



**BlowerDoor GmbH**  
MessSysteme für Luftdichtheit



## BlowerDoor MultipleFan

Airtightness measurement  
with several BlowerDoor fans  
and the Software TECLOG MultipleFan





The Energy Conservatory

Minneapolis BlowerDoor  
manufactured by The Energy Conservatory, Minneapolis, MN, USA



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MessSysteme für Luftdichtheit

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## Table of contents

<b>1</b>	<b>Introduction .....</b>	<b>7</b>
1.1	The BlowerDoor MultipleFan Measuring System .....	7
1.2	Applications .....	7
1.3	Use of digital pressure gauges .....	8
1.3.1	DG-1000.....	8
1.3.2	DG-700.....	9
1.3.3	APT in combination with DG-1000 / DG-700.....	9
<b>2</b>	<b>Software .....</b>	<b>10</b>
2.1	System requirements.....	11
2.2	Installing the TECLOG MultipleFan software .....	11
2.3	Program features of TECLOG MultipleFan.....	12
2.4	Exporting test results for creating a test report with TECTITE Express .....	14
<b>3</b>	<b>Setting up the communications link between the router, pressure gauges, and a laptop.....</b>	<b>15</b>
3.1	Overview of connection types .....	15
3.1.1	WiFi connection using a DG-1000 .....	16
3.1.2	WiFi connection using a router .....	16
3.1.3	Wired LAN connection using a router .....	17
3.2	Setting up a WiFi connection using a DG-1000.....	18
3.3	Our Recommendation: Setting up a WiFi connection using a router.....	20
3.4	Connecting the digital pressure gauges.....	21
3.4.1	Wireless connection between DG-1000 and WiFi-router or another WiFi network (WLAN) – DG-1000 settings .....	21

3.4.2	Wired LAN connection between DG-1000 and router using Ethernet cables – DG-1000 settings .....	23
3.4.3	Wireless connection between DG-700 and WiFi-router or another WiFi network (WLAN).....	24
3.5	Connecting the laptop .....	28
3.5.1	Wireless connection between laptop and WiFi-router or another WiFi network (WLAN).....	28
3.5.2	Wired LAN connection between laptop and router using an Ethernet cable .....	30
<b>4</b>	<b>Set-up of the BlowerDoor Multiple Fan Measuring System .....</b>	<b>31</b>
4.1	BlowerDoor MultipleFan with two measuring fans and two DG-1000 devices .....	32
4.2	BlowerDoor MultipleFan with three measuring fans and two DG-1000 devices .....	34
4.2.1	Set-up version with WiFi connection (WLAN) without router .....	34
4.2.2	Set-up version with WiFi connection (WLAN) using a router.....	36
4.2.3	Set-up version with wired Ethernet connection using a router .....	37
4.2.4	Set-up version with two door openings – WiFi connection (WLAN) using a router .....	38
4.3	BlowerDoor MultipleFan with twelve measuring fans .....	40
<b>5</b>	<b>Preparations and software settings before starting the test.....</b>	<b>41</b>
5.1	An Overview of the Most Important Steps.....	41
5.2	Configure default settings in TECLOG .....	44
5.3	Registering and Setting Up Measuring Devices .....	46
5.3.1	Activating the measuring devices.....	48
5.3.1.1	Testing the connection of the measuring devices with TECLOG4 .....	48
5.3.1.2	Display of all properly connected measuring devices.....	49
5.3.2	Activation of the connected measuring devices .....	50

5.3.3	Configuring the differential pressure channels.....	52
5.3.3.1	Opening the Channel Settings window.....	53
5.3.3.2	Activating and configuring the differential pressure channels.....	54
5.3.3.3	Cruise control – Individual device settings .....	58
<b>6</b>	<b>Conducting measurements with TECLOG MultipleFan.....</b>	<b>59</b>
6.1	Starting and ending the measurement.....	59
6.2	Data recording mode: Action window overview .....	61
6.2.1	Overview: Controlling the gauges (DG-1000, DG-700) via the control panel .....	62
6.2.2	Overview: Live diagram with measuring curves.....	66
6.2.3	Overview: Digital value display .....	70
6.3	Recording a test series.....	74
6.3.1	Starting the measurement .....	75
6.3.2	Displaying central controller ( <i>MASTER</i> ) .....	75
6.3.3	Configuring the test mode: depressurization or pressurization .....	75
6.3.4	Recording the baseline pressure differential before the test.....	76
6.3.5	Measurement series (depressurization or pressurization) .....	81
6.3.6	Continuing measurement series with one less fan .....	90
6.3.7	Recording the baseline pressure differential after the measurement.....	92
6.3.8	Reviewing the series of measurements .....	97
6.3.9	Ending the measurement.....	99
6.4	Displaying the measurement result in TECLOG MultipleFan.....	99
6.4.1	Diagram with measuring curve .....	102
6.4.2	Display of measurement result .....	103
6.4.3	Measuring data in Airtightness Results table in TECLOG4 .....	103
6.4.4	Enter climate parameters (View/Edit Test Details).....	104
6.4.5	Creation of a .bld file with the Export to TECTITE Express button .....	105

<b>7</b>	<b>Menu Bar, Toolbar, Zooming, Periods of Record, Data Export .....</b>	<b>106</b>
7.1	Menu bar .....	106
7.2	Toolbar .....	108
7.3	Shortcuts .....	110
7.4	Working in the diagram (zooming etc.) .....	111
7.5	Creating, deleting, or renaming periods of record .....	114
7.5.1	Create measurement period in live diagram .....	114
7.5.2	Create measurement period subsequently.....	115
7.5.3	Deleting periods of record.....	118
7.5.4	Renaming periods of record .....	119
7.6	Export in different file formats .....	120
<b>8</b>	<b>Troubleshooting .....</b>	<b>121</b>
8.1	No connection between TECLOG MultipleFan and measurement device .....	121
8.2	Measurement is interrupted .....	121
	<b>Our Service Offer .....</b>	<b>122</b>
	<b>Guarantee .....</b>	<b>124</b>

# 1 Introduction

## 1.1 The BlowerDoor MultipleFan Measuring System

Minneapolis BlowerDoor Measuring Systems are modular and allow you to combine several system components. BlowerDoor MultipleFan Systems are made up of two or more measuring fans, several differential pressure gauges, and the respective accessories. These systems are suitable for airtightness tests of large and very large buildings of residential and commercial use, as for example apartment or office buildings, schools, nursing homes, as well as warehouses and production halls.

The separate calibration of measuring fans and pressure gauges maintains the high precision of the measuring system even when combining different components.

The number of the BlowerDoor measuring fans and pressure gauges can be adjusted to your needs. With the [TECLOG4](#) software you can control the measuring fans automatically and centrally.

## 1.2 Applications

The BlowerDoor MultipleFan Measuring System allows for non-destructive tests and measurements of building airtightness.

**The following list shows typical areas of application:**

- Determining air tightness or air permeability of large and very large residential and commercial buildings, and comparison to the legal requirements, as for example stipulated in the Energy Savings Regulation.
- On-site leakage detection for quality assurance of the airtight layer in large and very large new buildings (apartment buildings, hospitals, gyms, high-bay warehouses, etc.)
- Leakage testing in existing buildings prior to renovations to plan targeted improvements and after, to inspect modernization measures.
- Special measurements, e.g. in fire protection (determining extinction gas holding times), etc.

### 1.3 Use of digital pressure gauges

Tests with several BlowerDoor Measuring Devices at a time require multiple pressure gauges to record the pressure differences (building pressure difference and fan pressure difference) and to control fan speed.

#### 1.3.1 DG-1000



Fig. 1.1: DG-1000

By connecting a **communication jack**, the two or three measuring fans in the recommended set-up can be controlled via a DG-1000 (see Fig. 4.6 to Fig. 4.10).



Fig. 1.2: Communication jack

(Using a DG-1000, it is possible to control up to ten measuring fans at a time.)

The DG-1000 offers **two pairs of differential pressure channels** (Channel A and Channel B) that can be used for recording pressure differences (building pressure difference or fan pressure difference).



Fig. 1.3: DG-1000 ports

The DG-1000 also comes with a built-in WiFi module allowing you to connect several devices in a wireless network.

With the Ethernet connection of the DG-1000 you can create a wired network. A router running DHCP is required for its use.



For an overview of all connections with the DG-1000 see Section 3.3.2 in your BlowerDoor Standard or MiniFan manual.



### 1.3.2 DG-700

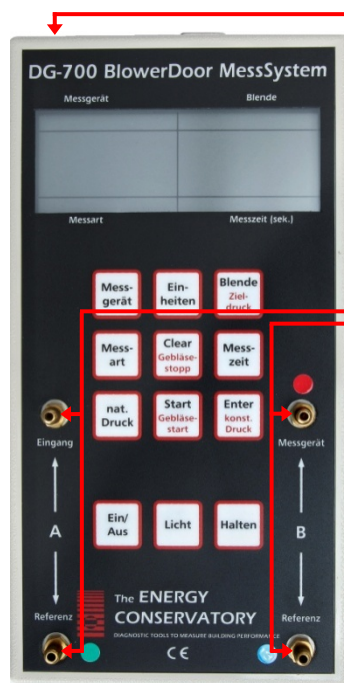


Fig. 1.4: DG-700

By connecting a communication jack to the DG-700, up to six fans can be controlled at the same time.

Like the DG-1000, the DG-700 offers two differential pressure channels (channel A and channel B) for recording pressure differences.

