analyser

the art of measuring

User Manual

FlowLab

IMT.Analytics

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IMT.Analytics

1 Preface

Application
This documentation applies to the products described as: FlowLab

Software versions
This documentation applies to the following versions:

- FlowLab Software Version 6.3.2 or higher

When using older or newer versions small differences to this manual may appear.

Key to symbols used in this manual
References to pages and chapters:
The symbol (→XY) is used for references to pages and chapters.

Version details
Edition of this User Manual: Release 03
Subject to technical modification without prior warning.

2 Intended Use

To minimize connectivity problems, please follow the recommend connection procedure:

1. Power on the device and wait until it is started up
2. Attach the USB cable to the computer (on the first time the driver is installed automatically)
3. Start FlowLab
4. Start measuring

Power saving options like standby or hibernate while FlowLab is running and devices are connected can lead to connectivity problems.

FlowLab is a measuring software for testing and calibrating ventilators together with a FlowAnalyser or CITREX. The FlowLab should not be used for patient monitoring. FlowLab must not be connected to a ventilator which is being used by a patient.

3 Technical Data

3.1 Minimum PC Requirements

- Intel® Pentium® 4 2.4 GHz
- (Intel® Core TM2 Duo recommended)
- Microsoft® Windows® Vista, 7, 8 (32 bit/ 64 bit)
- Microsoft® .NET Framework 3.5 or above
- 128 MB RAM (512 MB recommended)
- 160 MB hard disc space (full installation)
- Screen 800 × 600 (1280 × 1024 recommended)

4 FlowLab Software

4.1 Installation

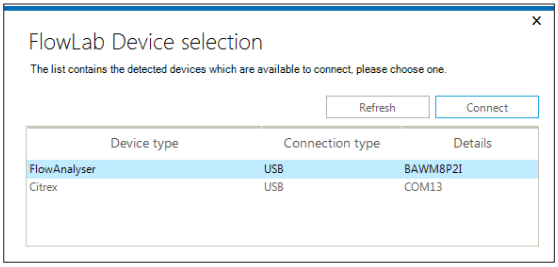
Check that your computer meets all minimum requirements before installation (→ 3.1 Minimum PC Requirements) and disconnect your FlowAnalyser/CITREX. Please observe the software instructions during the installation process. During installation the digitally signed USB drivers will be automatically installed. If you wish to reinstall the driver manually after installation, the USB drivers are located in your FlowLab installation directory.

Download-Link: https://www.imtanalytics.com/en/Analyser/CITREX_H5_Software

4.2 Compatible devices

FlowLab can be operated with a FlowAnalyser or CITREX. To make the user manual easier to read, all examples are related to FlowAnalyser.

On application startup FlowLab searches for available devices. If there are multiple devices to connect, you are going to be asked which one you would like to use.

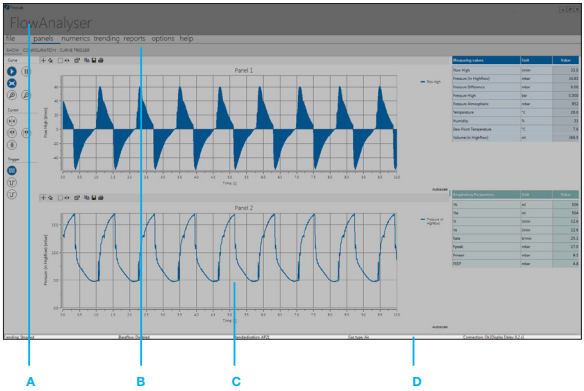


Note about multiple instances: It is possible to have multiple FlowLab instances running in parallel. However there exists only one configuration file. This means that the last instance which is closed overwrites the previous configuration. This use case is not officially supported.

4.3 USB Communication

If your device was not configured to use FlowLab software in the factory, you will need to do this afterwards by entering a clearance code for the USB interface. This code can be obtained from your FlowAnalyser/CITREX dealer.

4.4 Overview



A

Application header. Information about the connected device and window commands (minimize, restore and close)

B

Menu and submenu navigation. FlowLab software is divided into five main areas: Panels- Numeric, Trending, Reports, Options

Select the required area from the main navigation area. The main areas will be described in the following chapters.

C

Content area. Content of selected main area (specific for each)

D

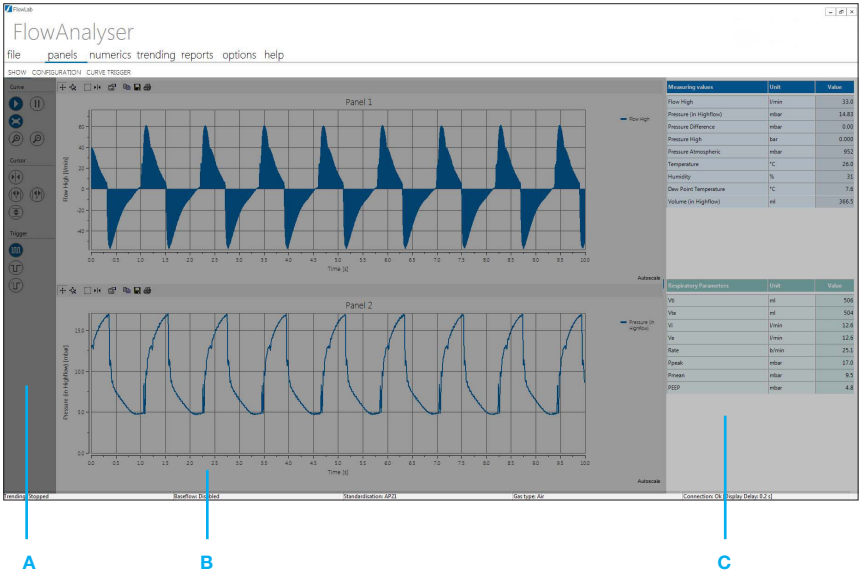
Status bar. Status information

4.5 Panels

The panels area has three specific areas:

- Show
- Configuration
- Curve Trigger

4.5.1 Panels Show

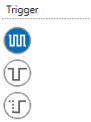


A

Panels toolbar. Toolbar buttons to configure the behavior of the real-time curves

Run / Freeze. Run / freeze the panels
Autoscale. Automatic adjustment of real-time curve value scale
Zoom in / Zoom out. Increase / decrease scale resolution

Global value cursor. Y value at the point where the cursor is
Global time / frequency cursor. Time / frequency between two cursors
Global value to value cursor. Y value between two cursors



Curve trigger auto. Continuous panel updates (roll mode)
Curve trigger normal. Updates when specific curve trigger reached
Curve trigger single. Updates once when specific curve trigger reached

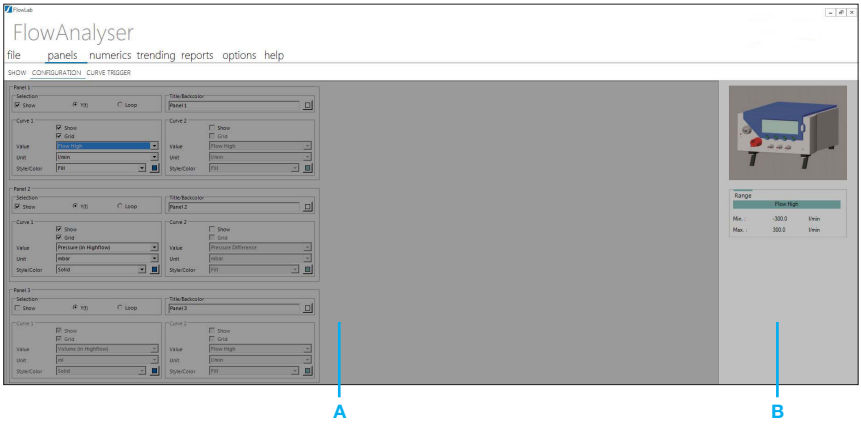
B

Real-time curves. Graphical representation of data
A maximum of 6 readings can be graphically displayed here. All related settings can be made in the **Configuration** menu.

C

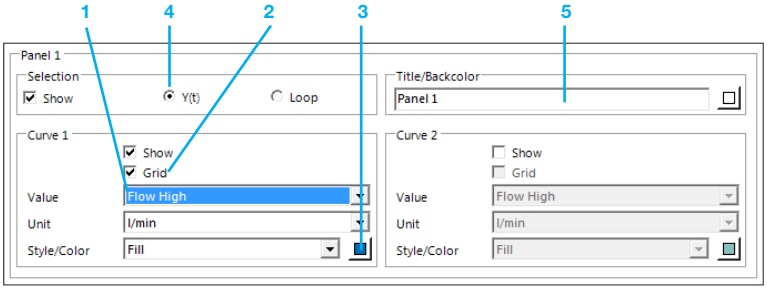
Numerics side panel. Current numerical values. The configuration can be made in **Numerics configuration** menu.

4.5.2 Panels Configuration



A

Value configuration. Configure which values and appearance of real-time curves. A maximum of three real-time curves can be displayed simultaneously.



1 **Value.** Measured variable and its unit of measurement.

2 **Grid.** A grid can be displayed.

3 Line color and its type can be chosen.

4 **Curve type.** The curve can be chosen in function of the time or as loop. For the display of a loop two values have to be selected, one for the x-axis and one for the y-axis.

5 **Title/Background color.** Each chart can here be identified by title. The back color of the chart can be changed.

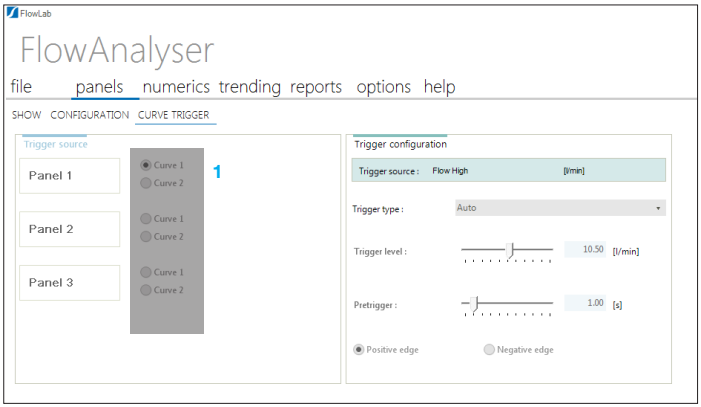
B

Sensor highlighter. Whenever you select a variable the corresponding mechanical connection is highlighted in the box on the right-hand side, and the range is shown below.

