open Test Definition**	Select and open a test definition record.
3	**Return icon**	■ Return to the previous menu level. ■ Save editing and return to previous window. ■ When editing test definitions and users, tapping the button will save the edited test definition or user when confirmed.
4	**Test screen icon**	Pressing this icon will take you to the **Test** screen. See *"The Test screen" on page 61* for details.
5	**Main Menu icon**	Pressing this icon will take you to the **Main Menu**. See *"Main menu" on page 87* for details.
6	**Find/Filter icons**	Opens the **Find** and/or **Filter** function - see *"Find and Filter" on page 93* for details.
7	**Scroll/Current page**	Tap icons to scroll through pages in current window. Page indicator shows current page of pages in total.
8	**Test function**	The test function can be used during test definition setup to find the optimal parameters for a specific Test definition.

Parameters

Setting up of test definitions and various device settings involves the following parameter types:



1	**Alphanumeric**	E.g. PIN-codes, Test Definition- and user names. Tap item to open an alphanumeric keyboard to edit/enter text. See *"Typing" on page 69* for details.
2	**Predefined options**	E.g. selection of menu language or pressure unit. Tap item to show list of predefined options.
3	**Numeric**	E.g. pressure- and time settings. Parameter value is numeric and in most cases they can only be set within a predetermined range. Tap item to open a numeric keyboard to edit/enter value.
4	**With check box**	Tap item to enable/disable function (Check/Uncheck)

Typing

An on-screen keyboard appears automatically anytime you need to type. An alphanumeric keyboard appears when you must enter text, such as test definition- or user names while a numeric keyboard appears when typing numerical values only, such as PIN-codes.

In the alphanumeric keyboard you can switch between upper- and lowercase characters, special characters, numbers or symbols, by tapping the appropriate keyboard selection key to the left of the ↵ key.

The ⊗ key deletes all the text whereas the ⌫ key deletes the character to left of the cursor.

The ◀ and ▶ keys move the cursor one character to the left or right respectively, and the ◀◀ and ▶▶ keys make the cursor jump to the beginning or end of the text respectively.

Tapping the ↵ key confirms the input and closes the keyboard, while tapping the Esc key will discard the entered text and exit the keyboard.

Entering accented letters or other alternate characters is done by touching and holding the related key...

...and then selecting the appropriate character from the pop-up list.
Pressing the ⊠ icon will close the pop-up list without typing any character.

It is also possible to use an external keyboard - see *"Keyboard" on page 70* for details.

Keyboard

It is possible to connect an external keyboard, which makes it easier to enter text.
USB keyboards with cable or wireless transmitter can be used.

MOCON Europe A/S does not offer keyboards.

Bar-code scanner

If a bar-code scanner is connected to the device, it can be used to scan bar-codes for test definition and user creation.
The scanner can also be used to scan predefined text strings converted to bar-codes, e.g. for custom field inputs or invalid measurement notes.

Printer

If a printer is connected to the device, it is possible to print a number of copies of the test results.
The print-outs show:

- Test date and current user
- Test Definition name and parameters
- Test result and custom fields and comments (if any)
- Device serial no. and current Firmware version.

See *"Printer" on page 128* for details about compatible printers.

Connecting multiple USB devices

Even if the device has only one USB connection, it is still possible to connect several USB devices at the same time. However, this requires the use of a USB hub, which is available with different numbers of USB connections.

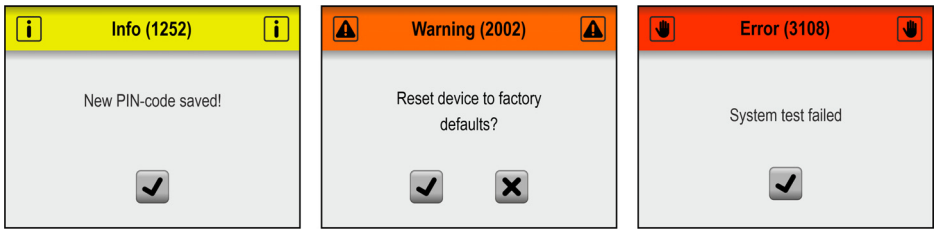
MOCON Europe A/S does not offer USB hubs.

NOTE! Some USB devices (f.ex. bar-code scanners) have a larger power consumption than others, so to ensure that the USB hub can provide the required power supply to all the connected devices, we recommend using a USB hub with a separate power supply.

Pop-up messages

Three types of messages may occur:

- **Info**
- **Warning**
- **Error**



Generally the **Info** and **Warning** messages are self explanatory and relates to user interface interaction. They must be acknowledged by tapping ✓ or by tapping ✓ or ✗ to decide how to proceed.

Error messages are mainly related to the device itself. The **Error** message screen describes the problem and must be acknowledged by tapping ✓.

See *"Error messages" on page 78* for details.

If one or more errors persist you should contact your service provider (see *"Service" on page 108*).
In these cases be sure to inform of the error no. as indicated in the header of the **Error** message screen.
A list of the most recent errors is available in the **Error/Event log** from the **Data** menu - see *"Data" on page 103* for details.

Get started

When you start the device for the first time and before you start making measurements, it is recommended that you perform some basic device settings.

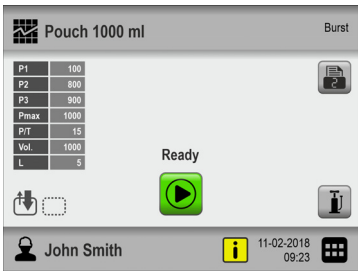
NOTE! To be able to change device settings you must change the device to "Administrator" access level.
To do so select "Access" from the "Main Menu" - see *"Access" on page 97* for details.

- **Device Settings**
  Go through the parameters available in the **Settings** menu and make appropriate settings - see *"Settings" on page 115* for details.
- **Set up Users**
  From the factory no default users have been created, but we highly recommend that you create specific users, so that you can separate measurements performed by different users later on for use in statistics etc. - see *"Access" on page 97* and *"Login" on page 120* for details.
- **Set up Test Definitions and Workflows**
  From the factory no default Test Definitions have been created, but we highly recommend that you create specific Test Definitions, so that you can separate the different tests later on for use in statistics etc. - see *"Workflow" on page 88* for details.

Testing

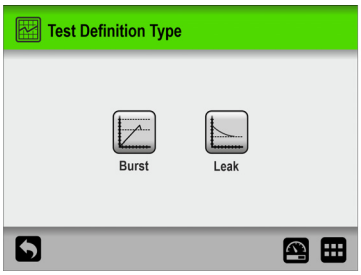
Selecting a Test definition

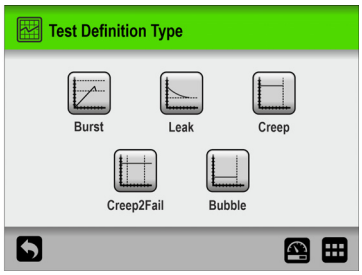
1. In the test screen....



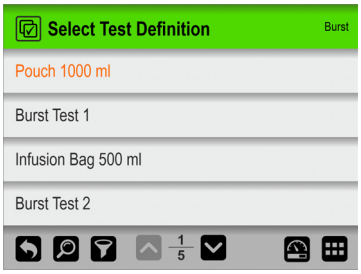
... tap the icon in the top left corner. This will bring up the **Test Definition Type** screen. This screen can also be reached by tapping the icon in the bottom right corner to go to the **Main Menu**, and then selecting **Workflow** -> **Test Definitions** -> **Select (as active)**.

NOTE! Only Burst and Leak tests are available by default. The other test types can be purchased as an option - see *"Consumables, accessories and options" on page 127*.





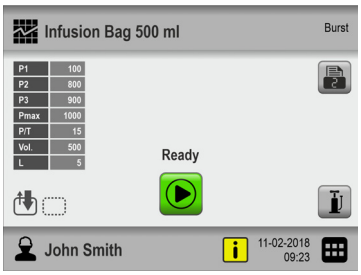
2. Select the appropriate type of test ex. **Burst**.



3. The **Select Test Definition** screen lists all the **Burst** test definitions in last used order. Orange text indicates that the currently selected test definition is from this group.
4. Use and keys to scroll through the list to find the appropriate test definition.

NOTE! If you have a large number of test definitions, scrolling through the list may be quite time consuming. In this case you can use the "Find" and "Filter" functions - see *"Find and Filter" on page 93* for details.

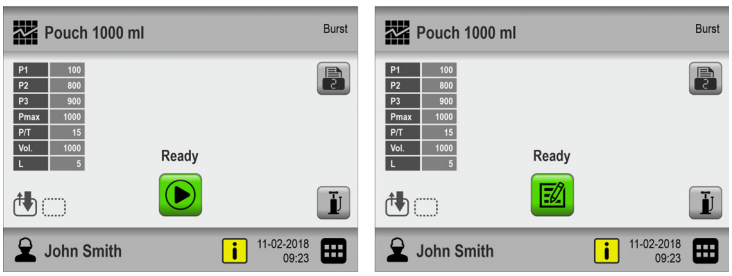
5. Once you have found the required test definition, tap it to select it and return to the test screen.



Performing a workflow/test

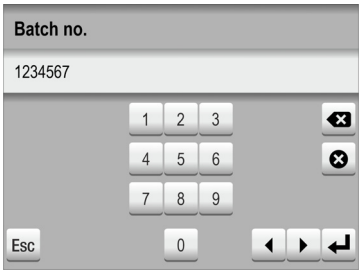
1. Prepare the test package using the appropriate test setup (accessory, needle type, septum type etc.).
2. Connect printer if required.

3. Select appropriate test definition - see *"Selecting a Test definition" on page 74*.
4. When the device is ready, the display will show one of the screens below.



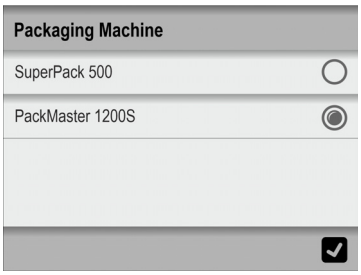
5. Press button to select required number of print-outs if required.
6. The button appears if the selected test definition requires entering of data in one or more predefined custom fields before test starts.
   If this is the case, proceed from item 7, otherwise go to item 10.
7. Press button to start the workflow.

8. If the first custom field requires entering of, for example, **Batch no.**, a keyboard will appear.



Enter appropriate information and press ↵ key.

9. If another custom field is required, this could, for example, be selection between 2 predefined options, e.g. packaging machines.