Via a 9-pole RS232-interface and by using a COM Port Box (serial USB adapter with several serial ports) one or more DG-700 devices can be connected to the USB-port of a laptop.

Another option is to use a TEC WiFi Link to establish a wireless connection between the DG-700 and a laptop.



Fig. 1.5: DG-700 ports

### 1.3.3 APT in combination with DG-1000 / DG-700



Fig. 1.6: APT

Depending on the model, the APT (Automated Performance Testing System) features between two and eight differential pressure channels for recording pressure differences.



The APT can not be used for the central control of several measuring fans with **TECLOG4**. This requires a DG 1000 or a DG-700.

## 2 Software

For BlowerDoor measurements in large buildings, the TECLOG MultipleFan software (version: [TECLOG4](#)) is used. The data-logger program TECLOG MultipleFan allows you to control several Minneapolis BlowerDoor fans for airtightness measurements in large buildings at the same time.

TECLOG MultipleFan is able to record data from up to sixteen DG-1000 or DG-700 devices.

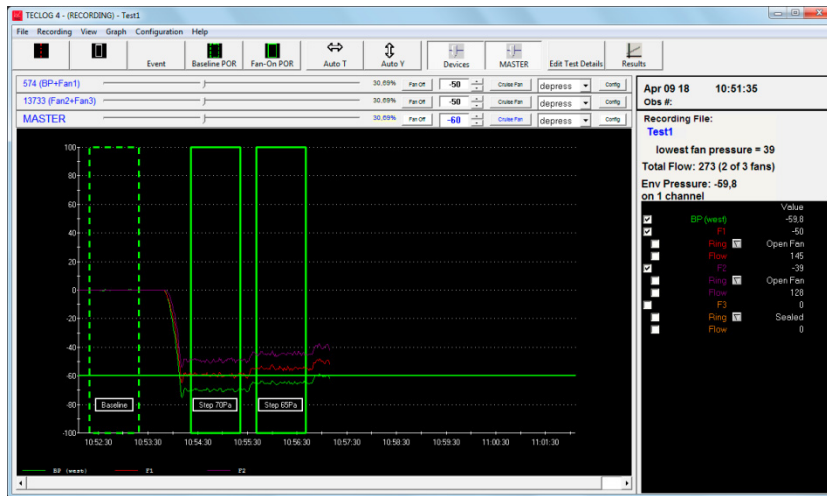


Fig. 2.1: TECLOG MultipleFan (TECLOG4) with measuring curves

In addition, you can display the leakage curve and the total measuring result as needed at a reporting pressure difference of 4 Pa, 10 Pa, 25 Pa, 50 Pa, or 75 Pa.

The evaluation of the measurement results is conducted using [TECTITE EXPRESS 5.1](#). A test report in accordance with ISO 9972 or EN13829 and country-specific regulations can be printed.

All measurement data (building pressure differences and flow rates) is displayed on the screen in the form of a diagram with measured curves, and as digital read-out.

At the same time, [TECLOG4](#) writes and saves all data in a file.

## 2.1 System requirements

Software [TECLOG4](#) and drivers run on computers, notebooks, or laptops with the full version of one of the following operating systems:

- Windows 7
- Windows 8
- Windows 10

For the creation of test reports: [TECTITE EXPRESS 5.1](#).

## 2.2 Installing the TECLOG MultipleFan software

- Before installing TECLOG MultipleFan (version: [TECLOG4](#)), close all other programs (even your virus scanner).
- Insert the installation CD into the drive of your computer.
- Start the installation by double-clicking on the installation file **TECLOG4\_version\_setup.exe** and follow the installation instructions.
- After the installation is finished, eject the CD.

Unless you choose a different directory, TECLOG MultipleFan (file name: [TECLOG4](#)) is archived as follows: C:/Programme/Energy Conservatory/TECLOG4.



To start TECLOG MultipleFan (file name: [TECLOG4](#)) use the icon on your desktop, or use the Windows interface as follows: → [START](#) → [PROGRAMS](#) → [ENERGY CONSERVATORY](#) → [TECLOG4](#).

**Directly after the installation, we recommend determining your default settings (see Section 5.2), registering and activating the measurement devices in [TECLOG4](#), and assigning the channels (see Section 5.3).**



### **Note:**

Be sure that the Bluetooth function of the computer is turned off during the measurement. Otherwise, the communication between [TECLOG4](#) and the measuring device could be interrupted.

## 2.3 Program features of TECLOG MultipleFan

TECLOG MultipleFan (version: *TECLOG4*) offers three different modes of operation:

- Inactive Mode for setup,
- Data Recording Mode for measuring with a live diagram of the measurement curves
- File View Mode.



Fig. 2.2: Start screen and Setup Mode

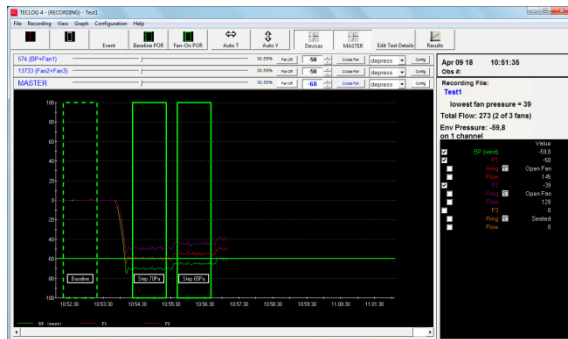


Fig. 2.3: Measuring Mode

### Setup mode (Inactive Mode)

Before starting the measurements, all measuring devices used (DG-1000, DG-700, APT) must be activated in the system and the differential pressure channels (building and fan pressure differences) assigned.

*MENU: → CONFIGURATION → SETTINGS*

### Measuring mode (Data Recording Mode)

In the measuring mode, all values measured by the connected gauges (DG-1000, DG-700, APT) are displayed as measurement curves and digital read-outs. At the same time, the measured data is written in a file and saved.

The control bar for the fans is located above the diagram. The fans can be controlled individually or in parallel with the central *MASTER* control function.

Starting the Data Recording Mode in the menu:

*→ RECORDING → START RECORDING*

Ending the Data Recording Mode:

*→ RECORDING → STOP RECORDING*



Fig. 2.4: View Mode (File)

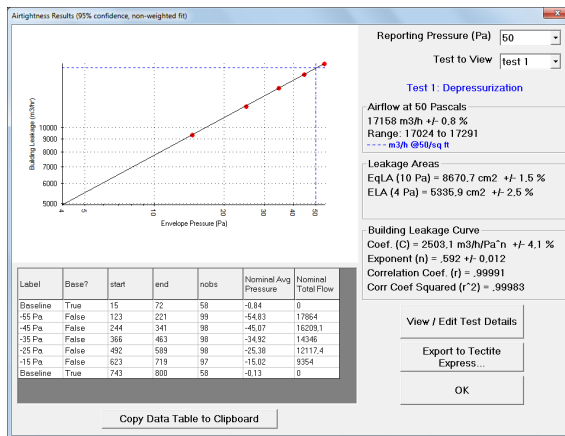


Fig. 2.5: Measurement results

## Help

The help menu can be accessed in the main menu via [→ HELP → CONTENTS](#).

The **F1**-button of your computer allows you to call up the help content at any time. The help system requires a Windows program called “winhelp.exe” which is available as a free download if needed. See <http://support.microsoft.com/?kbid=917607>.

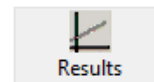
## View mode (File View Mode)

The View Mode allows you to display and edit the recorded measurements at a later point.

Accessing a saved file: [→ FILE → LOAD DATA FILE](#)

## Measuring result

The total test result can be displayed in the Data Recording Mode, as well as the File View Mode.



Click on the **RESULTS** button in the toolbar.

For the evaluation, a measuring period for the baseline pressure difference, and at least one measuring period with the fan flow at a building pressure difference (e.g. 50 Pa) must be created in the diagram.

## 2.4 Exporting test results for creating a test report with TECTITE Express

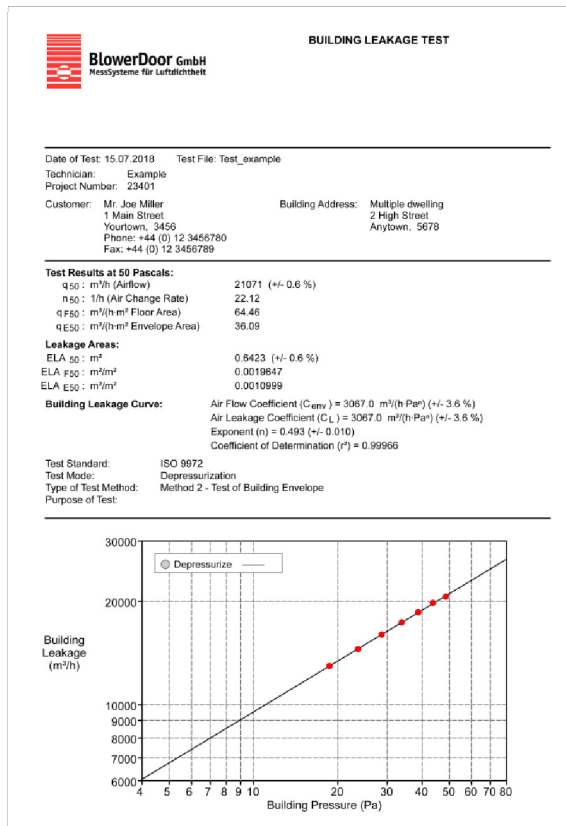


Fig. 2.6: Test report

For the evaluation, the measured values from the **AIRTIGHTNESS RESULTS** window of **TECLOG4** can be exported with help of the button **EXPORT TO TECTITE EXPRESS...** The measurement values are saved in a file ending with .bld.