4.5.3 Panels Curve Trigger

The menu **curve trigger** is relates to the graphical display of the curves.

If the curve shall be displayed as Norm- or Single Shot Curve, curve triggers are needed to start the display. Do not confuse this trigger with the volume trigger, which calculates volumes and respiratory coefficients.



1 **Trigger source.** Here you can choose the curve which shall be adjusted below.

2 **Trigger type.** Here you can choose the type of the trigger. This setting stays the same for all curves. There are three different types:

- **Auto:** This always displays the updated curve. No curve triggers are needed!
- **Norm:** This displays a static curve, which is updated with each new trigger.
- **Single Shot:** Use this function to capture a single curve. The trigger has to be activated manually.

3 **Trigger level.** The curve starts to be displayed when the measured value passes this level.

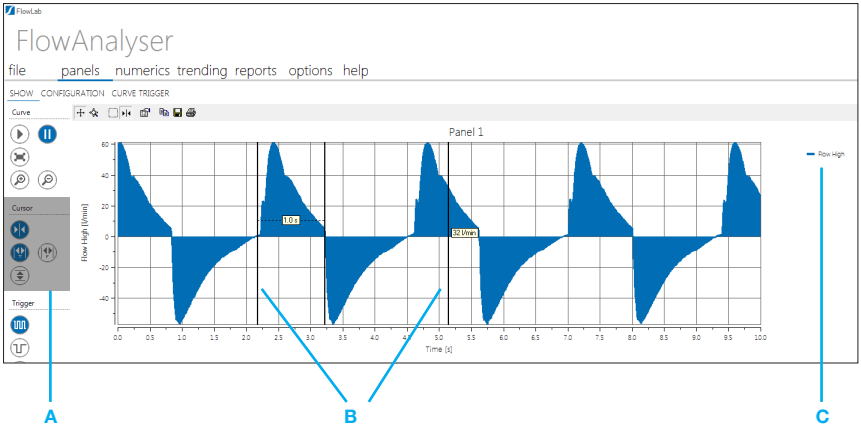
4 **Pretrigger.** If a certain period of the curve has to be displayed prior the effective trigger point this can be adjusted here.

5 **Edge** for the trigger.

4.5.4 Customizing cursors and curves

If you wish to look at a curve in more detail, this can easily be done with the cursors provided. Altogether there are 4 different styles of cursor

Value Y	Displays the Y value at the point where the cursor is intersected.
Period	Displays the time period between two cursors.
Frequency	Displays the frequency between two cursors.
Peak - Peak	Displays the Y value between two cursors.



A

Global Cursor. By choosing one of the 4 corresponding icons you can select a cursor to apply to all displayed curves in the corresponding style.

B

Individual Curser. It is also possible to apply a cursor only for one curve. If you right-click the cursor, a menu pops up where you can change the style of the cursor.

C

Curve. If two curves are displayed simultaneously in one panel, you can click the corresponding curve title to select the curve relating to the cursor.

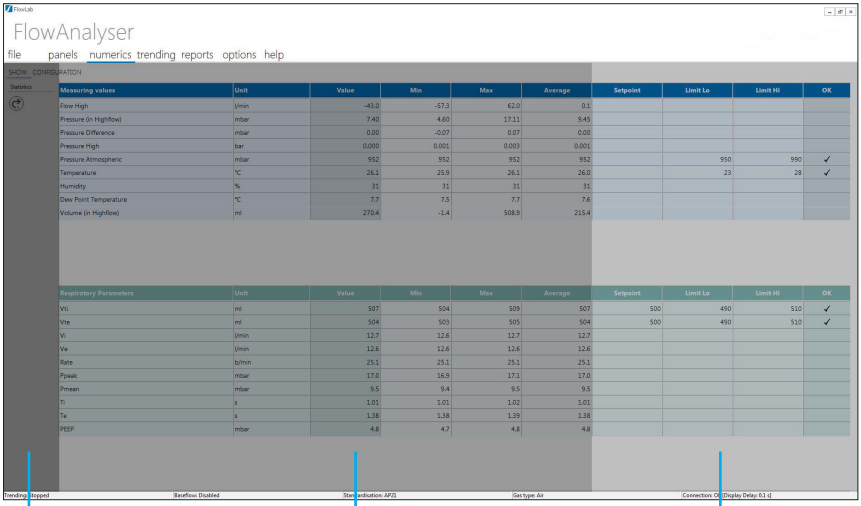
4.6 Numerics

The numerics area has two specific areas:

- Show
- Configuration

4.6.1 Numerics Show

The general sensor variables are in the top section and the respiratory parameters in the bottom section.



A

Numerics toolbar. Reset the statistics min / max / average

B

Numerical values. Numerically representation of data. The statistical values for each variable can also be seen here, i.e. the mean value, and the smallest and largest value since the last reset

C

Tolerance check. Configurable setpoint and limits

It's possible to check the tolerance of each measurement. If the measured value is fitting to the predefined accepted measurement range, the software will mark the value with: ✓

4.6.2 Numerics Configuration

A

Value Configuration. The overall appearance of the Numerics display can also be adjusted to individual requirements in the Configuration menu. In the columns Setpoint, Limit Lo and Limit Hi you can set the conditions for the automatic check of the measurements.