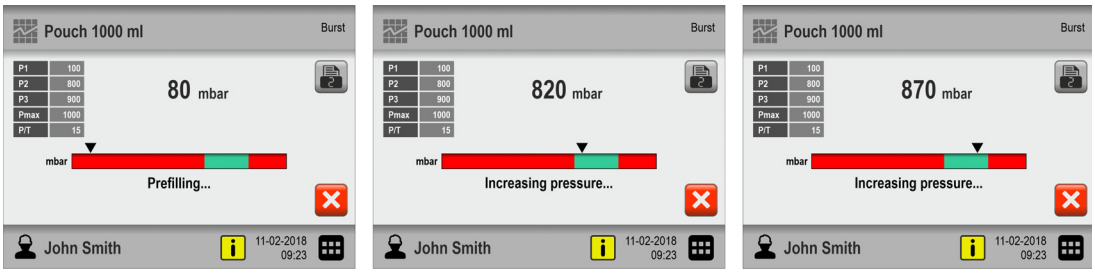


Make your selection and press ☑.

10. When display changes to...

... press the ▶ button to start the test.

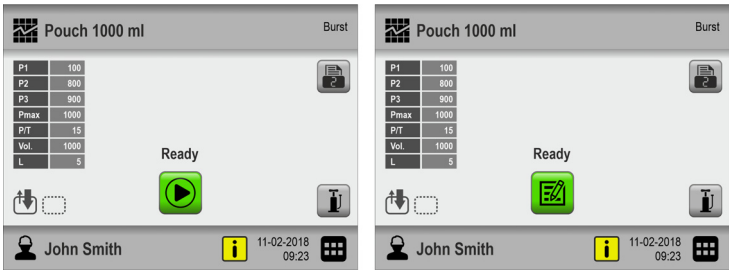
11. The device now automatically performs all the steps of the selected test, displaying each step as it is executed (pre-filling, pressure increase, etc.) together with the read-out of the current package pressure. See *"Test screen progress bar" on page 64* for further details.



NOTE! The test can be aborted anytime by pressing the ✕ button.

12. When the test terminates (in this case when the package bursts) the test result is displayed on the screen.
    In this case the test is approved (**PASS**) because the package bursts within the limits as specified in the test definition.

13. If **Acknowledge Measurement** is enabled in **Main Menu -> Workflow** you must press the , , or button now to validate and end the test/workflow - see *page 62* for details.
14. If print-outs are selected, the selected number is now printed on the connected printer.



15. The device is now ready for a new test/workflow.

Manual Inflation

While preparing a package for testing, it may turn out that the package is so flat that it is difficult to get the needle properly into the package without the risk of damaging the back of the package.
In this case, you can use the button to inflate the package a little and thus get better space for the needle inside the package.

The button is only available on the test screen if **Manual inflation** is enabled in **Main Menu -> Workflow**.

Error messages

NOTE! The error message list below is not complete but describes the possible errors that the daily user has an opportunity to respond to and correct. Other error messages may occur, but these will most often require a greater technical insight into the device or that you contact your assigned service provider (see *"Service" on page 108*).

NOTE! If problems or errors occur, that are not described in this section or if one or more errors persist, you should contact your assigned service provider (see *"Service" on page 108*).

No.	Message	Problem	Solution
3004	Name exists: XX	This name is already used.	Use another name.
3005	ID already exist: XX	This ID is already used.	Use another ID.
3009	Binary file version not supported	The binary file is not compatible with the device.	Check that it was the correct file. Files from other Dansensor equipment can not be imported.
3010	Printing failed	The printer was not connected or not turned on. Non-compatible printer is used.	Connect and turn on the printer. Change to recommended printer.
3011	Max. pressure < prefill pressure	Incorrect parameter settings when creating a Burst Test Definition.	Set appropriate values.
3012	Burst minimum limit is lower than prefill pressure	Incorrect parameter settings when creating a Burst Test Definition.	Set appropriate values.
3013	Max. burst pressure is lower than max. burst limit	Incorrect parameter settings when creating a Burst Test Definition.	Set appropriate values.
3014	Burst maximum limit is lower than burst minimum limit	Incorrect parameter settings when creating a Burst Test Definition.	Set appropriate values.
3015	Pressure drop limit is greater or equal with test pressure	Incorrect parameter settings when creating a Leak Test Definition.	Set appropriate values.
3016	Lower time limit is greater or equal with upper time limit	Incorrect parameter settings when creating a Creep2Fail Test Definition	Set appropriate values.

No.	Message	Problem	Solution
3017	Test time is lower than test time upper limit	Incorrect parameter settings when creating a Creep2Fail Test Definition	Set appropriate values.
3107	Inlet pressure exceeds allowed limit	Inlet pressure exceeds max. limit	Reduce the inlet pressure to an acceptable value.
3111	Initial package pressure too high	The start pressure in the package is higher or the same as the test pressure.	Remove pressure from the package or increase the test pressure.
3112	Target pressure not achieved	The package could not be filled to the set pressure	Ensure that correct package connection has been selected. Ensure that the package is restrained, if needed. Do not touch the package when the device is inflating the package. Ensure that the entered volume is correct. If it is a porous package cover the porous surface. If it is a burst test reduce the inflation rate. For other tests reduce the test speed.
3113	Overshoot more than XXX	The pressure in the package became higher that the set point.	Ensure that the package is restrained, if needed. Do not touch the package when the device is inflating the package. If it still overshoots, reduce the test speed.

No.	Message	Problem	Solution
3114	Regulation error	The package could not be filled with the settings selected.	Ensure that correct package connection has been selected. Ensure that the package is restrained, if needed. Do not touch the package when the device is inflating the package. Ensure that the entered volume is correct. If it is a porous package cover the porous surface. If it is a burst test reduce the inflation rate. For other tests reduce the test speed.
3203	Flash memory full	Not enough space on the connected USB-stick.	Use an empty USB-stick.
3205	User login not allowed	Service access not enabled.	Enable service access. (Requires Administrator access).
3206	Unsupported users database	You are trying to import an incompatible user database	Select a compatible user database.
3207	Users database corrupted	Internal SW error.	Try to restart.
3208	Users list import failure		Try another USB-stick.
3209	Users list export failure		Try another USB-stick.
3215	Cannot edit test definition. Test definition has been used	You are trying to edit a test definition that has been used.	Either create a new test definition or change the “Lock Test” setting so that a used test definition can be edited.
3216	Test definition value(s) out of range		Change the value to an acceptable value.
3236	Test definition exists		Save test definition with another name.
3301	USB stick not inserted	No USB-stick connected.	Connect USB-stick.
3302	Failed to copy a file to USB		Try another USB-stick.

No.	Message	Problem	Solution
3303	Couldn't find a file from USB		Try another USB-stick. The file must be placed in the correct folder on the USB-stick and it must have the correct name.
3305	File export failed		Try another USB-stick.
3306	File import failed		Try another USB-stick.
3308	Failed to communicate with data logging server	No LAN connection when the device tried to send data.	If you do not want to use Network Logging: Disable Network Logging. If you want to use Network logging: Ensure that the device and PC is connected to the same network. Ensure that the IP-address set on the device is the one used by the PC.
3312	File exists in USB		Use an empty USB-stick.

5. Cleaning and Maintenance

General

NOTE! Performing cleaning and maintenance regularly reduces the chances of equipment failure.

CAUTION! Personnel performing any maintenance or cleaning must familiarize themselves with the *"Safety and Handling Instructions" on page 129* before attempting any of these procedures.

The **Dansensor® Lippke® 5000** devices are maintenance-free. This particularly applies to the pneumatics and electronic control systems.

Cleaning and maintenance of other items such as measurement accessories and needles etc. is described in the following.

Parts required for maintenance purposes are listed in *"Consumables, accessories and options" on page 127*.

Cleaning

Device and accessories

All device and test accessory surfaces should be cleaned using a mild soap solution and a wrung cloth.

Needles and test heads

Disassemble needles and test heads from time to time and check whether they are completely clean and that all openings are free from dirt and residues. Any residues can be removed carefully by means of a needle and liquids should be blown out using compressed air.
Flushing with water and alcohol is also possible. After that, all parts should be blown out thoroughly with compressed air to make sure that no liquids remain.

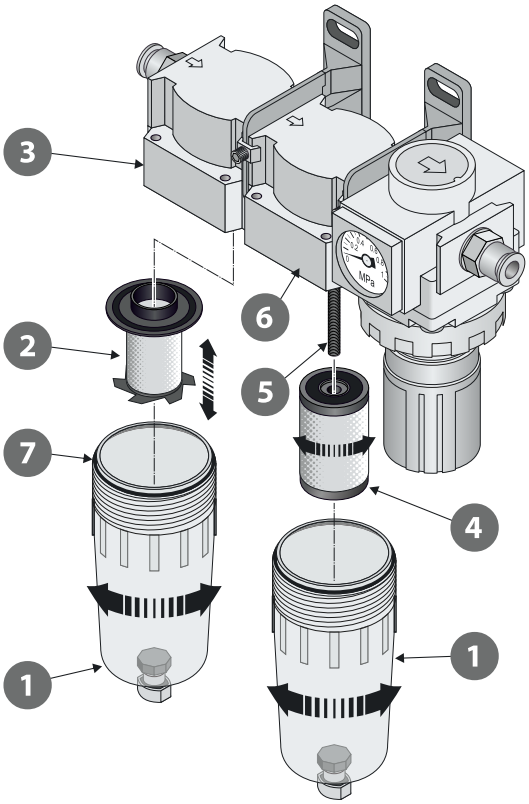
Hoses

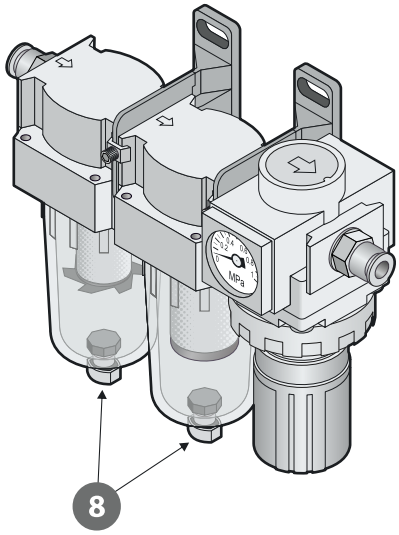
All hoses should be disconnected regularly and blown through using compressed air.

NOTE! When using compressed air for cleaning, make sure that air is dry and oil free.

Pressure regulator with filters

The filters in the optional pressure regulator unit should be replaced at regular intervals or if they are soiled.





1. Unscrew the filter bowl 1.
2. Replace filter:
   - The new oil filter element 2 should be clicked into the bowl 1 before assembling it with the filter housing 3.
   - The new dust filter element 4 must be screwed onto the threaded rod 5 and tightened before assembling the bowl 1 with the filter housing 6.