The file can be loaded into **TECTITE EXPRESS 5.1** (not into older TECTITE Express versions). All data required for creating a test report is added and then the measurement record is printed.

### 3 Setting up the communications link between the router, pressure gauges, and a laptop

The two-way communications connection between a laptop and the BlowerDoor Multiple Fan Measuring System with several DG-1000 devices is always established via a local network provided either by a DG-1000 or by a router running DHCP.

A router running DHCP can provide both, a wired network (LAN) or a wireless network (WiFi network/WLAN). A wireless network can also be provided by any DG-1000.

Either the router or a DG-1000 acts as a communication center, as an access point for “clients” (such as DG-1000, DG-700 with TEC WiFi Link and laptop) that can join the network. The router or a DG-1000 provides the IP-addresses creating a network that allows all devices connected to it to communicate with each other.

 To change rapidly from a WiFi connection to a wired LAN connection (Ethernet), it is useful to install a router (see Sections 3.3 and 3.4.1/3.4.2 and the overview in Fig. 3.3 and Fig. 3.4).

Another option is plugging DG-700 devices or APT systems directly into the laptop for them to be recognized by the *TECLOG4* Software and to be used for the measurement.

#### 3.1 Overview of connection types

This is what the symbols used in the following overview diagrams stand for:



A WiFi network/WLAN (access point) is provided, e.g. by a DG-1000 or a WiFi-router.



Wireless connection to a WiFi network/WLAN (access point)



Wired Ethernet connection to a LAN-network (only applies to DG-1000)

Fig. 3.1

### 3.1.1 WiFi connection using a DG-1000



Fig. 3.2

A DG-1000 can be configured to broadcast a WiFi network/WLAN-signal, i.e. to provide an access point to which a laptop and a maximum of nine further DG-1000 devices can be connected.

Using a wireless connection, you can also connect a DG-700 in combination with TEC WiFi Link to this network.

Consult Section 3.2 for instructions on how to set up such a DG-1000 WiFi network.

Subsequently, connect the laptop (see Section 3.5) and further DG-1000 (see Section 3.4.1) and/or DG-700 devices via WiFi/WLAN (see Section 3.4.3).

### 3.1.2 WiFi connection using a router

It is advisable to install a WiFi-router for the communications link between the laptop and the pressure gauges (DG-1000 or DG-700 with TEC WiFi Link).



Fig. 3.3

A WiFi-router running DHCP allows you to connect several DG-1000 devices or DG-700 devices with TEC WiFi Link in a network.

The router provides a wireless access point for the communication between all connected devices.

Consult Section 3.3 for instructions on how to set up TP Link Wireless N Routers.

Subsequently, connect the laptop (see Section 3.5) and further DG-1000 (see Section 3.4.1) and/or DG-700 devices via WiFi (see Section 3.4.3).



### 3.1.3 Wired LAN connection using a router

To establish a wired connection between a laptop and several DG-1000 devices, the following is required:

- A router running DHCP.
- one Ethernet cable (network cable, stranded CAT5-cable) per DG-1000
- another Ethernet cable to connect the router and the laptop
- Use an Ethernet switch to provide more connections.

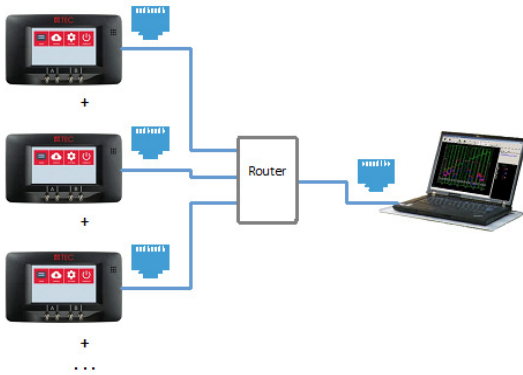


Fig. 3.4

Several DG-1000 devices and a laptop can be connected in a local area network (LAN) using Ethernet cables and a router running DHCP.

Following the installation of the router (see Section 3.3), connect the laptop and the DG-1000 devices to the router with a cable (see Sections 3.5.2 and 3.4.2).

**Note:**

Using a TEC WiFi Link, it is possible to establish a wireless connection between DG-700 devices and the WiFi-router. With a serial cable including a serial USB-adapter, the DG-700 devices can be connected directly to a laptop.



The wireless and wired connections of DG-1000 devices via a router as described in Sections 3.1.2 and 3.1.3 may be combined.

The laptop can, for example, be connected to the router using an Ethernet cable, while the connection between the pressure gauges DG-1000 or DG-700 with TEC WiFi Link and the router is wireless.

### 3.2 Setting up a WiFi connection using a DG-1000



Fig. 3.5

**We recommend setting the Auto Off Time of the DG-1000 pressure gauges to “Never”!**

- To do that, turn on the DG-1000 pressure gauge by pressing and holding the power button for approx. 3 seconds until the green power indicator light turns on.

Wait until the DG-1000 is booted. The bootup process may take a few seconds to complete.

The start screen will automatically open.

- Tap on “Settings” to get to the DG-1000 Settings.

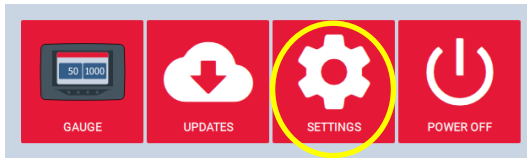


Fig. 3.6

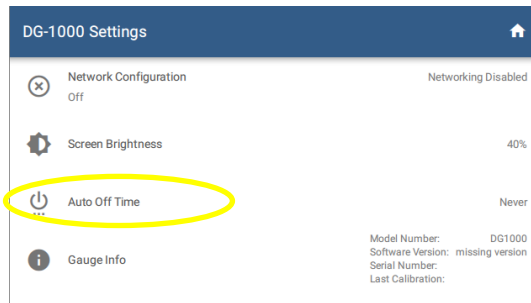


Fig. 3.7

- Then tap on “Auto Off Time” and set it to “Never”.

To establish a WiFi network (WLAN) using a DG-1000, follow these steps:

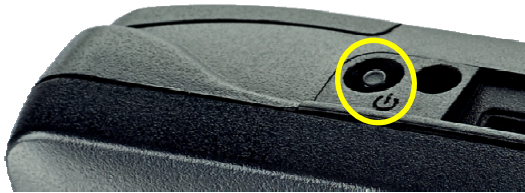


Fig. 3.8

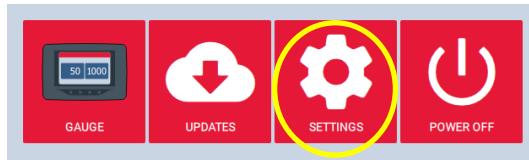


Fig. 3.9

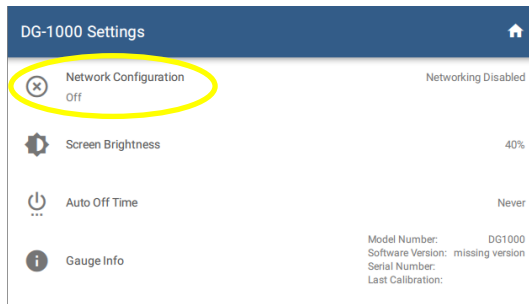


Fig. 3.10

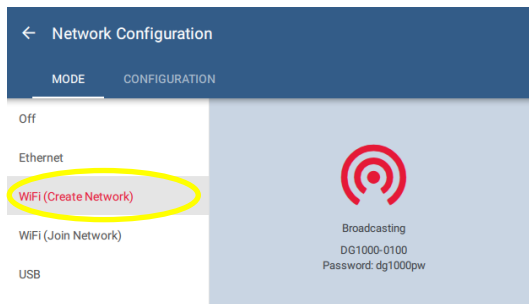


Fig. 3.11

- Turn on the DG-1000 pressure gauge by pressing and holding the power button for approx. 3 seconds until the green power indicator light turns on and wait until the DG-1000 is booted.

The bootup process may take a few seconds to complete, and the gauge is ready to be used when the start screen appears.

- To enable WiFi (Create Network) tap on “Settings” on the start screen.

- Select “Network Configuration”.

- Select “WiFi (Create Network)” from the Network Configuration options.

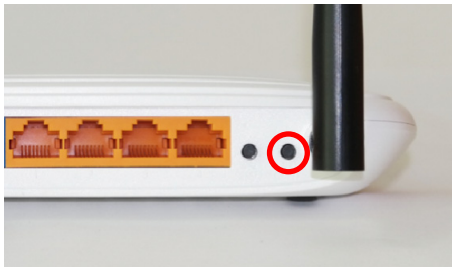
The DG-1000 will begin broadcasting a secured wireless network with the following settings.

**SSID:** DG1000-(serial number of gauge)

**Password:** dg1000pw

### 3.3 Our Recommendation: Setting up a WiFi connection using a router

To set up a WiFi network (WLAN) with the router supplied, follow the subsequent steps:



- Connect the router (e.g. TP Link Wireless N Router, see Fig. 3.12 above) with its adapter to the power grid and use the on-/off-button to switch it on.

