



# Operation Manual



## MANUAL FILTER INTEGRITY TEST SYSTEM



### Safety Cautions:

- Please read the Manual carefully before starting up, so as to prevent the unintentional injury of the operation or the damage of the instrument and other undesirable incidents.
- Please read the "Installation & " before the operation to ensure the correct installation and connection of the various parts of the instrument.
- Please invite an experienced operator to guide before the operation at the first time, so as to prevent the occurrence of unexpected events caused by mis-operation.
- Please pay attention to the point that whether the pressure within the test tank is released completely before use, so as to prevent producing of the panic or dangerous atmosphere.

## Signs of the Manual:



This is a comment sign which can increase the characteristics for the use and operation of the instrument.



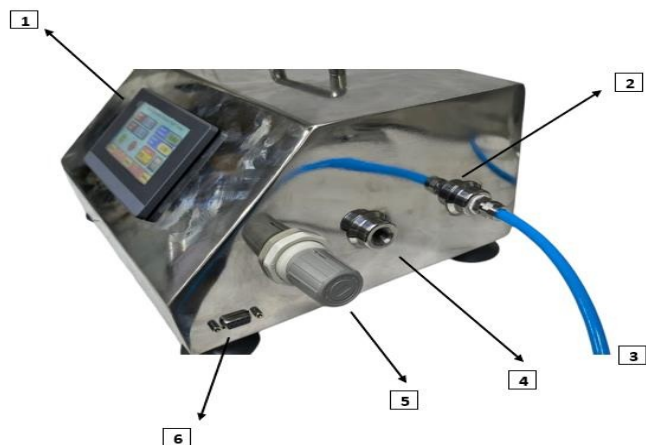
This is a warning sign which indicates that this point is very important for the safety of the users, and it may cause serious damage of the instrument and personal accident in case of neglectation.



For example: “Ensure that the pressure within the filter has been released completely before removing the filter.”

This is a sign of example.

## FILTER INTEGRITY TEST SYSTEM (FITS)- USER GUIDE



Sr. No	Description	Sr. No	Description
1	TFT Touch Screen 4.5"	4	BPT Outlet Point
2	Pressure Air Inlet	5	Pressure Controller
3	Pressure Hose	6	RS-232 Port

### 1.2 Operation Requirements

- ◆ Alternating current power supply: 170 to 260V, the frequency thereof is 50/60Hz;
- ◆ Clean and oil-free compressed air or nitrogen;
- ◆ The maximum working pressure of compressed air or nitrogen is less than 80psi

### Advices of safety measures:



1. Please ensure the reliable grounding of the power supply;
2. The diameter of power cable is more than 2.5mm<sup>2</sup>;
3. Please do not soak the instrument into water or other liquids.

## 2. Introduction

### Features

A **Filter Integrity Test System (FITS)** is used to **verify the integrity of membrane filters** (before and after use) to ensure there are **no leaks, pinholes, or defects**. It is essential in **pharma, biotech, food & beverage, and laboratory filtration**

### What is a Filter Integrity Test?

It is a **non-destructive test** performed on membrane filters to confirm that the filter performs as per its rated pore size.

### Common Integrity Test Methods

#### Bubble Point Test (BPT)

- Determines the **maximum pore size**
- Gas pressure applied to a wetted membrane
- Bubble formation indicates pore breakthrough **Most commonly used**

#### Pressure Hold Test

- Pressurize the system and **monitor pressure decay**
- Simple and cost-effective
- Often used in labs

## Typical Applications

- Sterile filtration validation
- Pharmaceutical production
- Biotechnology processes
- Water & microbiology labs
- Filter validation before/after filtration

## Key Components of a Filter Integrity Test System

- Oil-free air / nitrogen supply
- Pressure regulator & precision gauge
- Digital controller (manual or automatic)
- Filter holder connection (disc / capsule / cartridge)
- Data logging (for automatic models)

## Typical Specifications (Example)

- Test Range: 0–6 bar / 0–100 psi
- Accuracy:  $\pm 1\%$  FS
- Compatible Filters:
  - Disc filters (25, 47, 90, 142, 293 mm)
  - Cartridge filters
- Membrane Types: PES, PVDF, Nylon, PTFE, MCE
- Compliance: GMP / GLP / FDA (for auto models)

## Manual vs Automatic Systems

Feature	Manual	Automatic
Cost	Low	Higher
Feature	Manual	Automatic
Operation	Operator dependent	Fully automated
Data logging	Yes	Yes