CAUTION! All parts should only be hand tightened - do not use any tools.

CAUTION! When assembling the bowls 1 with the filter housings 3 and 6, make sure that the O-rings 7 are fitted properly on the bowls.

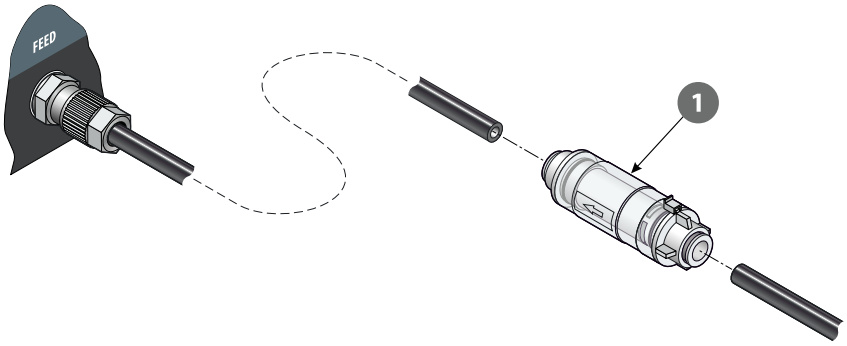
Draining the filters

If necessary, use the drain valves 8 at the bottom of the bowls 1 to empty them of dirt and oil residues.

CAUTION! This should be done when the unit is under pressure.

Filter for “FEED” hose

The optional filter should be replaced at regular intervals or if it is soiled.

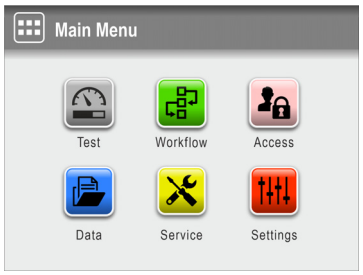


Disconnect the filter 1 from the “FEED” hose and replace it with a new - see *"Correct use of hose connectors" on page 54* for details.

6. Menus and Settings

Main menu

Tapping the icon in the lower right corner of the test screen takes you to the **Main Menu**.



Please note that the access level of the current user determines which features and menus are available - see *"Access levels" on page 98* for details about the various access levels and the associated rights.

Test	Takes you to the Test screen. See *"Performing a workflow/test" on page 75* for details.
Workflow	Definition of workflows and set-up of test definitions. See *"Workflow" on page 88* for details.
Access	Selection and administration of user access levels. See*"Access" on page 97* for details.
Data	View logged data for a test definition. See *"Data" on page 103* for details.
Service	Perform test measurements and view device serial nos., SW version and counters etc. See *"Service" on page 108* for details.
Settings	Setting of various device parameters. See *"Settings" on page 115* for details.

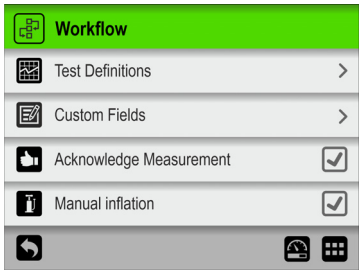
IMPORTANT!

When changes are made to device settings, workflows and users etc., most of these are not saved until you return to the previous menu level.

To make sure changes are saved, you should go to the main menu and wait at least 30 sec. before switching the device off.

Workflow

A workflow is set up as a combination of a test definition, the actual testing and a number of predefined custom fields. During the workflow the custom fields allow the user to enter optional texts or numbers and/or to select from a list of predefined text strings.
All data entries are saved together with the test result in **Test Log** in the **Data** menu - see *"Data" on page 103* for details.

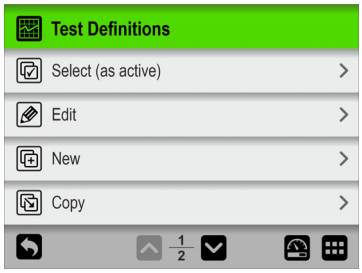


Parameters marked with an asterisk (*) are only available when logged in as "Administrator".

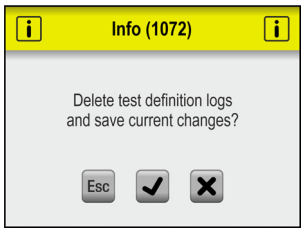
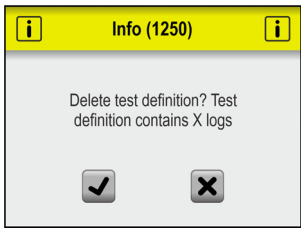
Test Definitions	Select, create, edit and delete test definitions. See *"Test Definitions"* below for details.
Custom Fields *	Setting up of the various custom fields. See *"Custom Fields" on page 95* for details.
Acknowledge Measurement *	If enabled, a set of buttons appear on the test screen for validation of the measurement - see detailed description for item 7 in *"The Test screen" on page 61*.
Manual inflation *	If enabled, a button appears on the test screen for manual inflation of a package - see *"Manual Inflation" on page 77* for details.

Test Definitions

Selecting **Test Definitions** from the **Workflow** menu will display a menu with the available test definition options. The total number of test definitions that can be created is 999.



Select (as active)	Select the test definition, you wish to use for the test. See *"Select (as active)" on page 90* for details.

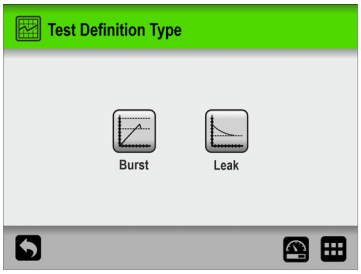
Edit	Edit an existing test definition. Test definition settings are described in *"New" on page 91*. Most of the test definition parameters can only be edited if no tests have been performed using the test definition or if the parameter **Settings -> Device** -> **Lock Test** has been disabled. When having edited a test definition, this message appears when exiting the function:  Tap to delete existing data (if any) from the data log and save changes.
New	Creates a new, blank test definition. See *"New" on page 91* for details.
Copy	Use this function to create a new test definition that is similar to an existing test definition. Test definition settings are described in *"New" on page 91*.
Delete	When deleting a test definition, both the test definition and its logged data are deleted. The action must be confirmed before the test definition is deleted. 

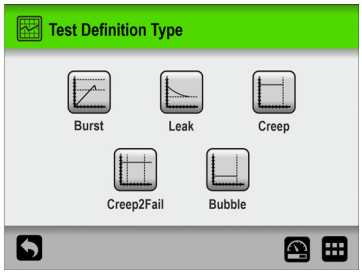
Select (as active)

This function allows you to select the test definition, you wish to use to perform a test.

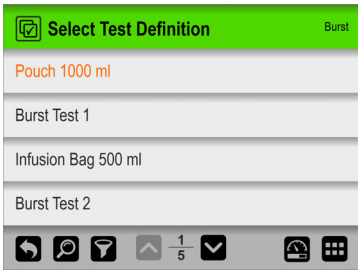
1. Selecting **Select (as active)** brings up the **Test Definition Type** screen.

NOTE! Only Burst and Leak tests are available by default. The other test types can be purchased as an option - see *"Consumables, accessories and options" on page 127*.





2. Select the appropriate type of test ex. **Burst**.



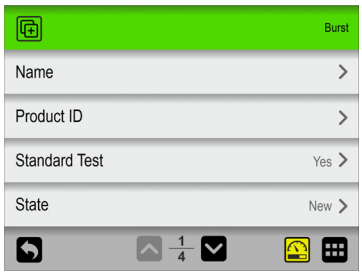
3. The **Select Test Definition** screen lists all the **Burst** test definitions in last used order. Orange text indicates that the currently selected test definition is from this group.

NOTE! If you have a large number of test definitions, scrolling through the list may be quite time consuming. In this case you can use the "Find" and "Filter" functions - see *"Find and Filter" on page 93* for details.

4. Use ▲ and ▼ keys to scroll through the list to find the appropriate test definition, then tap it to select it and return to the test screen.

New

Creates a new test definition with default settings.



TIP! If a new test definition will be very similar to an existing test definition, you might want to use the "Copy" function.

An explanation of the parameters for the various test definition types can be found here:

Burst - see *"Burst test settings" on page 40*.

Leak - see *"Leak test settings" on page 44*

Creep - see *"Creep test settings" on page 46*

Creep2Fail - see *"Creep2Fail test settings" on page 49*

Bubble - see *"Bubble test settings" on page 52*

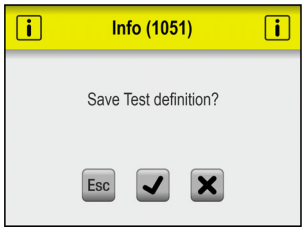
The test function can be used during test definition setup to find the optimal parameter settings for a specific test definition.

When you press the icon, a special test screen opens.

This test screen works in exactly the same way as the normal test screen, where tests are made on a package with the set values. The difference is that no measurements performed from here are stored in the data log.

Perform the test then press the icon to exit and return to the test definition to edit one or more test parameters if required then perform another test. Repeat until appropriate test definitions settings have been determined.

When you have finished setting the test definition parameters, a warning appears when exiting the function:

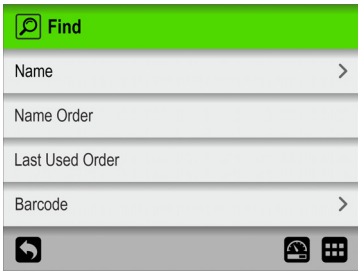


Tap ✓ to save the new test definition and return to the **Test Definitions** menu.

Find and Filter

The **Find** and **Filter** functions can be helpful if you have a large number of test definitions thus making scrolling through the list quite time consuming.
The functions can be used separately, or combined as described below:

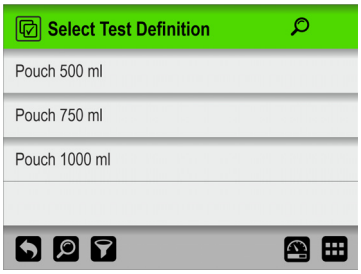
1. Tap the icon to bring up the **Find** screen.



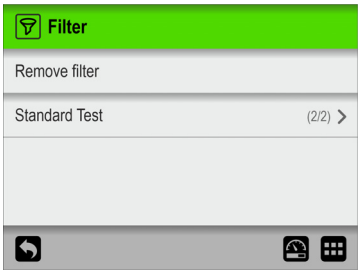
2. Select the appropriate search method. Selecting either the **Name** or **Barcode** methods brings up a touch screen keyboard for keying in the search text.