As soon as the two indicator lights on the topside of the router on the left are permanently on, the router is ready, and WiFi network (WLAN) is transmitted.

If the WiFi indicator is not yet on, it must be switched on. Press and hold the right button (WiFi ON/OFF) on the back of the router for 2 to 3 seconds.

The router can now also be used for wired networks (LAN).

Fig. 3.12

### 3.4 Connecting the digital pressure gauges

DG-1000 devices may be connected to the router network via WiFi or Ethernet cable.

If the WiFi Network (WLAN) is provided by a DG-1000, further DG-1000 devices and DG-700 with TEC WiFi Link can only establish a wireless connection to the DG-1000 network. A DG-1000 cannot provide a wired network (LAN connection)!

Another option is to connect the DG-700 or APT directly to the laptop with a serial cable including a USB serial adapter (COM Port Box).

#### 3.4.1 Wireless connection between DG-1000 and WiFi-router or another WiFi network (WLAN) – DG-1000 settings

Start as described at the beginning of Section 3.2:

- Turn on the DG-1000.
- Tap on “Settings” on the start screen“.
- Select “Network Configuration“.

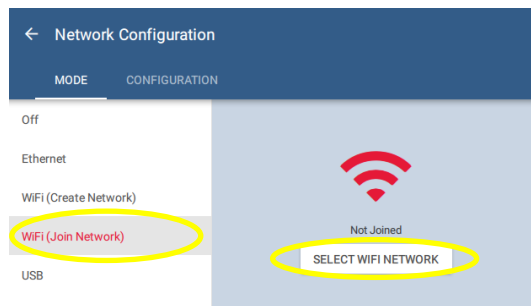


Fig. 3.13

- Then select “WiFi (Join Network)” and tap on “Select WiFi Network”.

The DG-1000 starts searching for networks

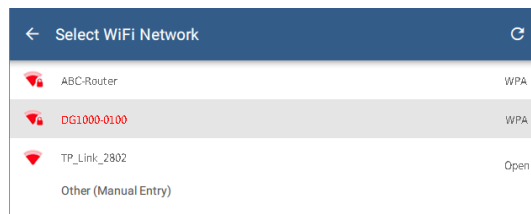


Fig. 3.14

- Select which WiFi network (WLAN) the DG-1000 should connect to from the populated list.
- It is also possible to enter the WiFi network name (SSID) manually to connect the DG-1000.



Fig. 3.15

- Enter the password if required and confirm with “Connect”.

The way the TP Link Wireless N Router supplied with the BlowerDoor MultipleFan System is configured you do not need to enter a network security key (wireless password/PIN).

You will be asked to enter a password to connect to DG-1000’s wireless network. The preset password for all DG-1000 devices is **dg1000pw**.



Fig. 3.16

Once the DG-1000 has been able to establish a connection to the WiFi network (WLAN) requested, it will display the status “Joined to...”



The DG-1000 does not allow you to enter a username, meaning it cannot connect to WiFi networks requiring a username.

- Proceed to connect further pressure gauges (DG-1000 or DG-700 with TEC WiFi Link) to the WiFi network (WLAN). Consult Section 3.4.3 for instructions on how to connect a DG-700 with TEC WiFi Link.

As soon as a laptop is connected to the same network (Section 3.5), the TEC Software installed on the computer should recognize the measuring device and establish a communications link.

### 3.4.2 Wired LAN connection between DG-1000 and router using Ethernet cables – DG-1000 settings

Start as described at the beginning of Section 3.2:

- Turn on the DG-1000.
- Tap on “Settings” on the start screen.
- Select “Network Configuration”.

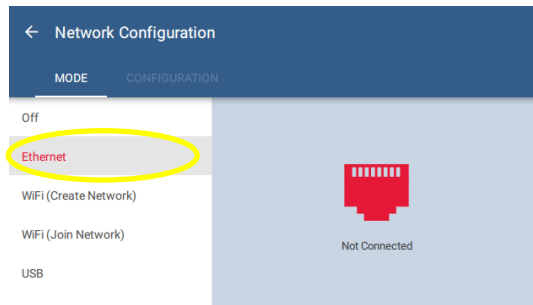


Fig. 3.17



Fig. 3.18

- Then select “Ethernet”.  
Ethernet should show “Not Connected” on the right half of the screen.

- Connect one end of an Ethernet cable (stranded CAT5 cable) to the DG-1000’s Ethernet port and the other to the Ethernet port on the router.

The Network Configuration status should update to show “Connected”.

If after two minutes, the status continues to show “Not Connected”, make sure the cables have been plugged in correctly and that the router or switch is connected to a power supply and running DHCP Server.



**Ethernet cables with a maximum length of 100 m provide a robust communications link.**

- Proceed to connect further DG-1000 pressure gauges following the same steps.

As soon as a laptop is connected to the same network (Section 3.5), the TEC Software installed on the computer should recognize the measuring device and establish a communications link.

### 3.4.3 Wireless connection between DG-700 and WiFi-router or another WiFi network (WLAN)



Fig. 3.19

To establish a wireless connection between a DG-700 pressure gauge and a WiFi-router or another WiFi network (WLAN) you will need a TEC WiFi Link.

- Connect the TEC WiFi Link to the serial port of the DG-700, plug in the power connector cable and turn on the DG-700. The blue indicator light No. 1 on the TEC WiFi Link will go on (power supply).

By default, all TEC WiFi Links are delivered in AP Direct Connect Mode, meaning they will transmit their own WiFi signal once turned on. As soon as the second indicator light on the TEC WiFi Link has turned constantly green, you may access the WiFi network (Access Point) provided by TEC WiFi Link.

To connect to another WiFi network (WLAN) (e.g. a router or DG-1000 wireless network) use the [TECLOG4](#) software to switch the TEC WiFi Links to Router Mode. You can only connect to the desired WiFi network once all TEC WiFi Links are correctly installed on a DG-700 and connected to the laptop!



**Please note the indications on connecting a laptop in Sections 3.5 and 3.5.1.**

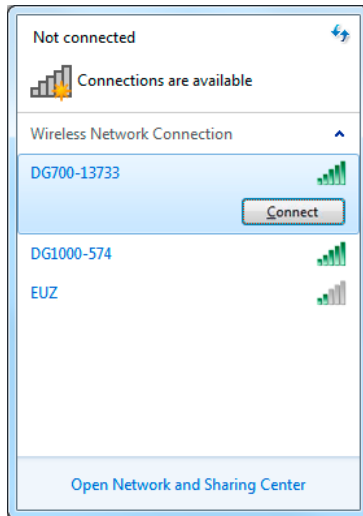


Fig. 3.20

- To connect your laptop to a DG-700 select the TEC WiFi Link network and click on “Connect”.

The TEC WiFi Link network is designated as follows:

**SSID:** DG700-(serial number of the measuring device)

**Password:** tecwifi12

- Enter the preset security key: **tecwifi12**

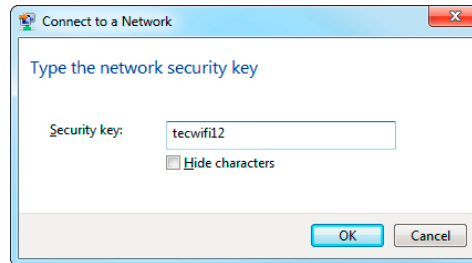


Fig. 3.21



The laptop will be connected to the TEC WiFi Link network. *TECLOG4* will recognize the DG-700 allowing access to the configuration menu.

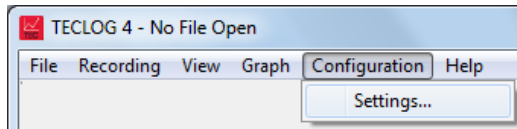


Fig. 3.22

- Open the *CONFIGURATION SETTINGS* window (For default settings see Fig. 5.13 on p. 47):

Menu: → *CONFIGURATION* → *SETTINGS*



Fig. 3.23

- Click on the button *SCAN FOR PORTS/DEVICES*

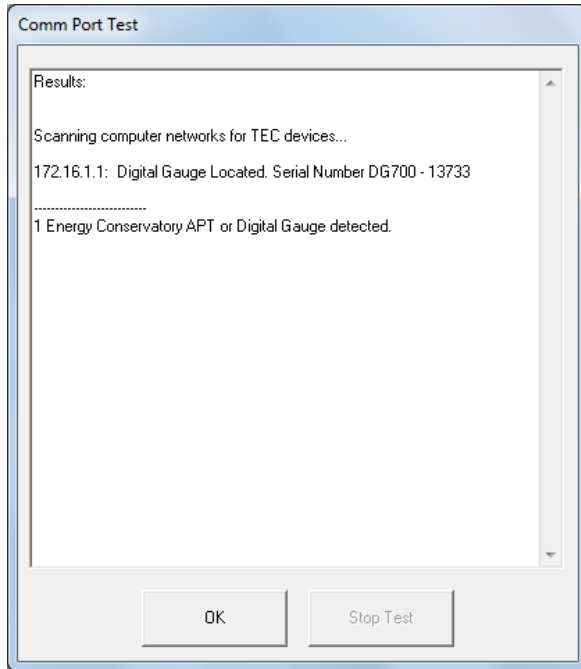


Fig. 3.24: Comm Port Test Window

- The software will find the DG-700 via the direct access point of the TEC WiFi Link Network.



Fig. 3.25: Button for the TEC WiFi Link configuration

- To switch TEC WiFi Link to Router Mode, proceed to click on the button *CONFIGURE WiFi LINK SETTINGS* in the *CONFIGURATION SETTINGS* window.