## Construction

- **Wetted Parts:** SS 316
- **Tubing:** PU / PTFE
- **Seals & O-rings:** Silicone / Viton
- **Enclosure:** SS housing

## Environmental

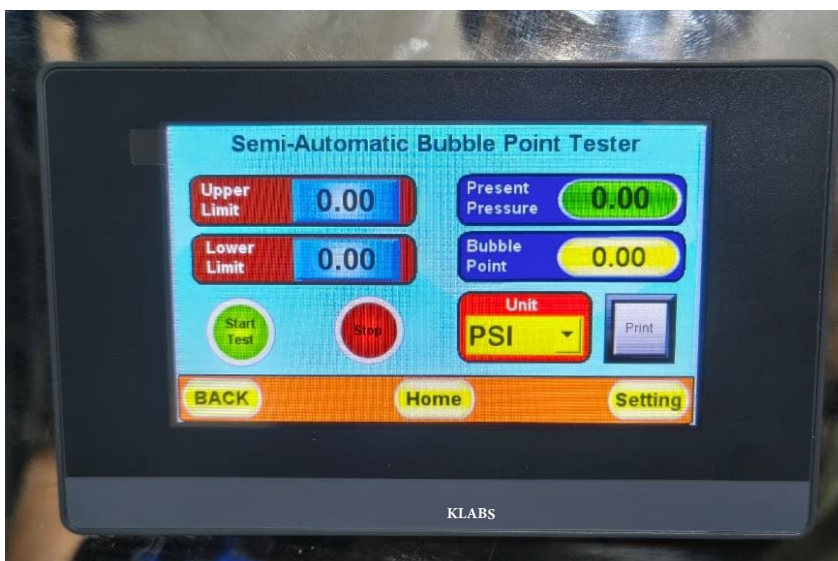
- **Operating Temperature:** 5 – 40 °C
- **Humidity:** ≤ 80% RH (non-condensing)

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## Utilities

- **Air Supply Requirement:** 4 – 6 bar, oil-free / Nitrogen
- **Power Supply** (if digital):
  - 230 VAC ±10%, 50 Hz



The different operation states of the instrument are indicated through the three state indication lamps on the panel of the instrument.

One the front side take Filter COA Set Upper Limit (BPT Max Value ) and Lower Limit (BPT Low Value )

## 1.4 Human-computer Interface



The “system state” item of the liquid crystal display can display states:

“Stop” and Stop indicates that the instrument is currently in standby mode and the pressure in the filter has been released completely; in case of the display self-checking state.

## 1.5 Operation State Indicated with an LED

After Set Upper and Lower Value

Connect N2 Or Compressed Air to inlet poin

## 1.6

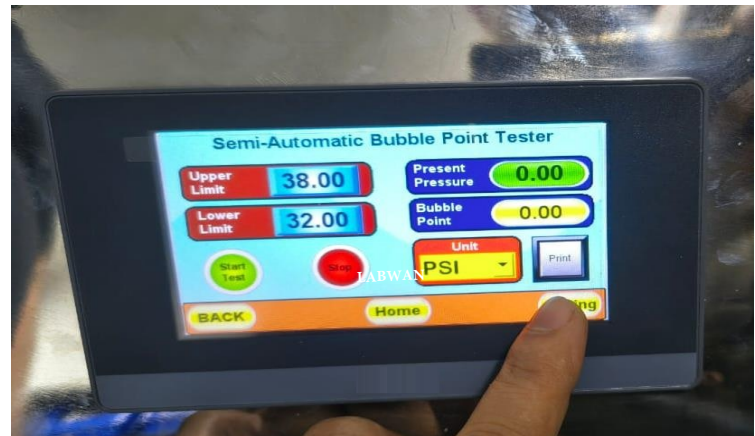
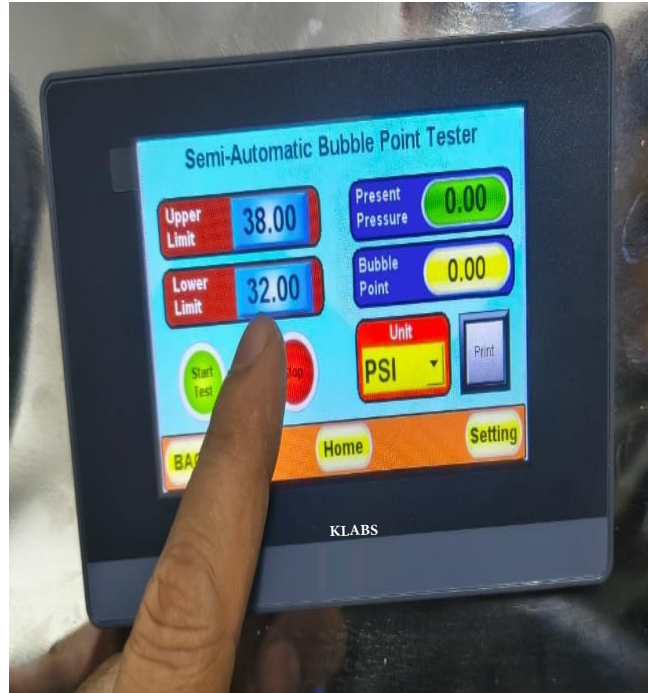
The “system state” item of the liquid crystal display can display two states:

**Present Pressure** Showing compress air  
Actual pressure

**Bubble Point** Showing Bubble Point Value

After Set Upper and lower valve then press

There are two units 1) Mbar and PSI  
**Next**



## 1.7 Operation Data

Fill Operator Data

1. Part No
2. Serial no.
3. Operator Name
4. Filter Line Size
5. Filter Part No.

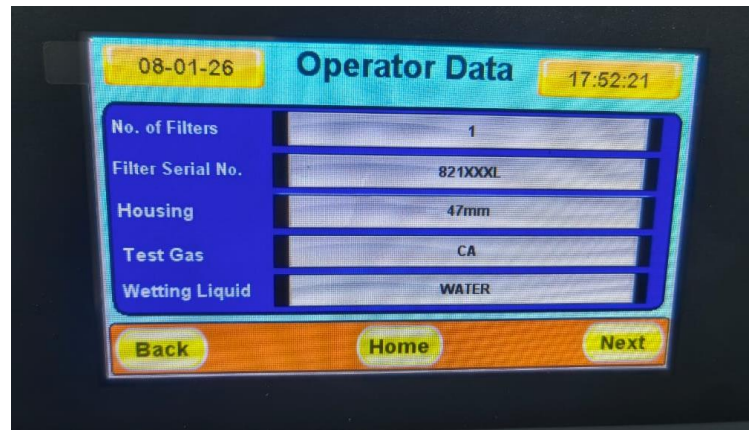
then press **Next**



## 1.8 Operation Data

The “system state” item of the liquid crystal display can display states:

1. No. Of Filter Set
2. Filter Serial No.
3. Housing Size / Type
4. Test Gas
5. Wetted liquid



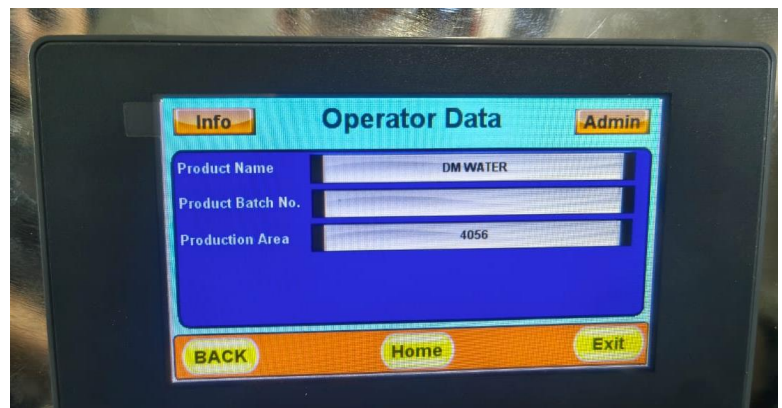
in case of the display of “Operation”, it can be indicated that the instrument is currently in testing or self-checking state.

then press **Next**

### Operation State Indicated with an LED

1. Product Name
2. Production Batch No.
3. Production Area

then press **Exit**



### Operation State Indicated

- Outlet tube connect to filtration unit /Housing
- Make Sure filter Wetted Properly
- Then Simultaneously regulate slowly

Check Assembly (Next Page



## Operating Instructions

### Pressure Maintaining Method

The following phenomenon is known as diffusion flow (D): when the filter element is soaked, the gas with a certain of volume and pressure is isolated upstream the filter, and when the pressure of the gas injected is close to that of the bubble point of the filter element, there is only small amount of gas is diffused from the gas-liquid interface of the pore canal without passing a large volume of gas through the hole.