NOTE! The "Name" or "Barcode" search methods will not find all test definitions, with the search text appearing somewhere in the name or Product ID, but only test definitions where the name or Product ID starts with the entered search text.

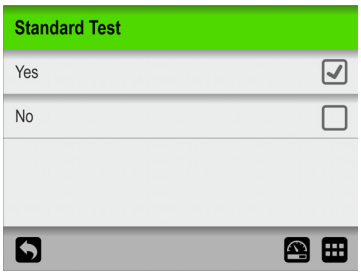
3. Key in the test definition name (e.g. **Pouch**) and confirm by tapping the ↵ key.
4. The **Select Test Definition** screen will appear showing a list of found test definitions with names starting with **Pouch**.



5. Now tap the icon to bring up the **Filter** screen.

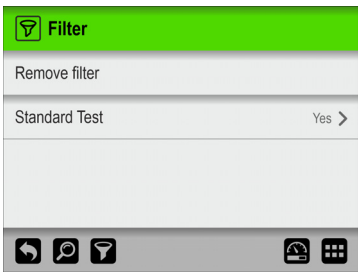


6. If required select the **Standard Test** filtering parameter.

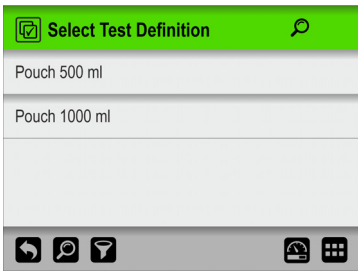


Make required setting, then press the key.

7. Now you can see the selected **Standard Test** filter setting.



Press the key to return to the list of test definitions that meet the search- and filter criteria.

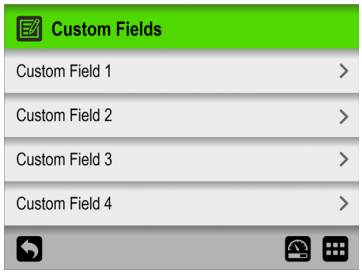


8. Tap the appropriate test definition to select it and return to the test screen.

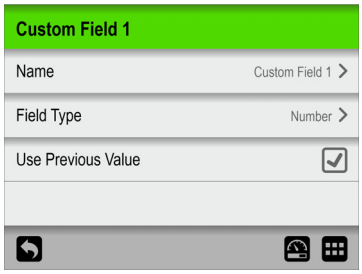
Custom Fields

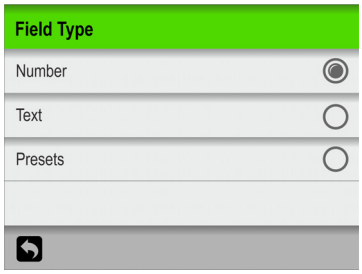
Use the custom fields to add various information about a specific measurement during a measurement workflow. The data entries are saved together with the measurement result.

4 custom fields are available, each of which can be individually defined with a name and an input type. Whether or not a field entry is required, is set up for each test definition individually.



Custom Field settings



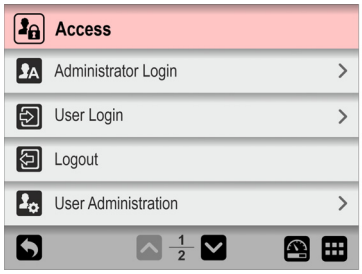
Name	A unique custom field name (up to 32 characters).
Field Type	Select the type of required input:  When type is set to either **Text** or **Number,** the appropriate type of keyboard appears when an entry is required.

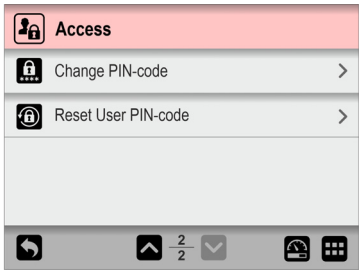
	When type is set to **Presets** you have the possibility to define up to 4 different text fields.  When prompted during the measuring workflow, you must select either of the preset text fields from the list.
Use Previous Value	If enabled, the previous entered value will already be filled in, when the appropriate entry keyboard appears. Only applies when **Field Type** is set to either **Text** or **Number**.

Access

From the **Access** menu the various users and their access levels are created and managed. This is also where the **Administrator** can log in and change and reset PIN-codes.

See *"Access levels" on page 98* for details about the various access levels and the associated rights.





Administrator Login	Requires for a special **Administrator** PIN-code (6 digits). From the factory the PIN-code is set to **"000000"**. The **Administrator** PIN-code can be changed to one of your own selection - see *"Change PIN-code" on page 101* for details. **For best safety and correct operation of the device, we recommend logging out of the "Administrator" feature when its use is not required.**
User Login	*(Only available if login is required - see "Login" on page 120 for details).* Select **User** or login with **User ID**, whatever is required.
Logout	Logout the current user or Administrator.
User Administration	Maintain user database. See *"User Administration" on page 99* for details.
Change PIN-code	See *"Change PIN-code" on page 101* for details.
Reset User PIN-code	*(Only available if logged in as Administrator)* See *"Reset User PIN-code" on page 102* for details.

Access levels

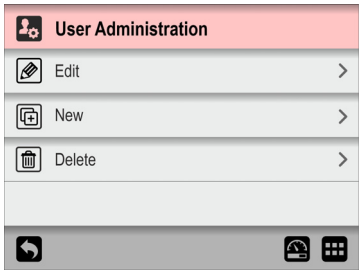
The various access levels and the associated rights are described below:

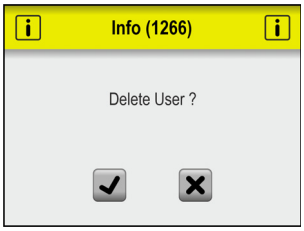
NOTE! A higher level of access always has all rights from lower access levels.

Standard Test Operator	Basic user. ■ Can only perform tests on workflows/test definitions marked as **Standard Test**. If **Use State Mark** is enabled in **Settings -> Device** the access is limited to **Standard Test** test definitions/workflows marked with **State = Current**. ■ Cannot change any settings.
Operator	Normal user. ■ Can perform tests using all test definitions/workflows with **State = Current**. ■ Cannot change any settings.
Supervisor	Daily administrator of test definitions/workflows and standard users. ■ Has access to all test definitions/workflows. ■ Can create test definitions/workflows and edit custom fields. ■ Can create **Standard Test Operator** and **Operator** users, but not other **Supervisor** users. ■ Can access the **System Leak Test** function from the **Service -> Test & Adjustment** menu. ■ Can export measurement logs and error/event logs. ■ Cannot change settings in the **Settings** menu.
Administrator	Device administrator. ■ Can change settings in the **Settings** menu (except for the **Service** menu). ■ Can create **Supervisor** users and other **Administrator** users. ■ Can reset PIN-codes. ■ Can remove access to **Service** login. ■ Can export and import all data.
Service	Service Technician. ■ Can access all settings in the **Settings -> Service** menu. ■ Can access all functions in the **Service -> Test & Adjustment** menu.

User Administration

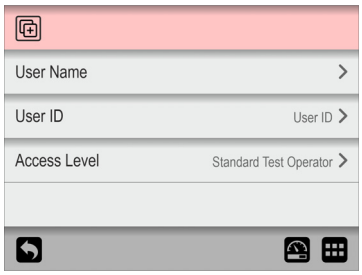
From here the user database is maintained. You can edit the settings for an existing user, create new users or delete users.



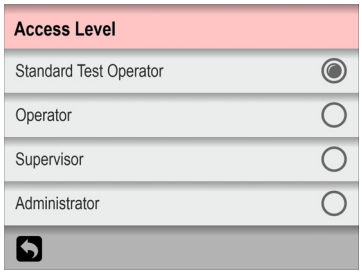
Edit	Edit an existing user. User settings are described in *"New" on page 100*.
New	Creates a new, blank user. See *"New" on page 100* for details.
Delete	Delete user. The action must be confirmed before the user is deleted. 

New

Creates a new, blank user. The total number of users that can be created is 100.



The following parameters can be set for a user:

User Name	A unique user name (up to 25 characters).
User ID	Unique user identification code (up to 25 characters). Both numbers and letters can be used. Use ID to login when login with **User ID** is required. **NOTE! If you forget your User ID, you should create a new (requires Supervisor or Administrator access).**
Access Level	Select access level.  The access level determines how much you have access to in relation to creating, modifying and deleting data. See *"Access levels" on page 98* for details.

User PIN-code

A default 6 character PIN-code will be assigned to all users on creation ("000000" for an Adminstrator, and "123456" for all other users).

NOTE! For security reasons, the PIN-code should be changed to a code known only by the individual user. See *"Change PIN-code" on page 101* for details.

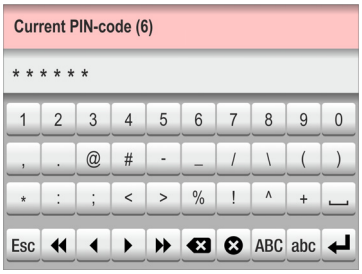
Change PIN-code

NOTE! Only available when logged in using a PIN-code.

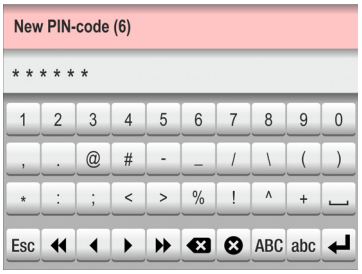
Use this function to change the PIN-code required for logging in.

To change the PIN-code do the following:

1. From the **Access** menu select **Change PIN-code**.
   This screen appears:



2. Enter current PIN-code (6 characters) and tap the ↵ key.



3. Enter new PIN-code (6 characters) and tap the ↵ key.

4. Enter new PIN-code again and tap the ↵ key.

5. Tap ✓ to confirm. PIN-code has now been changed.

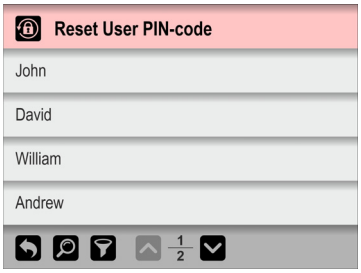
Reset User PIN-code

*(**Administrator** only)*

Use this function to reset a PIN-code to the default ("000000" for an Administrator, and "123456" for all other users).

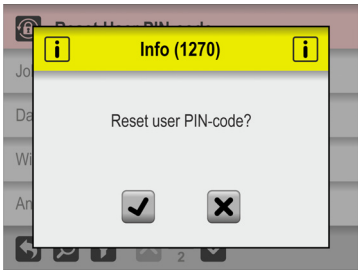
NOTE! The reset functionality cannot be used to reset the PIN-code for the default Administrator. If you need help with that, you should contact your appointed service provider (see *"Service" on page 108*).