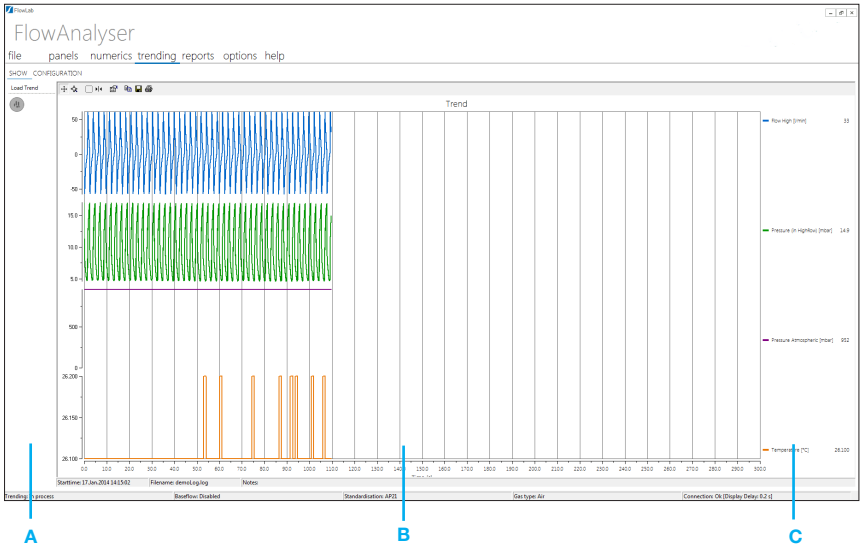
B

Sensor highlighter. Whenever you select a variable the corresponding mechanical connection is highlighted in the box on the right-hand side, and the range is shown below.

4.7 Trending

In this area measurements can be recorded within a specific time range. Select the **Configuration** menu to start a specific trending recording

4.7.1 Trending Show



In the Display view the curves can be visualized and analyzed. By pressing load trend you can load another trending file which has been produced earlier.

A

Trending Toolbar. Load a trend that was saved before into the show tab.

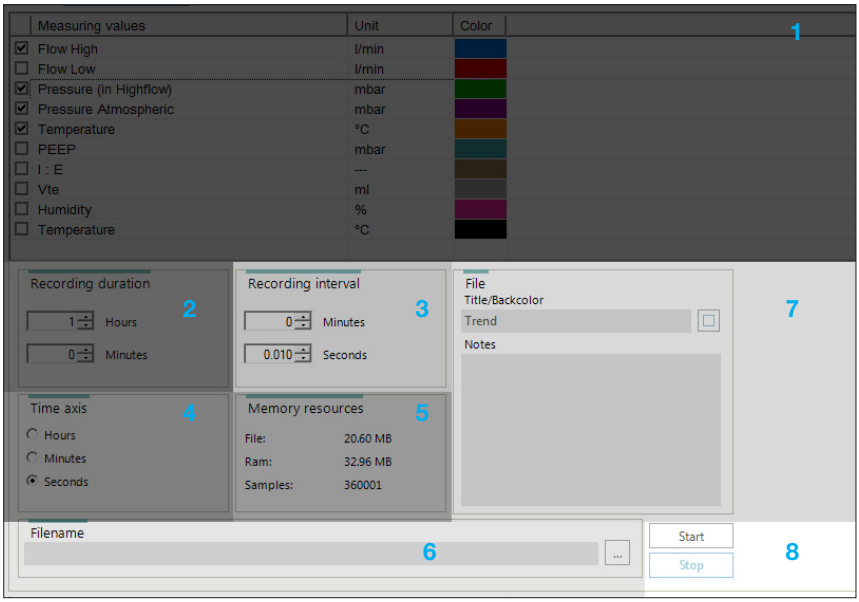
B

Trending Curves. Graphical representation of data recording. All related settings can be made in the **Configuration** menu.

C

Measuring Values. Whenever you select a variable Measuring Values. Current measuring values. The configuration can be made in **Configuration** menu.

4.7.2 Trending Configuration



1 In the field **Measured Variables** you can define the variables and units of measurement to be recorded. You can also select the color of the graphical display. The corresponding mechanical connection and possible measurement range can be found in the box at the top right-hand section of the display.

2 In the field **Recording duration** you can specify the length of the data recording. The range goes from 1 minute to 100 hours.

3 The field **Recording interval** defines how often data should be recorded. Select from a range of 0.005 seconds to 60 minutes.

4 In the **Time axis** field you can select the unit of measurement which applies to the x-axis, of the sub-tab "show".

5 In the field **Memory resources** you can check the expected file size and required working memory.

Depending on the recording time and interval very large files a ring buffer has to be used to visualize the trending data. The data recording into the file however is not affected by this. If this is the case, the keyword “Buffer” is displayed next to the RAM resource.