## 2.0 Installation and Connection of All Instrument Parts

Install according to the following steps after unpacking:

- Inspect whether the instrument is complete according to the packing list.
- Ensure that the instrument did not be damaged during the transportation process.
- Remove the external packing of the chassis, and place that in the correct position.
- Inspect whether the fuse of the instrument is installed well, and connect cable of commercial power to connecting terminal.
- Connect the gas source and the filter according to the installation diagram.
- Electrify the system.

## Operating Instructions

### Test Preparation

- 1) Place the instrument in a stable and clean operation platform;
- 2) Prepare dry and clean gas or nitrogen as the gas source;
- 3) Prepare a clean infiltrating solution, specifically the hydrophilic filter

element can use pure water, the hydrophobic filter element can use an alcohol infiltrating solution, or directly measured by means of a water immersion method.

The frequently-used hydrophilic filter comprises nylon membrane, mixed cellulose membrane, and polyether sulfone membrane and etc.;



The frequently-use hydrophobic filter element comprises PVDF (Polyvinylidene Fluoride) membrane, and PTFE (Polytetrafluoroethylene) membrane and etc.;

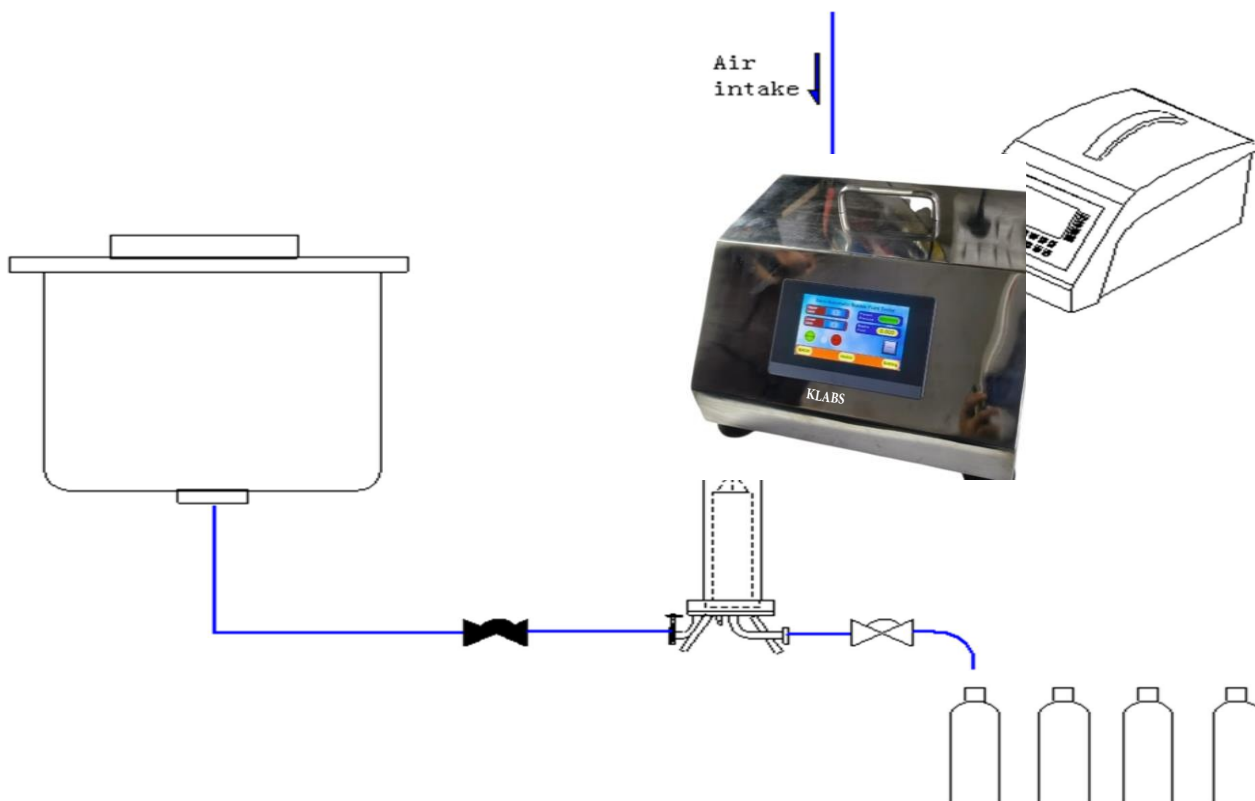


When the infiltrating solution is a flammable liquid, the ventilation of the testing environment should be maintained, and the open flame should be strictly prohibited.