1. From the **Access** menu select **Reset User PIN-code**.
2. From the appearing list of users...



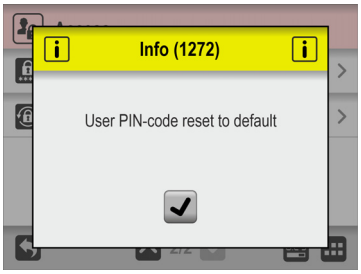
...select the user whose PIN-code should be reset.

3. When this message appears...



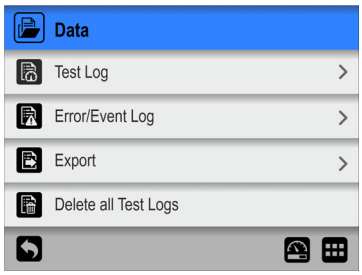
...confirm that you wish to reset the PIN-code for the selected user.

4. If action is confirmed, the PIN-code for the selected user has been reset.



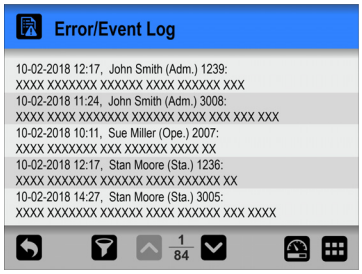
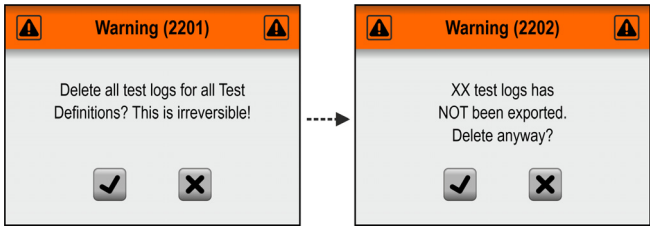
Data

From the **Data** menu you can read out and manage measurement data for selected test definitions and error and event log data.
The device can store log data for more than 1,000,000 tests.



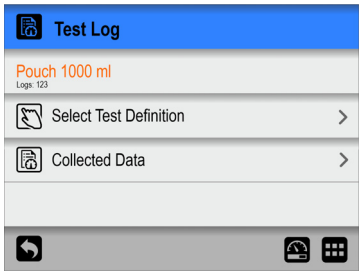
The **Data** menu holds the following items:

Parameters marked with an asterisk (*) are only available when logged in as "Supervisor".

Test Log	Opens the **Test Log** screen See *"Test Log" on page 105* for details.
Error/Event Log	Displays an internal log file listing the last 99 pages of errors and events. To see the complete list of errors and events you should export the logs - see *"Export" on page 107* for details.  Tap the icon to select the type of logs to be displayed (**Errors**, **Events**, **Warnings** or **All**) if required.
Export *	Opens the **Export** screen See *"Export" on page 107* for details.
Delete all Test Logs *	Use function to delete log data for all test definitions. The action must be confirmed before the data is deleted. 

Test Log

From the **Test Log** screen you can read out and manage the test log data for selected test definitions.

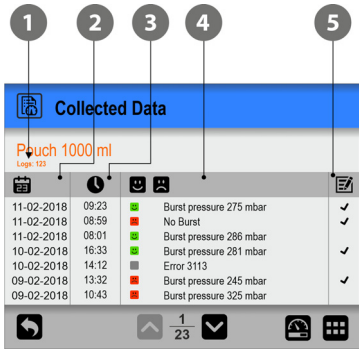


The **Test Log** menu holds the following items:

Active test definition	The test definition currently selected for data management. The field also shows the current number of data logs for the test definition. The default selected test definition is always the active test definition (test definition text is orange) but any other test definition can be selected using the **Select Test Definition** function.
Select Test Definition	Select test definition for data management. The procedure of locating and selecting test definitions is the same as described in *"Select (as active)" on page 90* and *"Find and Filter" on page 93*.
Collected data	Displays the logged data (if any) for the currently selected test definition. See *"Collected data" on page 106* for details.

Collected data

Selecting **Collected data** from the **Test Log** menu will display a list of the logged measurement data for the selected test definition.



The list shows the following information about each log:

1. **Number of log entries for the selected test definition**
2. **Log date**
3. **Log time**
4. **Test result**
   The colored symbols indicate the following:

   PASS - the test result is within the set limit values.
   Test is a valid test.

   FAIL - the test result is outside the set limit values.
   Test is a valid test.

   The test has been marked as invalid or an error occurred during the test.

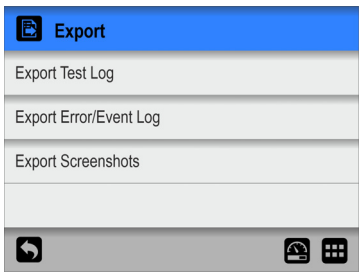
5. **Comments**
   Comments are attached to the measurement, either via custom fields or as a comment on an invalid measurement.
   All custom field entries and comments are exported together with the log data.

The logged data can be exported - see *"Export" on page 116* for details.

Data logging via a local network is also possible - see *"Network Logging" on page 119* for details.

Export

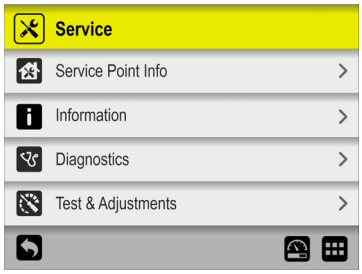
Selecting **Export** from the **Data** menu will display a screen showing the available export functions.



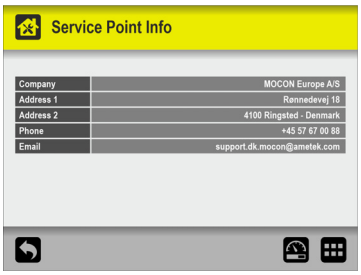
NOTE! The export functions require that you insert a USB-stick in the device's USB-port (labelled).

Export Test Log	Exports all test data logs (as text file).
Export Error/Event Log	Exports error/event logs (as text file).
Export Screenshots	Exports all screen-shots from the device's memory to a USB-stick. At the same time the screen-shots are deleted from the device. See *page 60* for details about making screen-shots.

Service

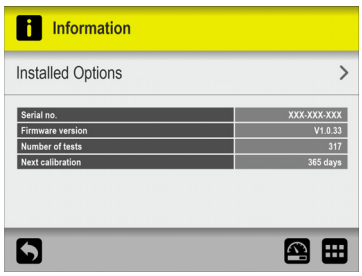


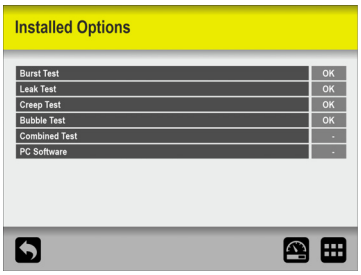
The **Service** menu holds the following items:

Service Point Info	Displays the company information for your appointed service provider.  (Can be changed by a Service Technician).
Information	Opens the **Information** screen. See *"Information" on page 109* for details.
Diagnostics	Opens the **Diagnostics** screen. See *"Diagnostics" on page 110* for details.
Test & Adjustments	Opens the **Test & Adjustments** screen. See *"Test & Adjustments" on page 111* for details.

Information

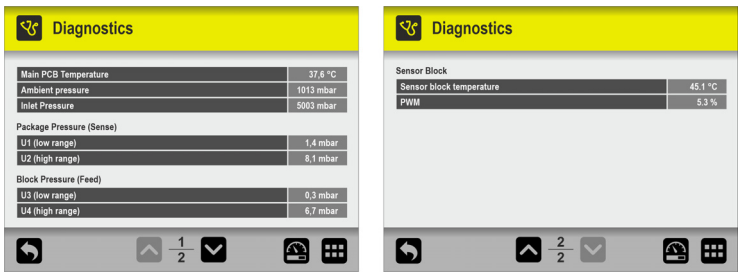
The **Information** screen holds general information about the device.



Installed Options	Opens the **Installed Options** screen, which shows an overview of the installed options: 
Serial no.	Shows the device's serial number.
Firmware Version	Shows the firmware version currently installed on the device.
Number of tests	Shows the total number of tests performed.
Next calibration	Shows the number of days left until the device should be calibrated.

Diagnostics

The **Diagnostics** screen holds various internal device parameters.

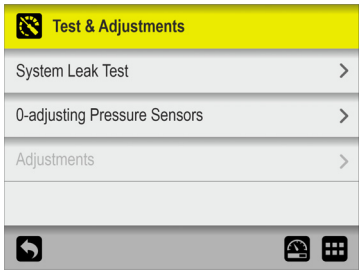


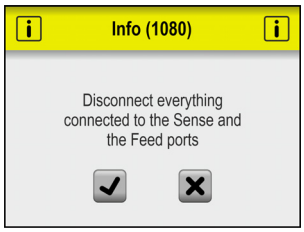
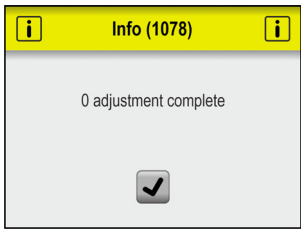
The parameters can only be read and not changed.

Main PCB Temperature	Shows the temperature measured on the PCB in the device. This will always be slightly higher than the surrounding temperature.	
Ambient pressure	Shows the currently measured ambient pressure.	
Inlet Pressure	Shows the current CO_2 concentration in the surrounding atmosphere.	
Package Pressure (Sense)	**U1 (low range)** **U2 (high range)**	Currently measured “SENSE” pressure.
Block Pressure (Feed)	**U3 (low range)** **U4 (high range)**	Currently measured “FEED” pressure.
Sensor Block	**Sensor block temperature**	Shows the temperature measured on the sensor block.
	PWM	Sensor block heater power percentage.

Test & Adjustments

The **Test & Adjustments** functions can be used to perform various tests.