The *CONFIGURE WIFI LINK(s)* window will open showing the DG-700 to be configured.

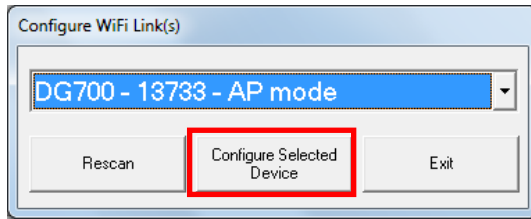


Fig. 3.26: Window with the connection mode of the TEC WiFi Link/measuring device selected.

- Click on the button *CONFIGURE SELECTED DEVICE*.  
The *CONFIGURE TEC WiFi LINK* window will open showing the connection mode for the DG-700 and allowing you to change it.

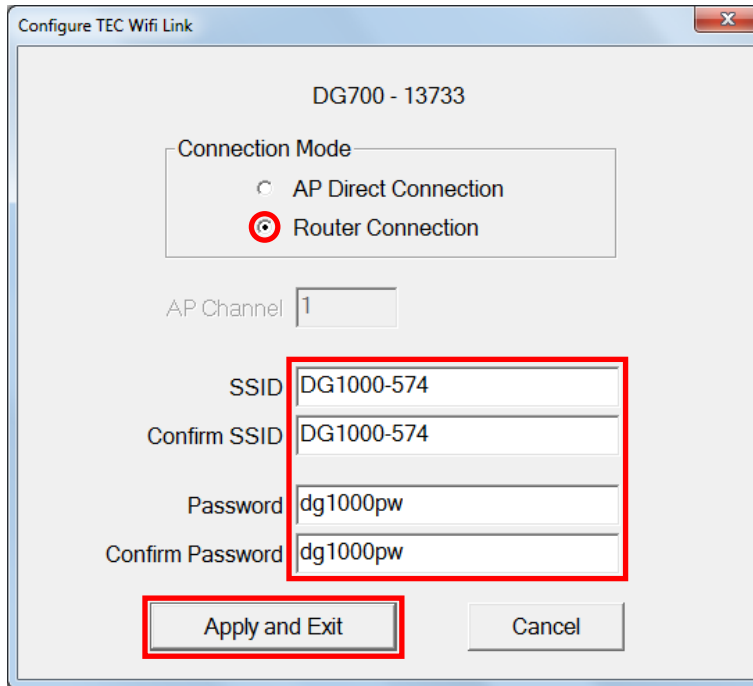
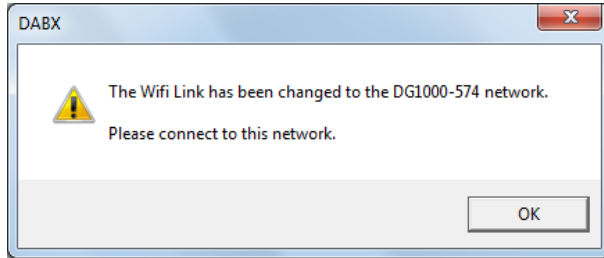


Fig. 3.27: Configuration window for TEC WiFi Links

- Select the connection mode *ROUTER CONNECTION*.

In the *SSID* field, enter the name of the network to be used (e.g. the WiFi-router network or a DG-1000 wireless network).

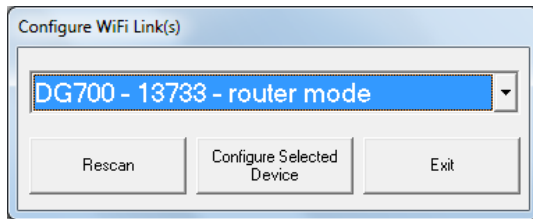
If required, enter the password and click on *APPLY AND EXIT*.



You will be given the notification that the DG-700 has successfully connected to the WiFi network selected. To exit the window click on „OK“.

Fig. 3.28: Notification window on the network connection

- Subsequently, the laptop is to be connected to the same WiFi network (WLAN); see Section 3.5.



After the laptop is connected to the same WiFi network (WLAN), when clicking on [CONFIGURE WiFi LINK SETTINGS](#) in the [CONFIGURATION SETTINGS](#) window again, you will now see the router mode.

Fig. 3.29: Window on the connection status of the selected TEC WiFi Link/measuring device

### 3.5 Connecting the laptop



Before connecting the laptop to the router or another WiFi network (WLAN), we recommend closing and saving all open files and disconnecting from any existing wired network connection.

#### 3.5.1 Wireless connection between laptop and WiFi-router or another WiFi network (WLAN)

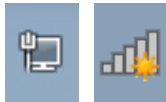


Fig. 3.30

- Make sure your laptop allows wireless connection to wireless networks.
- How you connect varies depending on the Windows operating system of your computer. You can usually open the Network Connections window on your laptop (e.g. via one of the icons in the task bar (see Fig. 3.29) or follow the path [START](#) → [SYSTEM CONTROL](#) → [NETWORK AND INTERNET](#) → [NETWORK AND SHARING CENTER](#) → [CONNECT TO A NETWORK](#)).

#### Note:

If your laptop is currently connected to another wireless network, first disconnect from the latter before connecting to your desired wireless network.

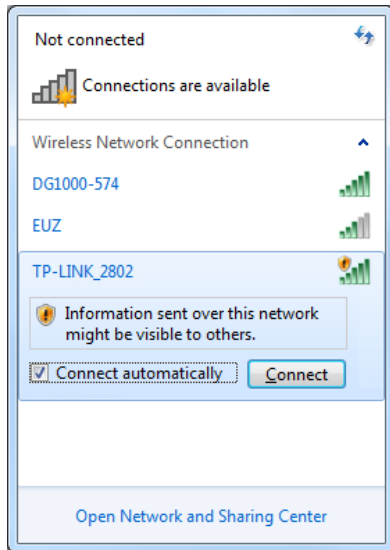


Fig. 3.31

- Select the desired WiFi network (WLAN) and connect your laptop to it by clicking on “Connect”.

For the WiFi network (WLAN) to be visible on your computer, the router or DG-1000 must be switched on.

The way the TP Link Wireless N Router supplied with the BlowerDoor MultipleFan System is configured you do not need to enter a network security key (Wireless password/PIN).

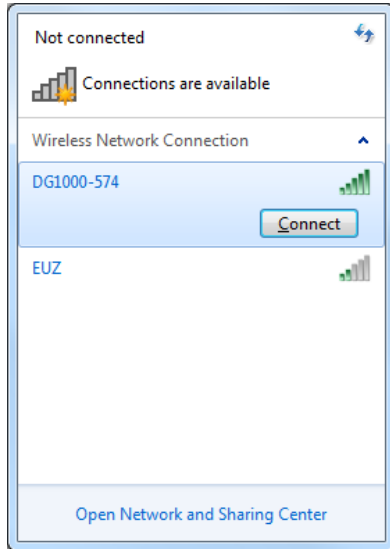


Fig. 3.32

- You will be asked to enter a password to connect to a DG-1000 WLAN. The preset password for all DG-1000 devices is **dg1000pw**.

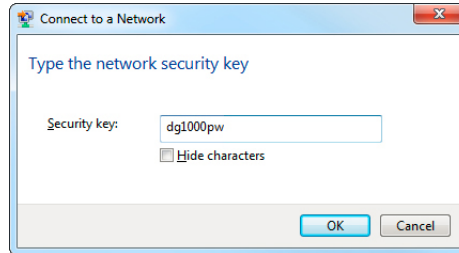


Fig. 3.33

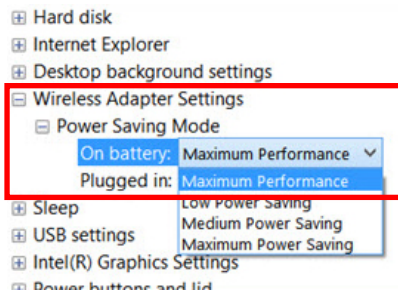


Fig. 3.34

- For strong wireless connection we recommend to switch the **Wireless Adapter Settings** for battery and cable connection on „Maximum Performance“.

### 3.5.2 Wired LAN connection between laptop and router using an Ethernet cable



Fig. 3.35

Using one of the Ethernet cables supplied, connect your laptop (network port) and the router running DHCP.

Once the router is switched on, the network connection is displayed on your laptop.



Fig. 3.36

## 4 Set-up of the BlowerDoor Multiple Fan Measuring System



Fig. 4.1

The assembly and installation of the BlowerDoor mounting frame, panel, and measuring fan is the same as for the BlowerDoor Standard Measuring System.

We recommend our measuring device holder for setting up the speed controller and pressure gauges.

When setting up three fans in one door, an additional internal cross bar is installed in the BlowerDoor mounting frame to suspend the top fan.