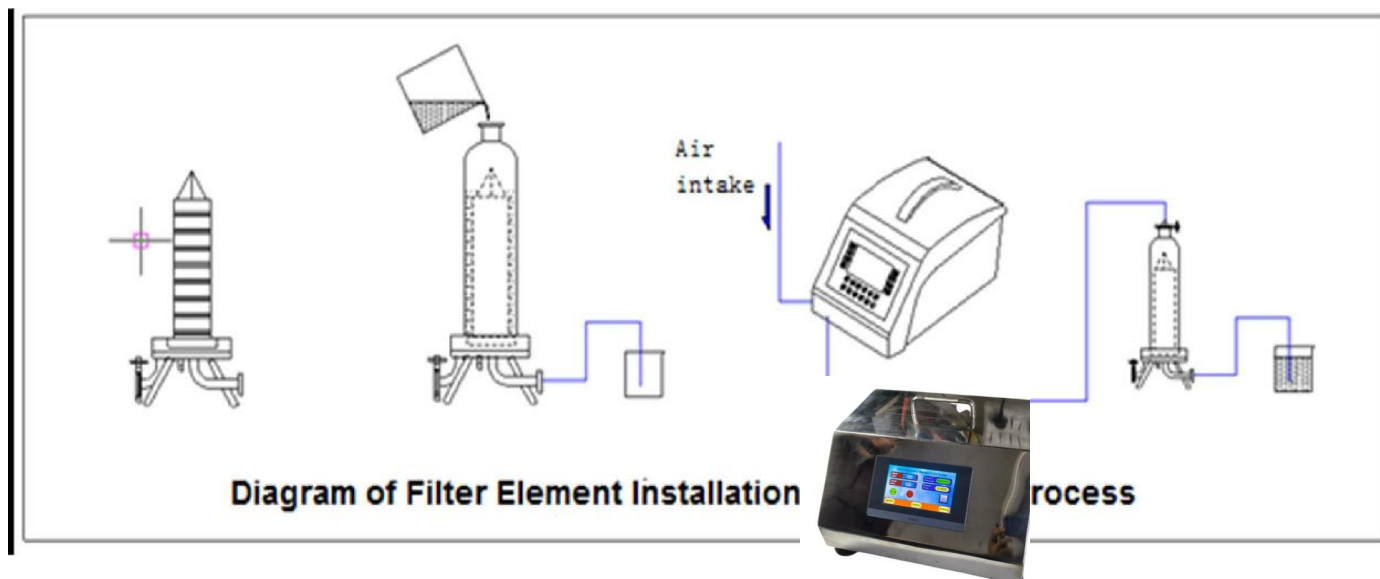
As the tester is a high-precision electronic component, the cleanness of the storing and testing environment should be maintained, and avoid using the instrument in high- temperature or condensation places.

## Operating Instructions

### FIT testing – how?



## Filter Element Installation and Soaking



Operating Instructions

### Data Printing

The KLABS integrity tester can carry out the printing function in two conditions.

The first one is as follows: when the test of the basic bubble point, enhanced bubble point, diffusion flow or water immersion testing method is carried out by the instrument, the test result interface will be popped up, and the current test results can be printed automatically or manually (pressing the button of "print").

The other one is carried out by printing from the historical records.

As the printer belongs to a slow mechanical response device, so please patiently wait for the printing process after pressing the button of "print"

For Example :

SCIENTIFIC	
Semi-Automatic Bubble Point Tester	
Flow / Bubble Point Test Report	
-----	
Report No.	: 001
Model	:
Part No.	:
Serial No.	:
Operator	:
Production Area	:
Filter Line	:
Product Name	:
Product Batch No.	:
Filter Part No.	:
No. of Filters	:
Filter Serial No.	:
Filter Housing	:
Test Gas	: Air / N2
Minimum BP	:
Max Pressure	:
Set Pressure	:
Pressure Units	: mbar / psi
Result	: PASS / FAIL
Outside Limit	: Yes / No
Measured	:
Test Completed On	:
Comments:	
Signature:	_____