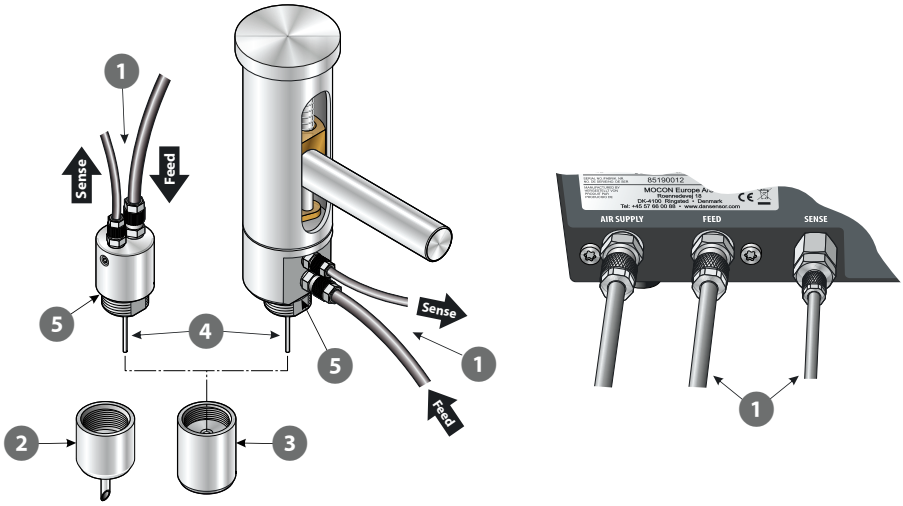


System Leak Test	Opens the **System Leak Test** screen. See *"System Leak Test" on page 112* for details.
0 adjusting Pressure Sensors	Calibrates the zero point of the pressure sensors in relation to the ambient atmospheric pressure. When selected the following message appears:  Disconnect hoses from the “FEED” and “SENSE” connectors, then press ✓ to continue. When calibration is completed, the following message is displayed:  Press ✓.
Adjustments	*Only available for Service Technicians.*

System Leak Test

The **System Leak Test** function is primarily to be used for checking the tightness of the system when a the test head or a single hand-held needle is connected to the device.

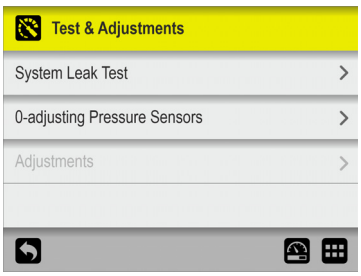
NOTE! System tightness is especially important when performing leak tests.



1. Make sure that the accessory's "Feed" and "Sense" hoses 1 are properly connected to the device.
2. If accessory is fitted with a needle 2, remove it and fit the "Blind" plug 3 instead. The plug fits on the outside of the small needle 4. Make sure that the O-ring 5 is present and intact.

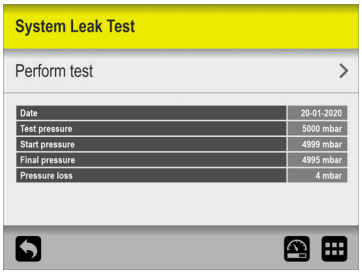
   CAUTION! The "Blind" plug should only be hand tightened - do not use any tools.

3. In the **Test & Adjustments** menu....



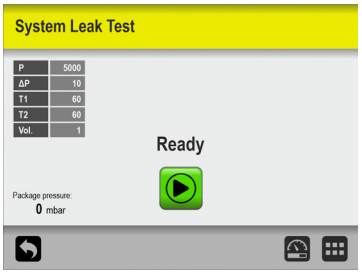
...select **System Leak Test**.

4. The **System Leak Test** screen shows the date, test pressures and measured pressure loss for the most recent test.



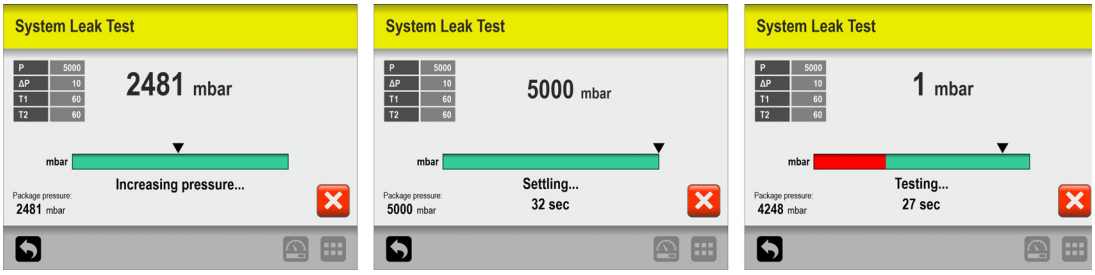
Press **Perform test**.

5. The test screen shows the parameters for the current test. The test pressure (P) is automatically adjusted to 1000 mbar below the current inlet pressure and the leak limit (ΔP) is defined as follows:
Test pressure below 2500 mbar -> 5 mbar
Test pressure 2500 to 5500 mbar -> 0.2% of test pressure

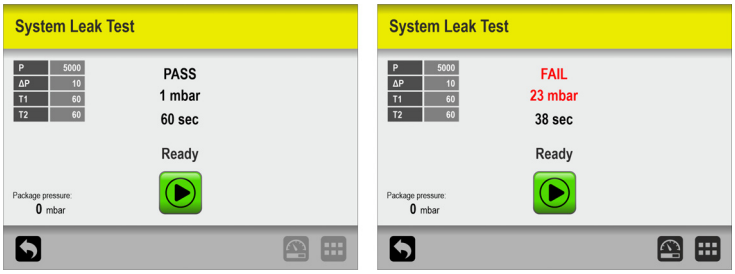


Press the button to start the test.

6. The test goes through the various stages...



...and when finished the test result is displayed.



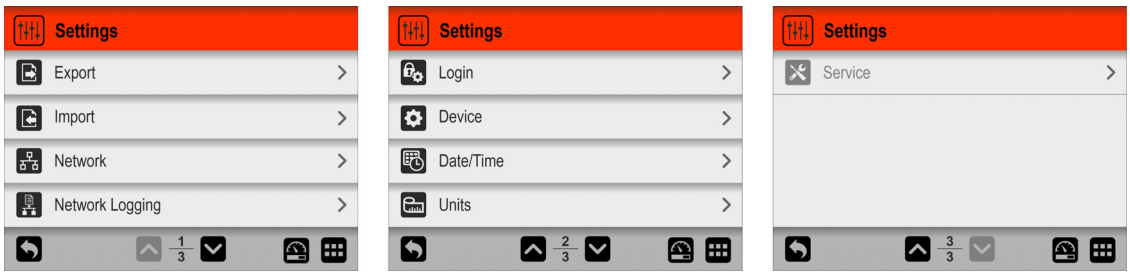
The highest measured pressure drop is displayed and for failed tests the specified time shows how long it took before the specified leak limit (ΔP) was exceeded.

7. When a test fails, it will be necessary to investigate where there are leaks in the system and have these repaired.

NOTE! We recommend to perform additional tests afterwards.

Settings

Selecting **Settings** from the **Main Menu** will display a menu with available set-up parameters.

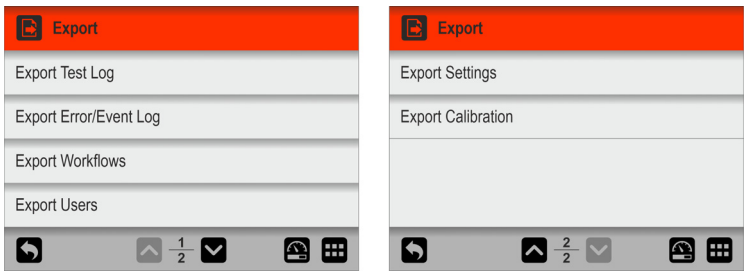


The menu holds the following items:

Export	Opens the **Export** screen See *"Export" on page 116* for details.
Import	Opens the **Import** screen See *"Import" on page 117* for details.
Network	Opens the **Network** setup screen See *"Network" on page 118* for details.
Network Logging	Opens the **Network Logging** setup screen See *"Network Logging" on page 119* for details.
Login	Opens the **Login** setup screen See *"Login" on page 120* for details.
Device	Opens the **Device** setup screen See *"Device" on page 121* for details.
Date/Time	Opens the **Date/Time** setup screen See *"Date/Time" on page 122* for details.
Units	Opens the **Units** setup screen See *"Units" on page 122* for details.
Service	Opens the **Service** setup screen *Only available for Service Technicians.*

Export

Selecting **Export** from the **Settings** menu will display a screen showing the various export functions.



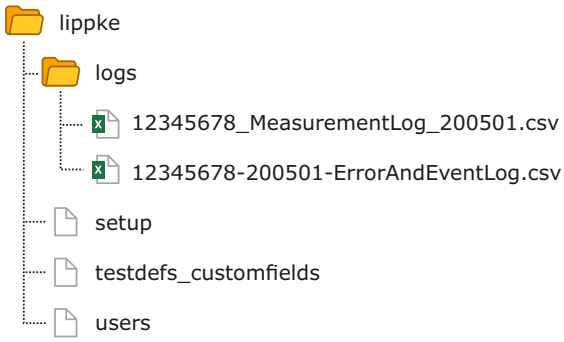
NOTE! The export functions require that you insert a USB-stick in the device's USB-port (labelled).

NOTE! We recommend to use the various export functions to make backups regularly so that files can be restored in case of a PCB breakdown.

The functions marked with an asterisk (*) can for example be used to clone another device.

Export Measurement Log	Exports all measurement data logs
Export Error/Event Log	Exports error/event logs
Export Workflows *	Exports the workflow database
Export Users *	Exports the user database
Export Settings *	Exports all settings from the **Settings** menu

The export function creates the following folders/files on the USB-stick:

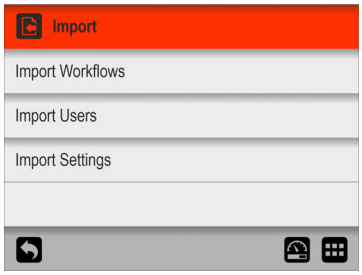


The file export format for the log files is *.csv (Comma Separated Values). This format can be imported into a spreadsheet. The actual used separator is ";" (semicolon).
Measurement log files are named **<serial no.>_MeasurementLog_<date>.csv** and Error and Event log files are named **<serial no.>-<date>-ErrorAndEventLog.csv**.

Other files are exported as binary files and named **setup, testdefs_customfields**, and **users** respectively. These files can not be edited.

Import

Selecting **Import** from the **Settings** menu will display a screen showing the various import functions.



NOTE! The import functions require that you insert a USB-stick with the required files in the device's USB-port (labelled).

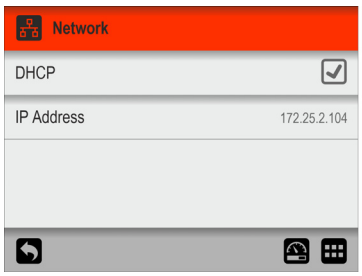
The functions can for example be used to clone your device with exported data from another device.