Fig. 4.2: Additional internal cross bar center/top



**Always test the stability of the frame. If the frame moves, tighten it further. Fix the installation additionally with mounting struts:**



Fig. 4.3: Mounting strut short and long



Fig. 4.4: Vertical installation of the mounting strut

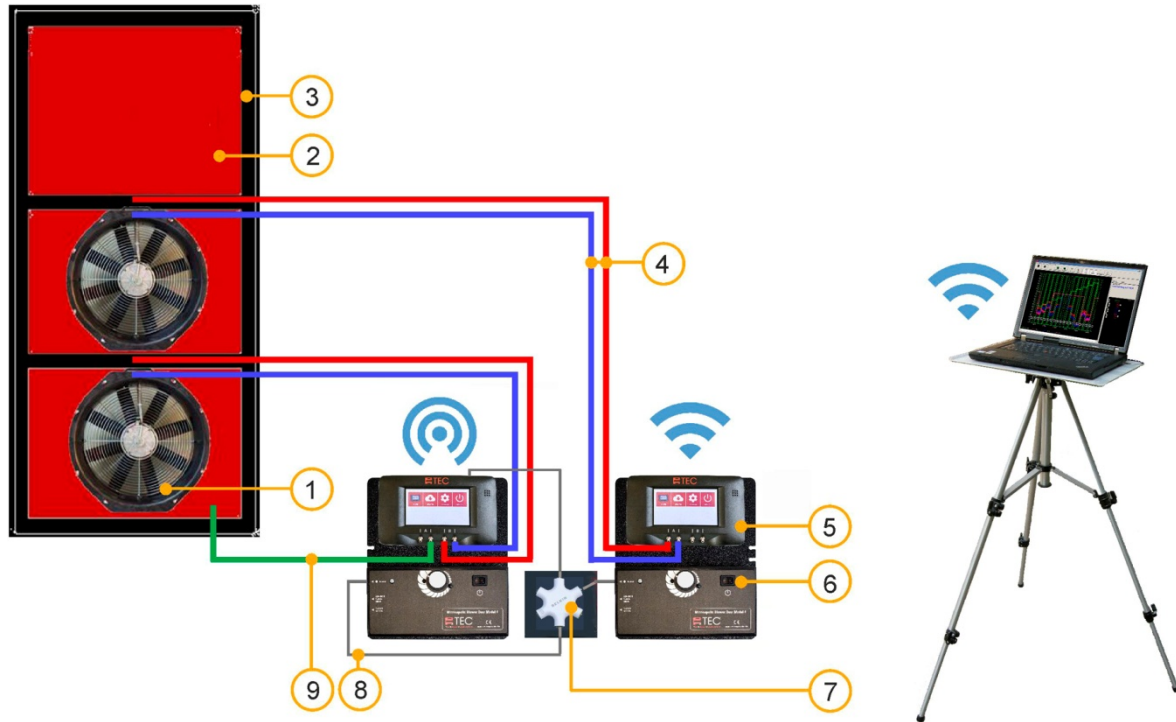


Fig. 4.5: Horizontal installation of the mounting strut

The tube connections, as well as the cable connections are clarified below using a BlowerDoor MultipleFan with three/two fans, as well as a DG-1000.

### 4.1 BlowerDoor MultipleFan with two measuring fans and two DG-1000 devices

#### Set-up version with WiFi connection (WLAN) without router



- |   |   |   |   |
|---|---|---|---|
| 1 | BlowerDoor fan (2 pcs)  | 5 | Digital pressure gauge DG-1000 (2 pcs)  |
| 2 | BlowerDoor panel standard size with two openings                    | 6 | Fan speed controller (2 pcs)  |
| 3 | BlowerDoor mounting frame standard size                             | 7 | Communication jack  |
| 4 | Set of tubes [connection fan – DG-1000, red and blue (3 m)] (2 pcs) | 8 | Cable with jack plugs (2 pcs)   |
|   |   | 9 | Set of tubes [capture outside pressure, inside green (3 m), outside transparent (10 m)] |

Fig. 4.6: Set-up version of a BlowerDoor MultipleFan Measuring System with two measuring fans and two DG-1000 devices. The communications link is established via the WiFi network (WLAN) provided by a DG-1000.



### **Flow rate**

Two standard measuring fans (Model 4.1 or Model 4 or Model 3) produce a flow rate of up to approx. 14,400 m<sup>3</sup>/h at a building pressure difference of 50 Pascal.

### **Controlling the measuring fan**


The left DG-1000 is connected to the two fan speed controllers via a communication jack. This measuring device allows your [TECLOG4](#) software to control the two fans in parallel.

### **Measuring the building pressure difference and fan pressure differences**

The above set-up requires three differential pressure channels (of the two DG-1000 devices) to record the measurement data:

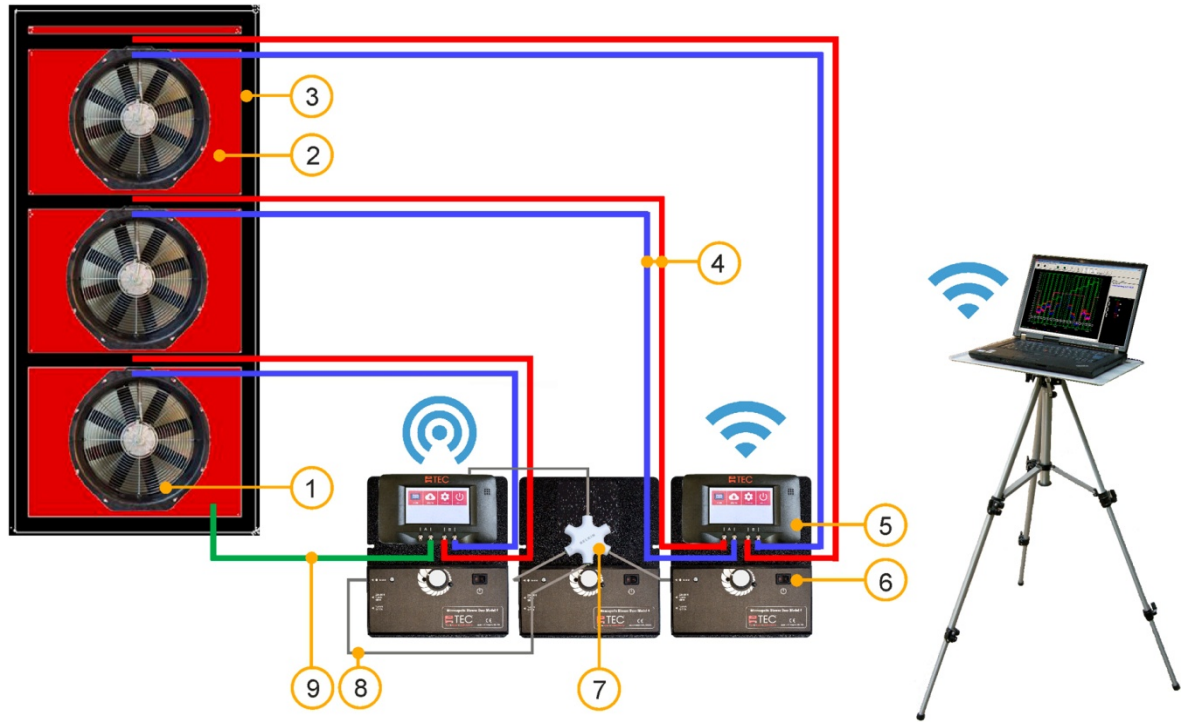
- Left DG-1000:
  - Channel A records the building pressure difference between the inside and the outside
  - Channel B records the fan pressure difference(flow rate) of the bottom fan.
- Right DG-1000:
  - Channel A records the fan pressure difference (flow rate) of the top fan.

### **Data transfer**

The data of the measurement values is transferred to the [TECLOG4](#) software via the left DG-1000, which is transmitting a WiFi (WLAN) , i.e. providing an access point to which the right DG-1000 as well as the laptop are connected.

## 4.2 BlowerDoor MultipleFan with three measuring fans and two DG-1000 devices

### 4.2.1 Set-up version with WiFi connection (WLAN) without router



- |   |   |
|---|---|
| 1 BlowerDoor fan (3 pcs)  | 5 Digital pressure gauge DG-1000 (2 pcs)  |
| 2 BlowerDoor panel standard size with three openings                          | 6 Fan speed controller (3 pcs)  |
| 3 BlowerDoor mounting frame standard size + additional upper/middle cross bar | 7 Communication jack  |
| 4 Set of tubes [connection fan – DG-1000, red and blue (3 m)] (3 pcs)         | 8 Cable with jack plugs (3 pcs)   |
|   | 9 Set of tubes [capture outside pressure, inside green (3 m), outside transparent (10 m)] |

Fig. 4.7: Set-up version for a BlowerDoor MultipleFan Measuring System with three measuring fans and two DG-1000 devices. The communications link is established via the WiFi network (WLAN) of a DG-1000.

### Flow rate

Three standard measuring fans (Model 4.1 or Model 4, as well as Model 3) produce a flow rate of up to approx. 21,600 m<sup>3</sup>/h at a building pressure difference of 50 Pascal.

### Controlling the measuring fan


The left DG-1000 is connected to the three fan speed controllers via a communication jack. This measuring device allows your [TECLOG4](#) software to control the fans at the same time.