6 In the **File name** field you can specify the file name and storage location.

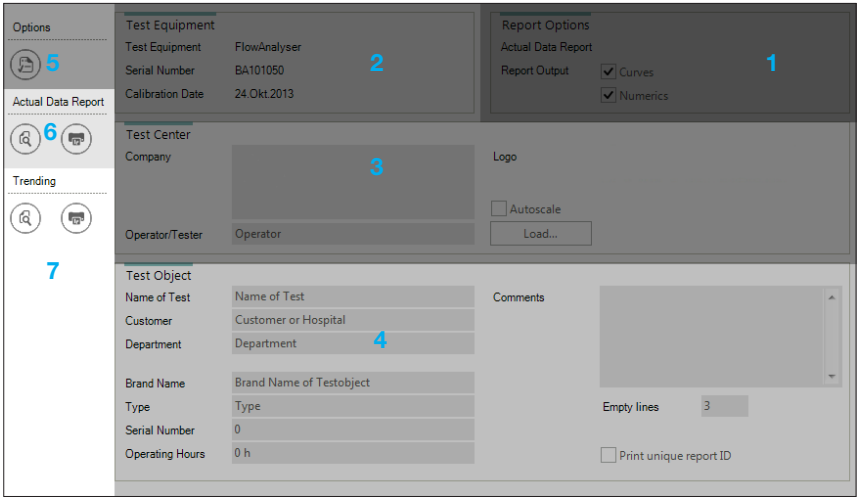
7 The section **File** enables you can to enter a title, which will be displayed above the trending curves. Descriptive notes will be copied to the trending file but are not shown in the **Display** section.

8 Once the **Start** button is pressed, the data are captured as defined and displayed in real time. A File save location is required to to Start a trending. Two files will be generated: The *.log file is containing all measurements and can be used by Excel or other data base systems. The *.cfg file contains the information for FlowLab to be able to reopen the trending files.

You can follow the data acquisition in the Trending show menu.

4.8 Reports

The reporting function is to print out your measurements in a sheet which includes the measured numerical data, the curves, the company's data and descriptions.



1 In the **Reporting Options** area you can select whether numerical data and/or curves shall be printed in the report.

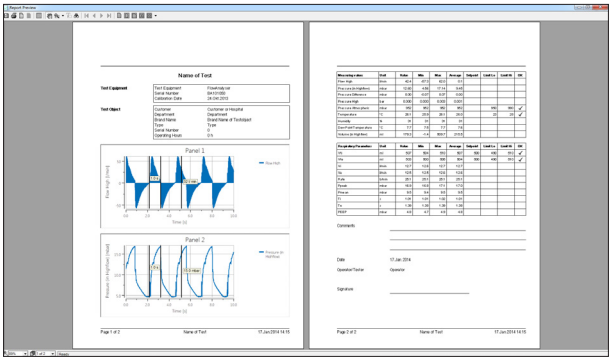
2 In the **Test Equipment** area you see all information regarding the connected device. The data is automatically loaded from the device.

3 In the **Test Center** field you can edit the company's data and there is also the possibility to load your company's logo to be shown in the report.

4 Use the **Test Object** area to edit the information about the test object, such as place of test, tested instrument or serial number of the instrument under test. Further you can define to print a unique ID number in the footer of the report.

5 Apply changes and save configuration.

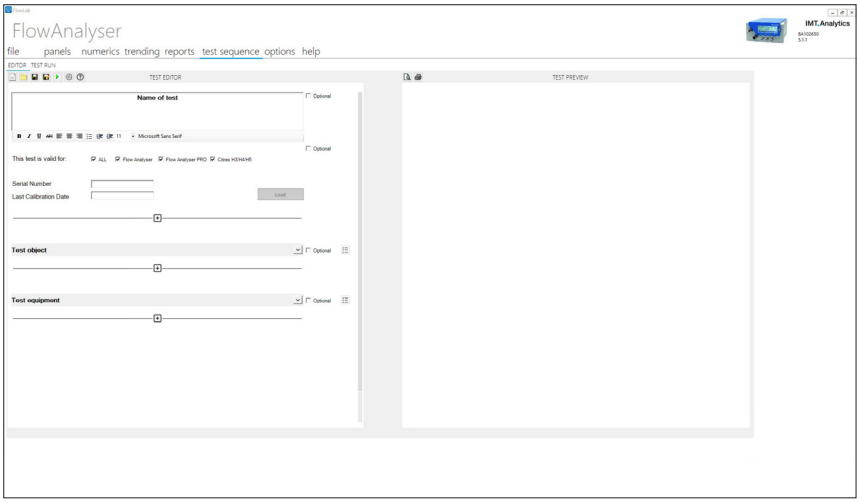
6 With the **Preview/Print Actual Data Report** button an actual data report can be produced, which displays the actual numerical data and curves.
On the preview screen you have access to the printing options as well as to page layout and save settings options.



7 With the **Preview/Print Trending Report** button a trending data report can be produced, which displays the trending curves.

4.9 Test Sequences

The test sequence editor is designed to create and execute a variety of different test applications including verification tests, system acceptance tests and more by simply adding the test components in the desired order.



1 With the Editor one can:

- Define customized tests by adding different components
- Add measurements, text blocks, tables, images, FlowLab trending data and more to your test
- Preview your tests with the Preview function
- Customize the test report header
- Save your customized tests as .tst and load them later in the Test Run.