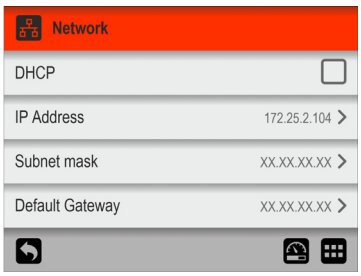
Import Workflows	Imports a workflow database. Only new test definitions will be imported, unless you choose to delete the existing test definitions before importing. **NOTE! Custom Fields will be deleted from the imported test definitions.**
Import Users	Imports a user database. Only new users will be imported.
Import Settings	Imports all settings. Current settings will be overwritten. Test definitions, users and log files are not affected.

The import functions requires that the files are located in a folder named **lippke** and named as described in *"Export" on page 116*.

Network

The **Network** screen holds the parameters for the Ethernet/LAN connection.





DHCP It is possible to choose between a fixed (static) IP-address or a DHCP (dynamic) IP-address, where the device's network settings are assigned from a DHCP server on the network.

DHCP is enabled as default.

Disabling **DHCP** brings up following parameters for setting up a static IP-address:

IP-address
Subnet mask
Default gateway

These parameters have to be set up to the existing network.

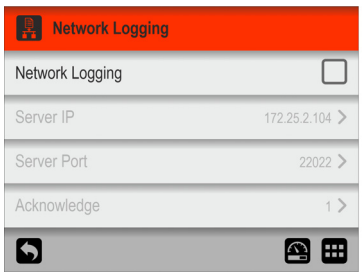
NOTE! Always consult your network administrator before making network settings, as incorrect settings can result in reduced or no network activity.

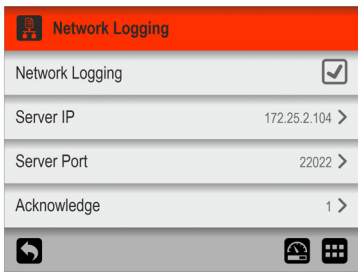
Network Logging

The **Network Logging** screen holds the parameters for the network logging function. If enabled, the function sends a data string through a LAN connection for each measurement.

The data format is an array of semicolon separated values. The format differs slightly from one test type to another in terms of test specific fields.

NOTE! Always consult your network administrator before making network settings, as incorrect settings can result in reduced or no network activity.





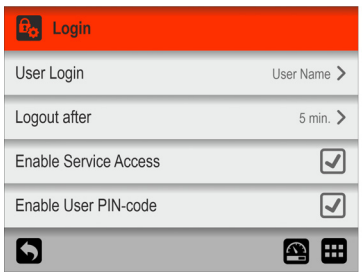
Network Logging	Select whether or not network logging is required. Disabled = No network logging Enabling **Network Logging** also enables the following parameters:	
	Server IP	Set up an IP-address to be used for collecting log data for each measurement via LAN. This requires for setting up of a **Server Port** number as well.
	Server Port	See above.
	Acknowledge	Byte sent by the server to the device after each received log entry. Setting value to 0 will disable the function.

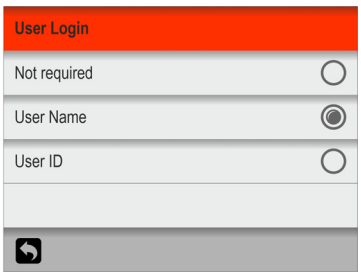
A TCP/IP LAN server has to be started to receive data. The server will listen to the port as specified above.

Third party solutions may support this functionality as well as the MAP Check 3 PC SW.

Login

Setting up of the login function.

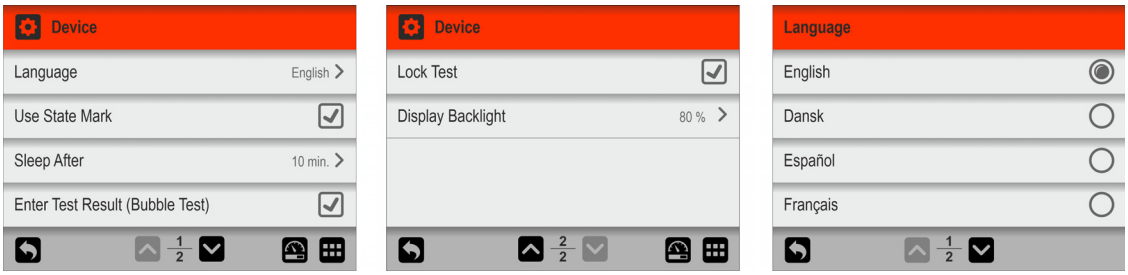




User Login	You can choose between 3 types of user login: **Not required** At start-up the device initializes and when finished it changes to show the test screen, ready for measuring. Current user is the default **Operator**. **User Name** **User ID** During start-up or if changing user, you are taken to the **Access** screen, where you must select **User Login** and then either select a user from the list or enter a valid **User ID** to go to the test screen, ready for measuring.
Logout After	Set the time after which the device automatically logs out if it is not in use.
Enable Service Access	Select whether or not it should be possible to log in as a user with **Service** access.
Enable User PIN-code	Select whether or not the user must log in with a PIN-code. **NOTE! Administrator and Supervisor users must always log in with a PIN-code, regardless of this setting.**

Device

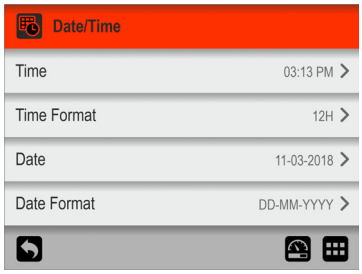
The **Device** screen holds some basic device setup parameters.



Language	When selecting a language all text throughout the menus will be displayed in this language
Use State Mark	Select whether or not the **State** function should be used for test definitions/workflows. If function is disabled all test definitions/workflows are available for users on all access levels.
Sleep After	To save energy and reduce noise, you can make the device switch to a "Sleep" mode when not in use for a period. This will cause e.g. the fan in the chamber and the sample pump to stop and the display will be dimmed. Setting value to 0 will disable the function. To "wake up" the device, simply tap anywhere on the screen.
Enter Test Result (Bubble Test)	Select whether you want the option to enter the result of a "Bubble" test.
Lock Test	When enabled, most of a test definition's parameters are locked from editing when tests have been performed using the test definition.
Display Backlight	Set the intensity of the display backlight (30-100%)

Date/Time

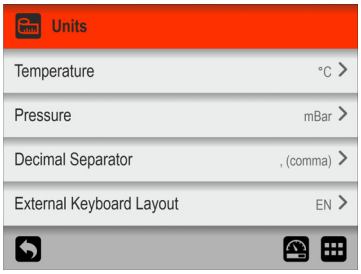
The **Date/Time** screen holds the time and date setup parameters.



Time	Setting of current time (hh:mm)
Time format	Setting of time format (**12h** or **24h**)
Date	Setting of current date (using **Date format**)
Date format	Setting of date format (**DD/MM/YYYY** or **MM/DD/YYYY**) **Time**, **Date** and **Date format** are related to the real time clock setting in the device. The settings will have effect in all displays showing time and date.

Units

The **Units** screen holds the various setup parameters for output formats and units.



Temperature	Setting of temperature read-out unit (**°C** or **°F**)
Pressure	Setting of gas pressure read-out unit (**mBar**, **PSI** or **mmHg**)
Decimal separator	Select whether decimal values should use "**. (dot)**" or "**, (comma)**" as decimal point.
External Keyboard Layout	Select keyboard layout for an external keyboard connected via USB (**English**, **Dansk**, **Español**, **Francais**, **Deutsch**, **Italiano**)

7. Technical Information

Technical specifications

Mechanical specifications

Dimensions	185 x 284 x 236.5 mm (7.3 x 11.2 x 9.3") (H x W x D)

Weight	Unpacked: 3.4 kg (7.5 lbs) Crated: 5.8 kg (12.8 lbs)
IP Class	IP 20
Ambient temperature	Operation: +2 to +35 °C Storage: - 20 to +60 °C
Ambient humidity	Operation: 10 to 90 % RH, non condensing Storage: < 95 % RH, non condensing
Ambient pressure	Operation: 750 - 1100 mbar

Electrical specifications

Supply voltage	External PSU, 100-240 VAC, 47-63 Hz
Power consumption	Max. 40 W

Connectivity

Network/LAN	RJ-45 Ethernet 10/100 Mbit/s, DHCP client or fixed IP
USB	1 x Host, USB 2.0 - Type A, max. current 500 mA 1 x Device, USB 2.0 - Type B, max. current 500 mA

User Interface

Display type	5.7″ colour touch display with back-light VGA (640 x 480 pixels) 4096 colours
Functions	Multi language text and icons Supported languages: EN, DA, ES, FR, DE, IT

PC Software (option)

System requirements	PC with Microsoft Windows 10

Compressed air supply

Hose dimensions	Ø6/4 mm [1]
Air supply pressure	4.0 - 6.5 bar The input pressure must be at least 1 bar above test pressure [2]
Air consumption	Max. 100 l/min [3] depending on test settings
Air quality	Dry, clean and free from oil Compliant with DIN ISO 8573-1:2010 [4:4:3] [4]

[1] Ensure that the used hose type is appropriate for the required pressure

[2] A separate pressure regulator is recommended

[3] Depending on test settings

[4] See *"Pressure Regulator with filters" on page 30*

Accessories data

Stand, basic	Dimensions (H x W x D): Weight:	407 x 250 x 330 mm (16 x 9.8 x 13″) 3.6 kg (7.9 lbs)
Fixture f. ASTM restraining	Dimensions (H x W x D): Weight: Restraining height: Max. package size (W x D):	412 x 400 x 405 mm (16.2 x 15.7 x 15.9″) 13.5 kg (29.8 lbs) 6. 35 - 76.2 mm (¼ - 3″) in steps of 6.35 mm (¼″) 230 x 400 mm (9 x 15.7″)
PPC 300 II w. Package fixture	Dimensions (H x W x D): Weight: Restraining height: Max. package size (W x D):	200 x 470 x 495 mm (7.9 x 18.5 x 19.5″) 20.0 kg (44.1 lbs) 31 - 80 mm (1.2 - 3.1″) 310 x 360 mm (12.2 x 14.2″)
Valve Test Unit (VTU)	Dimensions (H x W x D): Weight: Max. sample size	115 x 176 x 189 mm (4.5 x 6.9 x 7.4″) 2.6 kg (5.7 lbs) Ø 24.1 mm (0.95″)

Basic specifications

Measuring range	1 - 5000 mbar	
Displayed resolution	0 - 1000 mbar: 1000 - 5000 mbar:	0,1 mbar 1 mbar
Accuracy	1 - 350 mbar: 350 - 5000 mbar:	± 0.5 mbar or ±0.5% of reading ± 5 mbar or ±0.5% of reading
Repeatability	1 - 350 mbar: Regulation at a fixed pressure: ± 0.5 mbar Overshoot regulation to a fixed pressure: ≤ 1.5 mbar + 0.25% of set-point 350 - 5000 mbar: Regulation at a fixed pressure: ± 3 mbar Overshoot regulation to a fixed pressure: ≤ 5 mbar + 0.2% of set-point	
Pressure units	mbar, mmHG or psi	
Test time	1 - 500 sec.	
Calibration interval	12 months	

Data Collection

Number of test definitions	999	
Data collection capacity	Test data from more than 1.000.000 tests	
Collection type	Stand alone units: Using PC Software:	Exported to CSV file Local or external SQL database

Conformity

- CE mark
- China RoHS II

Other standards

- ASTM F-1140, F-2054, F-2095, F-2096
- CFR 21 part 11 (with PC SW or use label printer, stand-alone without printer not approved).
- ISO 11607

8. Consumables, accessories and options

Ordering items

When ordering any of the below listed items please state carefully the item number, the item specification and the number of items wanted and send the order to your spare parts dealer.