### Measuring the building pressure difference and fan pressure differences

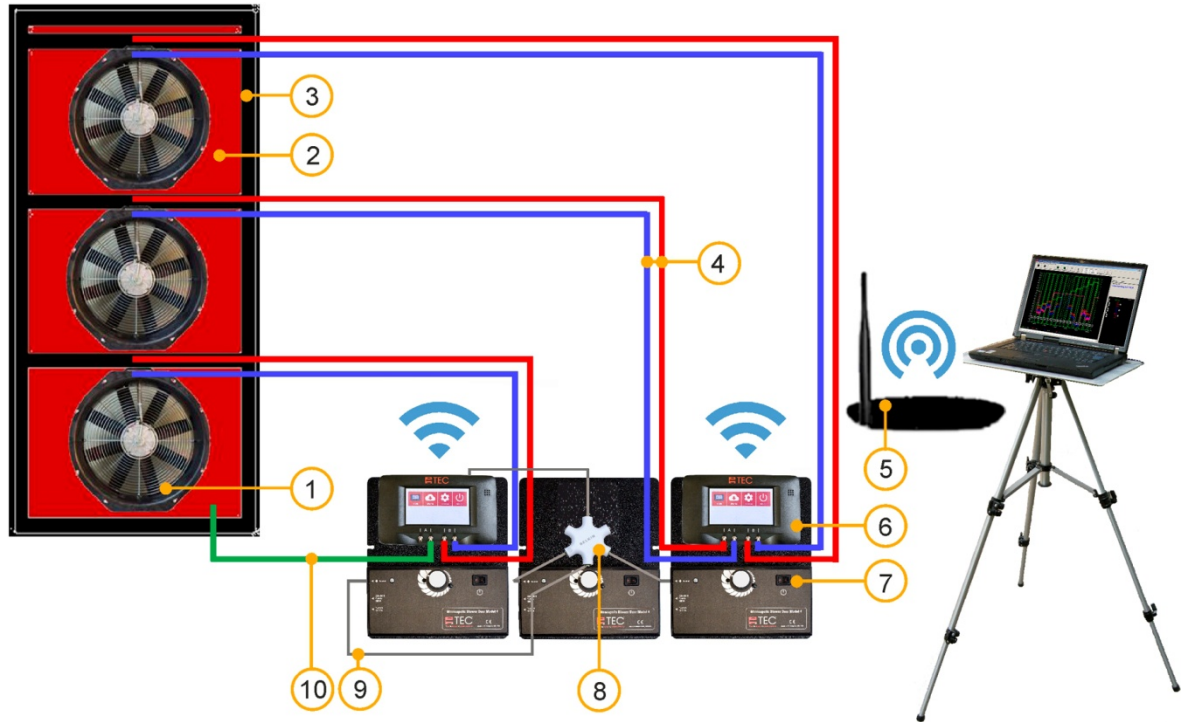
The above set-up requires four differential pressure channels (of the two DG-1000 devices) to record the measurement data:

- Left DG-1000:
  - Channel A records the building pressure difference between the inside and the outside.
  - Channel B records the fan pressure difference (flow rate) of the bottom fan.
- Right DG-1000:
  - Channel A records the fan pressure difference (flow rate) of the central fan.
  - Channel B records the fan pressure difference (flow rate) of the top fan.

### Data transfer

The data of the measurement values is transferred to the [TECLOG4](#) software via the left DG-1000, which is transmitting a WiFi signal (WLAN) , i.e. providing an access point to which the right DG-1000 as well as the laptop are connected.

### 4.2.2 Set-up version with WiFi connection (WLAN) using a router

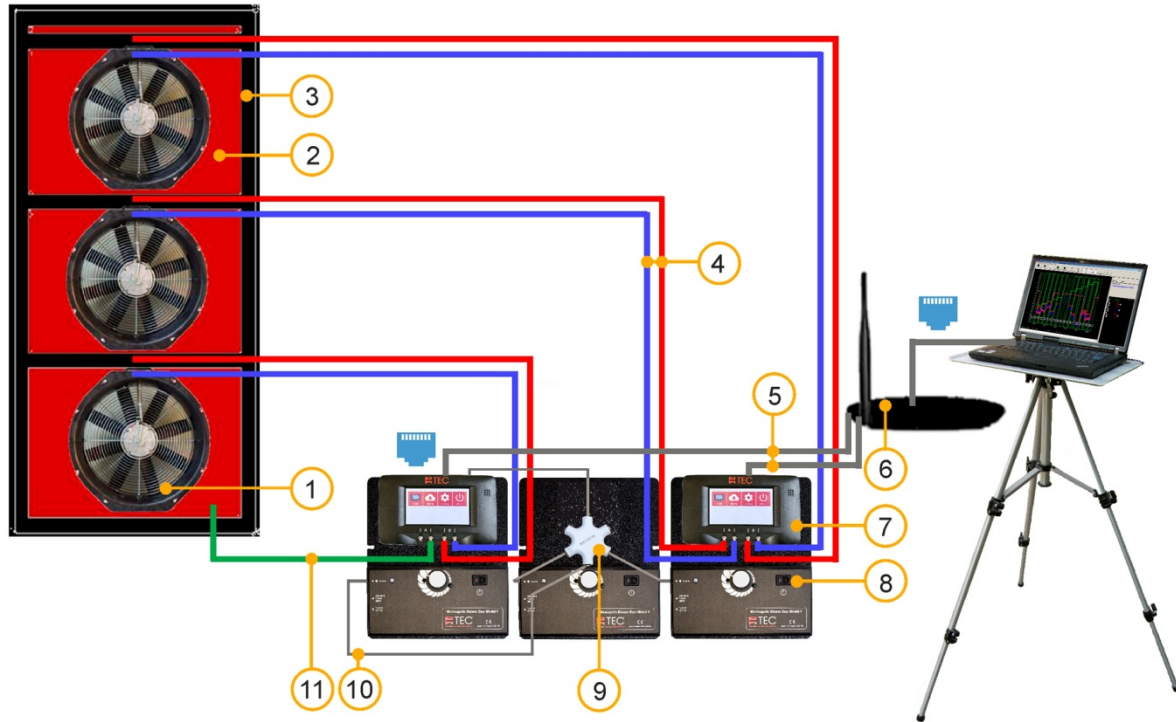


- |   |  |
|---|--|
| 1 BlowerDoor fan (3 pcs)  | 5 WiFi-router (DHCP) [connection router – DG-1000 and connection router – laptop]          |
| 2 BlowerDoor panel standard size with three openings                          | 6 Digital pressure gauge DG-1000 (2 pcs)   |
| 3 BlowerDoor mounting frame standard size + additional upper/middle cross bar | 7 Fan speed controller (3 pcs)   |
| 4 Set of tubes [connection fan – DG-1000, red and blue (3 m)] (3 pcs)         | 8 Communication jack   |
|   | 9 Cable with jack plugs (3 pcs)  |
|   | 10 Set of tubes [capture outside pressure, inside green (3 m), outside transparent (10 m)] |

Fig. 4.8: Set-up version for a BlowerDoor MultipleFan Measuring System with three measuring fans and two DG-1000 devices. The communications link is established via the WiFi network (WLAN) of a WiFi-router.

For information on the flow rate, controlling the measuring fans, recording the pressure differences, and transferring the data, consult the explanations given at the end of Section 4.2.4 on page 38 et seq.

### 4.2.3 Set-up version with wired Ethernet connection using a router

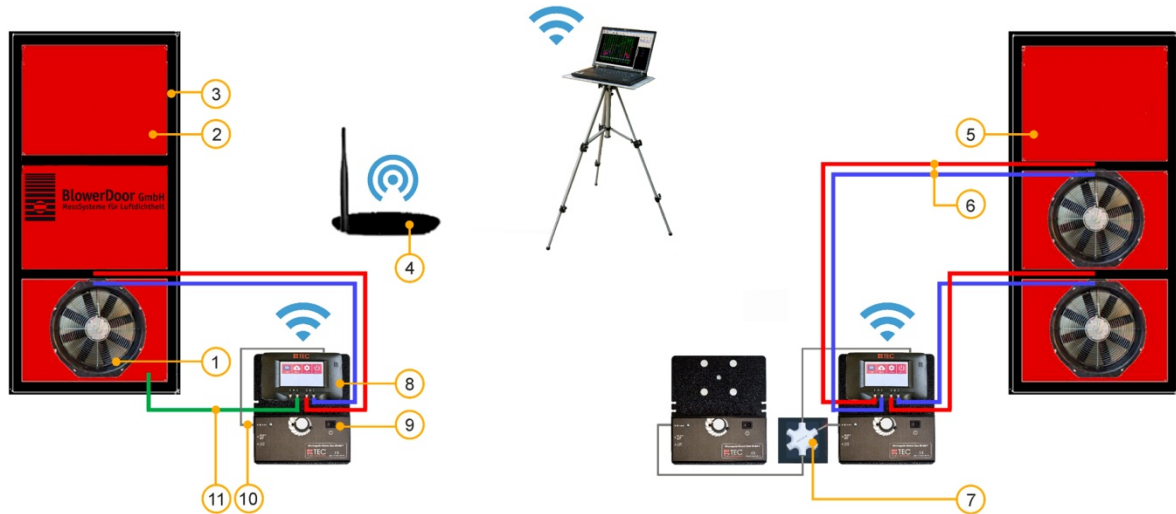


- |   |  |
|---|--|
| 1 BlowerDoor fan (3 pcs)  | 6 Router (DHCP) incl. Ethernet cable (10 m)<br>[connection router – laptop]                |
| 2 BlowerDoor panel standard size with three openings                          | 7 Digital pressure gauge DG-1000 (2 pcs)   |
| 3 BlowerDoor mounting frame standard size + additional upper/middle cross bar | 8 Fan speed controller (3 pcs)   |
| 4 Set of tubes [connection fan – DG-1000, red and blue (3 m)] (3 pcs)         | 9 Communication jack   |
| 5 Ethernet cable (2 pcs) [connection DG-1000 – router (2m)]                   | 10 Cable with jack plugs (3 pcs)   |
|   | 11 Set of tubes [capture outside pressure, inside green (3 m), outside transparent (10 m)] |

Fig. 4.9: Set-up version for a BlowerDoor MultipleFan Measuring System with three measuring fans and two DG-1000 devices. The communications link is established via cable and the router network (LAN).