2 With the Test Run one can:

- Run your tests and export the test result as .run, .pdf or more
- Automated measurement tests with PASS/FAIL indicator based on your criteria
- Sign the test and/or add remarks

4.9.1 Password Protection

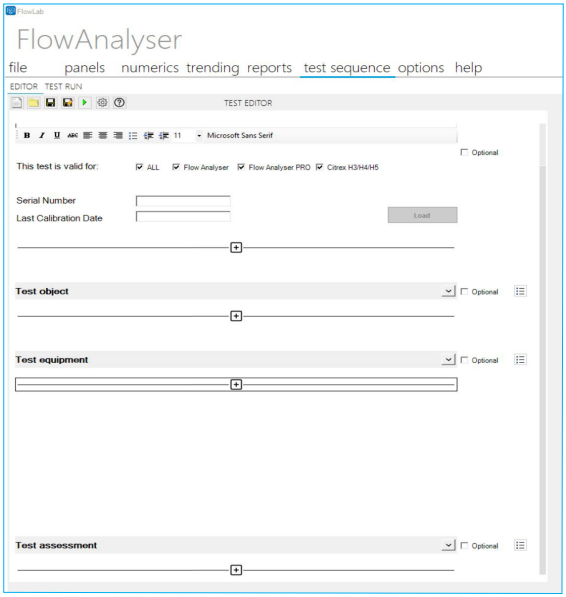
Tests can be saved with a password protection. By clicking on the gear symbol, the Test Configuration window will open.

Before saving a test, click in the checkbox of “Save test with a password”, a tick will appear. Then enter a password in the password column.

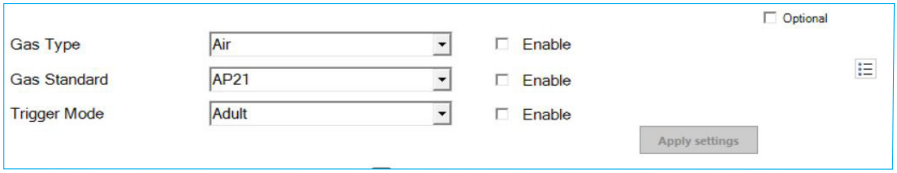
When another operator opens your saved test without the correct password entered in the Test Configuration window, the test is locked and cannot be changed.
To unlock the test, enter the correct password in the Test Configuration window. The test can now be changed by the operator.

4.9.2 Test Components

The Editor has a total of 16 Test Sequences to add to the test, by clicking on the + symbol. When creating a new test, the Test Settings test sequence is already loaded.



A Enable **Device Setting** and add them to the test.



B Use **Measured and Observed Value** to measure values within a defined range.

1. Measurement value and unit
Select the measurement value and the unit of measure.

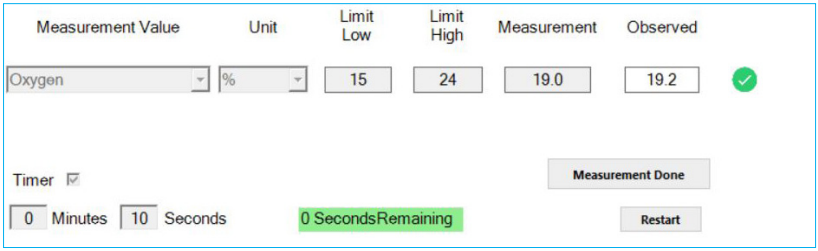
2. Limit Low/High
Set the upper and lower limit for the measurement and/or observed value(s).

3. Measurement (optional)
Measurement value from the testing device, e.g. Oxygen.

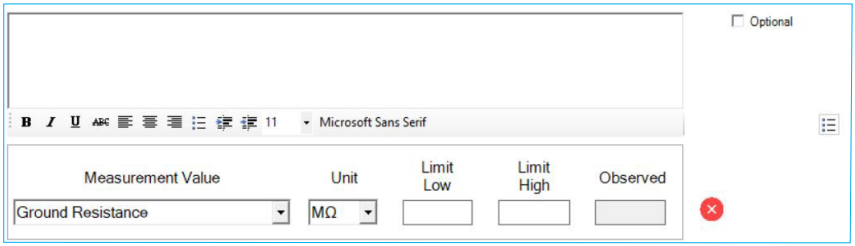
4. Observed (optional)
Observation value of your UUT or other test equipment.

5. Timer (optional)
Add a timer to the measurement. For this type of test, the operator must press "Start" while running the test. When the time set has elapsed, the measurement value is taken and the observed field is unlocked to enter the value.

6. PASS/FAIL indicator
PASS: The measurement and/or observed values are within the set limits
FAIL: The measurement and/or observed value are outside the set limits



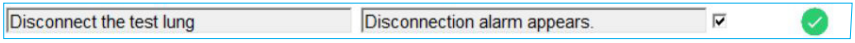
C The **Electrical Safety** test component consists of measurement value, unit, limits and observed value field. PASS/FAIL behaviour is the same as for the Measured and Observed Value component.



D The **Interaction Test** has an Action and an Expectation Field.