Consumables

- Septa, ø21/ø3x3mm (1000 pcs) black, Ser. Cpl. . . . . P/N 340313
- Septa, ø21/ø3x1mm (1000 pcs) grey, Ser. Cpl. . . . . P/N 340314
- Septa, blue 20 mm (roll of 10m), Ser. Cpl.. . . . . P/N 340904
- Needle Ø3x30mm, Ser. Cpl.. . . . . P/N 340315
- Needle Ø1.8x30mm, Ser. Cpl. . . . . P/N 340316
- Needle Ø4x30mm, Ser. Cpl.. . . . . P/N 340409
- Filter element, filter Ø6-Ø6, for "Feed" hose, Ser. Cpl. . . . . P/N 390081
- Filter element, water sep., pressure regulator (5 pcs.), Ser. Cpl. . . . . P/N 390250
- Filter element, air, pressure regulator (10 pcs.), Ser. Cpl.. . . . . P/N 390251

Accessories

- Barcode Scanner w. USB cable, Ser. Cpl. . . . . P/N 301189
- Stand, basic, Ser. Cpl.. . . . . P/N 340323
- Fixture f. ASTM restraining, Ser. Cpl.. . . . . P/N 340325
- PPC 300 II, Ser. Cpl. . . . . P/N 330237
- Package Fixture f. PPC 300 II, Ser. Cpl. . . . . P/N 340347
- IV-Bag adapter, Ser. Cpl. . . . . P/N 340338
- Valve Test Unit (VTU), Ser. Cpl. . . . . P/N 340350
- Test Head without needle, Ser. Cpl. . . . . P/N 390044
- Filter Ø6-Ø6, for feed hose, Ser. Cpl.. . . . . P/N 390075
- Valve, release package pressure, Ser. Cpl.. . . . . P/N 390095
- Needle, sharp, Ø4mm, Ser. Cpl. . . . . P/N 340303
- Needle, flat, Ø4mm, Ser. Cpl.. . . . . P/N 340304
- Needle, twin, handheld, w. cover, Ser. Cpl.. . . . . P/N 340317
- Needle, handheld, mono (with Y-piece), Ser. Cpl. . . . . P/N 340336
- Needle, handheld, separate feed and sense, Ser. Cpl. . . . . P/N 380410
- Needle, handheld, single (with small needle in big), Ser. Cpl.. . . . . P/N 390119
- Pressure regulator incl. Filter . . . . . P/N 390208

Options

- Option, Creep Tests, Lippke 5000.. . . . . P/N 390076
- Option, Bubble Test, Lippke 5000. . . . . P/N 390077
- Option, PC SW, CFR 21 part 11, Lippke 5000. . . . . P/N 390078
- Option, PC SW, Combined, Creep, Bubble Tests, Lippke 5000. . . . . P/N 390079

Printer

All measurement data can be printed continuously on a connected USB-printer.
MOCON Europe A/S does not offer printers, but we have tested the following printers and can therefore recommend these:

Epson TM-T20II Series
Epson TM-U220B Series

NOTE! If you want to connect another printer model, it must be compatible with the ESC/POSTM standard.

Appendix

Safety and Handling Instructions

WARNING! Personnel operating and maintaining the device must be familiar with all aspects of its operation and be proficient in maintenance.
Such personnel should review the following precautions to promote safety awareness.
Failure to follow the safety instructions could result in fire, electric shock, injury, or damage to the Dansensor® Lippke® 5000 or other property.

NOTE! The manufacturer cannot be held responsible for any damage caused by incorrect installation, operation or maintenance of the device.

Installation

- To ensure the best installation with the least technical problems, please install equipment as described in this manual.
- Only operate the system with the mains voltage indicated on the nameplate.
- Never install the equipment in explosive environments.
- Always use correct fittings when connecting compressed air to the device.
- Provide adequate space around the equipment for proper ventilation.
- The units are Class 2 appliances and thus do not require an earthed mains connection.
- It is the responsibility of the owner and operator(s) of the equipment, that the installation is made in accordance with local rules and regulations.

Handling and maintenance

- Be sure to disconnect compressed air supply hoses and electrical power cables before performing any cleaning or maintenance.
- All panels and protective guards must be in place before operating the equipment.
- When operating or maintaining the equipment always obey the relevant rules and regulations for workers safety.
- Never block gas outlets.
- Handle the device with care. It is made of metal, glass, and plastic and has sensitive electronic components inside.
- The device can be damaged if dropped, burned, or crushed, or if it comes in contact with liquid.
- Do not use a damaged device, such as one with a cracked screen, as it may cause injury.
- Do not cover the device with a cloth or piece of plastic to protect it from dust, as this prevents free air circulation around the device and might lead to overheating.
- Do not expose the device to heavy moisture or heat and keep it away from direct sunlight.

Repairing

- Don't open the device and do not attempt to repair it yourself, as this may damage it or may cause injury to you.
- If device is damaged, malfunctions, or comes in contact with liquid, contact your authorized MOCON Dansensor service provider.

Cables

- If using other third-party cables and power plugs, make sure that they are compatible with USB 2.0 or later, and that the power supply and plugs are compliant with applicable country regulations.
- Replace damaged cables immediately. Using damaged cables can cause fire, electric shock, injury, or damage to the device or other property.

Explosive atmospheres

- Using the device in any area with a potentially explosive atmosphere, such as areas where the air contains high levels of flammable chemicals, vapours, or particles, may be hazardous. Obey all signs and instructions.

Cleaning

- Never use hard tools or abrasive materials when cleaning any part of the device.
- Never use cleaning agents containing chlorinated solvents or acetic or phosphoric acid. These constitute a health hazard and could damage the device.
- Avoid getting moisture in openings.
- When using compressed air for cleaning of e.g. hoses or needles, use safety goggles and make sure that items have been disconnected from the device.

Using connectors, ports, and buttons

- Never force a connector into a port or apply excessive pressure to a button, because this may cause damage that is not covered under the warranty.
- If the connector and port don't join with reasonable ease, they probably don't match. Check for obstructions and make sure that the connector matches the port and that you have positioned the connector correctly in relation to the port.

Operating/storing temperatures

- The device is designed to be operated and stored in the temperatures ranges as specified in *"Basic specifications" on page 125*.
  The device can be damaged if stored or operated outside of these temperature ranges.
- Avoid exposing the device to dramatic changes in temperature or humidity.

NOTE! If the device has been stored in a cold location and then moved to a warmer location then at least one hour of acclimatization is required before switching on the unit.
If operated in a cold and high humidity environment it is advisable to let the device heat up for 30 minutes after is has been switched on.

NOTE! The device must be placed in a temperature controlled environment in order to perform within specifications. Temperature and pressure in a (closed) test volume are proportional i.e. changes in ambient temperature will have an impact on the pressure during a leak test.

Toxic and Hazardous Substances or Elements

(For China RoHS compliance)

See table on the next page.

Lippke 5000
Hazardous Substances
有害物质

Component name (组件名称)	Hazardous Substances 有害物质					
	Lead 铅 (Pb)	Mercury 汞 (Hg)	Cadmium 镉 (Cd)	Hexavalent Chromium 六价铬 (Cr(Vi))	Polybrominated Biphenyls 多溴联苯 (PPB)	Polybrominated Diphenyl Ethers 多溴联苯醚 (PBDE)
Metal enclosure with foils and labels (带包装箔和标签的金属外壳)	O	O	O	O	O	O
Power supply (PSU) (供电单元 (PSU))	O	O	O	O	O	O
Printed circuit board assembly (Main PCB) (印刷电路板组件（主 PCB))	O	O	O	O	O	O
Printed circuit board with pressure sensors (带压力传感器的印刷电路板)	O	O	O	O	O	O
Block assembly for pressure senor PCB (without PCB) (压力传感器 PCB 的阀块组件（无 PCB))	X	O	O	O	O	O
Proportional valve (比例阀)	X	O	O	O	O	O
On/Off valve (开/关阀)	O	O	O	O	O	O
Valve block assembly (without valves) (阀块组件（无阀))	X	O	O	O	O	O
Internal cables and connections to external cables, on/off rocker switch (内部电缆和外部电缆接头，开/关船型开关)	O	O	O	O	O	O
Mounting hardware (screws, studs, feet) (安装零件（螺钉、螺柱、支脚))	X	O	O	O	O	O
Silencer with fitting (带配件的消音器)	X	O	O	O	O	O
Display panel (LCD) (显示面板 (LCD))	O	O	O	O	O	O
Printed circuit board display PCB (印刷电路板显示屏 PCB)	O	O	O	O	O	O
Bracket and frame for display mounting (用于安装显示屏的支架和框架)	O	O	O	O	O	O
Plastic sides for lid (盖的塑料边)	O	O	O	O	O	O
External power cabels to PSU (PSU 的外部电源线)	O	O	O	O	O	O

This table is prepared in accordance with the provisions of SJ/T 11364. (此表是按照 SJ/T 11364 的规定而编制的。)

O: It indicates that the content of the hazardous substance contained in all of the homogeneous materials for this part is below the limit requirements of GB/T 26572.
表示该部件所有均质材料中所含有害物质的含量低于 GB/T 26572 的限值要求。

X: It indicates that the content of the hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirements of GB/T 26572.
表示该部件采用的至少一种均质材料中所含有害物质的含量高于 GB/T 26572 的限值要求。

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01/2023

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