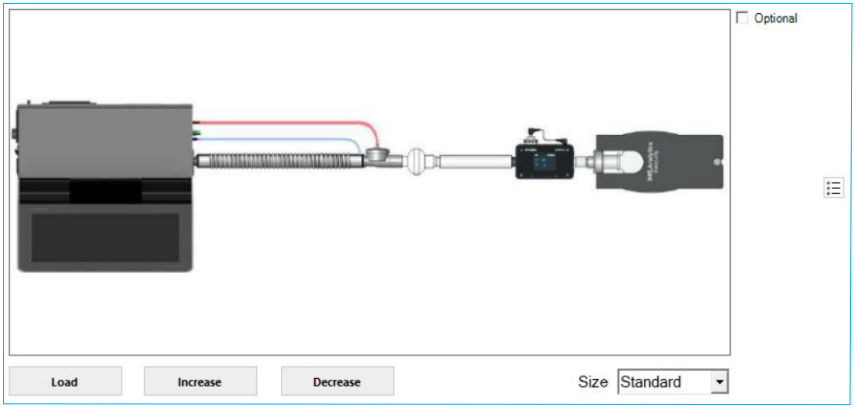
Action: Description, e.g. disconnect the test lung
Expectation: Expectation, e.g. disconnection alarm appears.

PASS/FAIL based on the checkbox which is selected by the operator.

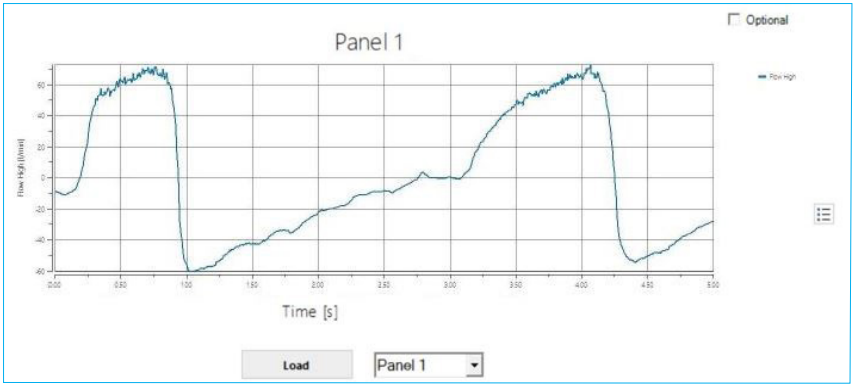


E The **Countdown Timer** can be used by the operator as a time reference. The timer will not be shown in the test export.

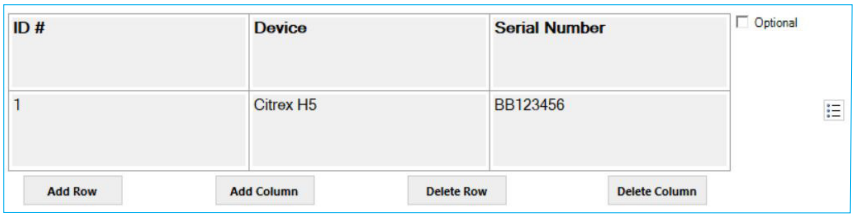
F With **Insert Image** you can add images to your test, e.g. test setups



G With **Insert Graph** you can insert panels or trending data from FlowLab for detailed measurements into your test.

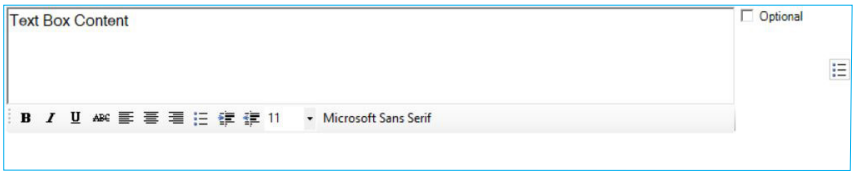


H Add a **Table**, e.g. for test equipment information.

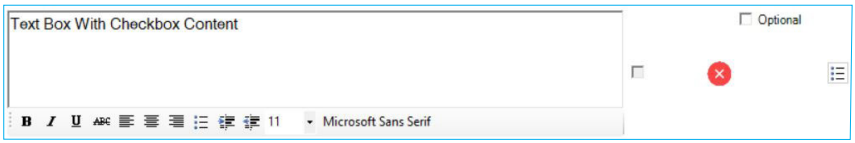


I Use **Text Field** to enter an interaction test without PASS/FAIL confirmation or to enter descriptions, e.g. serial numbers, device type and more.

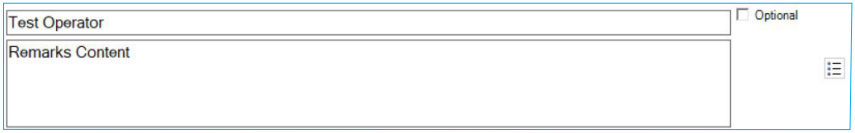
J Use **Text Box** for detailed test descriptions, notes for the operator, comments and more.



K Use **Text Box With Checkbox** for descriptions or test steps which require conformation of an action

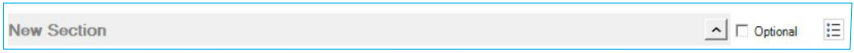


L **Remarks** from the operator or the test assessor.

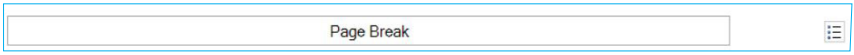


M **Signature Field** for the operator or test assessor.

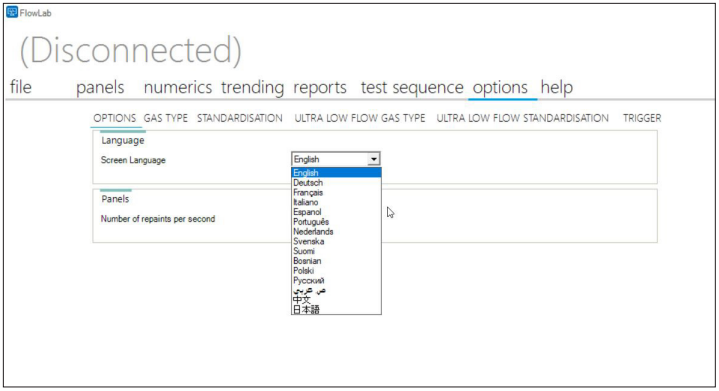
N Add a **Section** to split your test into sections for a better overview.



O Use a **Page Break** for a better test structure. This component will not be shown in the test export.



4.10 Options



In the Options menu you can set the same settings as in Menu of the device:

- Language
- Gas Type
- Gas Standardisation
- Ultra Low Flow Gas Type (PF-300 PRO only)
- Ultra Low Flow Standardisation (PF-300 PRO only)
- Volume Trigger

Warning: Except of the settings in the Options sub-tab, the device will adopt any changes that you make here to the device!

Additionally you can find the setting Performance where you can change the update rate for the real-time panels.

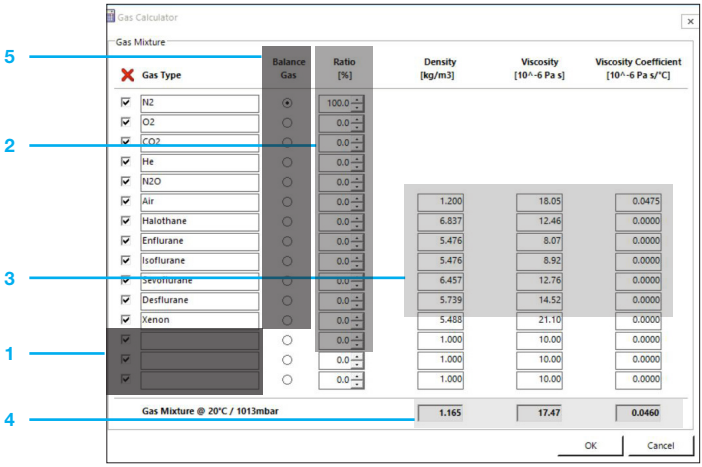
If you change the trigger setting in the flowlab, this will be changed and saved on the CITREX or FlowAnalyser too. Also, if you then disconnect the measurement devices, the setting will be kept on the measurement devices. => **FlowLab is Master**

If you save the flowlab settings for example for the bellavista ventilator to an .ini-file, and if you later load this setting-file (measurement device must be connected), all settings will be applied also to the measurement devices. => **FlowLab is Master**

If you have set up the flowlab without connection with a measurement device, and then connect a measurement devics to flowlab => all setting in FlowLab will be changed to the measurement device settings => **Measurement device is Master**

4.11 Gas Calculator

The gas calculator enables users to configure a mixture of varying gas fractions for flow and volume measurements. Users can select the ratio of standard gases as well as the ratio and physical characteristics of customized gases.

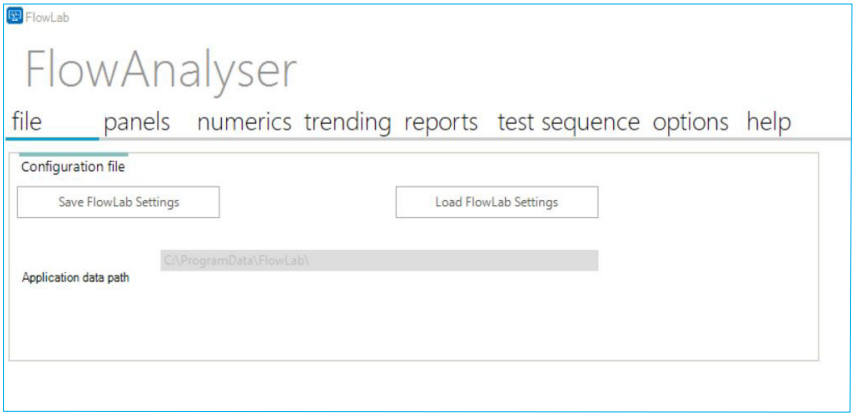


1 Customized gases (user-defined)
2 Ratio of the total gas volume
3 Physical characteristics (entered by the user)
4 Total gas mixture
5 Balance Gas (The ratio of the balance gas is automatically calculated. The sum of the ratios must be 100%.)

Warning: Custom Gas is applicable for the PF-30x devices, but not for the PF-300 PRO and Citrex Hx.

4.12 FlowLab Settings

In the header toolbar menu listing under **File** the **Load FlowLab Settings** and **Save FlowLab Settings** options allows users to save and load user-defined settings.



The following settings can be saved using this important menu function:

- Panels
- Numerics
- Trending
- Report

Warning: Saved FlowLab Settings do not save custom settings made in the Test Sequences and Options Tab, such as Gas Type.

The settings are then saved as an *.ini File.

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