For information on the flow rate, controlling the measuring fans, recording the pressure differences, and transferring the data, consult the explanations given at the end of Section 4.2.4 on page 38 et seq.

#### 4.2.4 Set-up version with two door openings – WiFi connection (WLAN) using a router



- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1 BlowerDoor fan (3 pcs)</li> <li>2 BlowerDoor panel standard size</li> <li>3 BlowerDoor mounting frame standard size (2 pcs)</li> <li>4 WiFi-router (DHCP) [connection router – DG-1000 and connection router – laptop]</li> <li>5 BlowerDoor panel standard size with two openings</li> </ul> | <ul style="list-style-type: none"> <li>6 Set of tubes [connection fan – DG-1000, red and blue (3 m)] (3 pcs)</li> <li>7 Communication jack</li> <li>8 Digital pressure gauge DG-1000 (2 pcs)</li> <li>9 Fan speed controller (3 pcs)</li> <li>10 Cable with jack plugs (3 pcs)</li> <li>11 Set of tubes [capture outside pressure, inside green (3 m), outside transparent (10 m)]</li> </ul> |
|--|---|

Fig. 4.10: Set-up version for a BlowerDoor MultipleFan Measuring System with three measuring fans in two building openings/door openings. The communications link as in Fig. 4.8 is established via the WiFi network (WLAN) of a WiFi-router to increase the distance between the measuring devices.

## Flow rate

Three standard measuring fans (Model 4.1 or Model 4, as well as Model 3) produce a flow rate of up to approx. 21,600 m<sup>3</sup>/h at a building pressure difference of 50 Pascal.

## Controlling the measuring fan

Option: Set-up of the measuring system in one door opening: In both figures, Fig. 4.8 and Fig. 4.9, the left DG-1000 device is connected to the three fan speed controllers via a communication jack. The respective measuring device allows your [TECLOG4](#) software to control the fans at the same time.

Option: Set-up of the measuring system in two door openings: In the exemplary set-up of the measuring system in two building openings at a distance from each other as in Fig. 4.10, the left DG-1000 is connected to the speed controller of the left fan. The right DG-1000 is connected to the two right fans via a communications jack. Via the [TECLOG4](#) software, the fans are controlled centrally.

## Measuring the building pressure difference and fan pressure differences

The above set-up requires four differential pressure channels (of two DG-1000 devices) to record the measurement data:

- Left DG-1000:
  - Channel A records the building pressure difference between the inside and the outside.
  - Channel B records the fan pressure difference (flow rate) of the bottom fan (that is in Fig. 4.10 of the left fan).
- Right DG-1000:
  - Channel A records the fan pressure difference (flow rate) of the central fan (that is in Fig. 4.10 of the fan on the top right).
  - Channel B records the fan pressure difference (flow rate) of the top fan (that is in Fig. 4.10 of the fan on the bottom right).

## Data transfer

The data of the measurement values is transferred to the [TECLOG4](#) software via a network connection between the pressure gauges and the laptop using a router running DHCP: in Fig. 4.9 using an Ethernet cable, in Fig. 4.8 and Fig. 4.10 via wireless connection.

### 4.3 BlowerDoor MultipleFan with twelve measuring fans

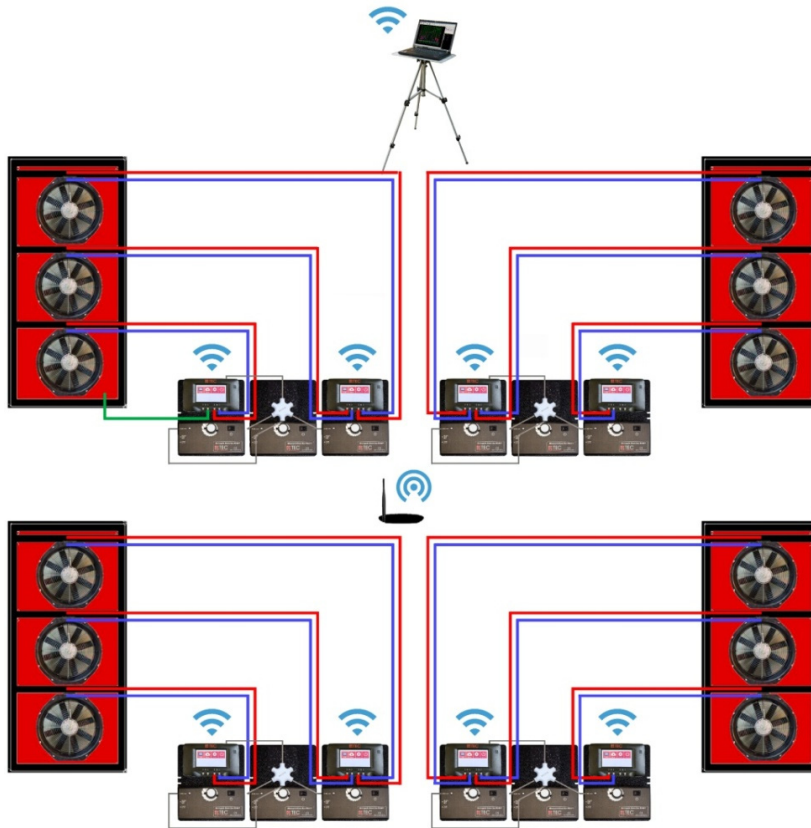


Fig. 4.11: Possible test set-up with 12 fans.

The example in Fig. 4.11 shows a combination of four BlowerDoor MultipleFan Systems with three measuring fans each. The set-up of each system in itself corresponds to the set-up in Fig. 4.8. All twelve measuring devices are controlled centrally by TECLOG MultipleFan. Twelve standard measuring fans produce a flow rate of approx. 86,400 m<sup>3</sup>/h at a building pressure difference of 50 Pascal.



For further possibilities of installing Multiple Fan Systems and combining options with older BlowerDoor pressure consult our CompetenceCenter on our website [www.blowerdoor.com](http://www.blowerdoor.com).



## 5 Preparations and software settings before starting the test

### 5.1 An Overview of the Most Important Steps

#### 1. Installing TECLOG MultipleFan

- Before installing the software, close all other programs (even your virus scanner).
- Install TECLOG MultipleFan (version: [TECLOG4](#)). Section 2.2

#### 2. Turn on pressure gauges (DG-1000, DG-700, APT), router if necessary and laptop and then connect and interconnect them Section 3

- Set up a network Section 3.2, 
  - WiFi network (WLAN) via a DG-1000 or a router Section 3.3
  - Wired network (LAN) via a router or 3.1.3
- Connect all pressure gauges (DG-1000 or DG-700 with TEC WiFi Link) to the network or Section 3.4   
**optional:** directly connect DG-700 without TEC WiFi Link and APT to the laptop via serial cable with a COM Port Box (serial USB adapter)
- Connect the laptop to the network Section 3.5

#### 3. Open TECLOG MultipleFan

- Open software by clicking on the item on the desktop or by following this path in WINDOWS: → [START](#) → [PROGRAMS](#) → [ENERGY CONSERVATORY](#) → [TECLOG4](#).

#### 4. One-time settings (Default configuration)

- In the menu bar go to → [CONFIGURATION](#) → [SETTINGS](#) for the European default setting by selecting the button [RESTORE FACTORY SETTINGS \(EUROPE\)](#). Section 5.2
- Select further individual settings (e.g. choosing a test standard).
- Save your settings once with [SAVE AS DEFAULT CONFIGURATION](#) and [OK](#).

- 5. Before starting the measurement register and activate all measuring devices in *TECLOG4* and assign channels.** Section 5.3
- Open the “Configuration Settings” window: Menu → *CONFIGURATION* → *SETTINGS*
  - Before you start, use *SCAN FOR PORTS/DEVICES* to check whether all measuring devices (DG-1000, DG-700, APT) are detected by the program. Section 5.3.1
  - Activate all connected measuring devices (DG-1000, DG-700, APT) in *DEVICE SETTINGS* (activate measuring devices, select type of measuring device, enter device number and name). Section 5.3.2
  - Activate all required pressure channels and assign a channel use for each (measuring building pressure difference, or a fan flow rate) via the option *VIEW AND EDIT CHANNEL SETTINGS*. Section 5.3.3
- 6. To record the measurement values start the Data Recording Mode in *TECLOG4*** Section 6
- Start the measurement in the *TECLOG4* start window:  
Menu → *RECORDING* → *START RECORDING*.
  - *TECLOG4* will require a file name for the measurement.
  - All data is then recorded in a *.TECLOGDATA* file.
- 7. Conducting the measurement (negative and positive pressure tests)** Section 6.3
- Record the baseline pressure difference before the measurement while the fans are closed.
  - Record different building pressure differences with the fans running.
  - Record the baseline pressure difference after the measurements with the fans closed.

**8. Creating a test report**

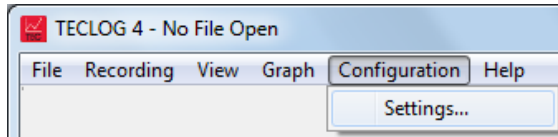
Section 6.4.5 □

Export the measurement value into a file that automatically receives the ending .bld from the *TECLOG4*-window *AIRTIGHTNESS RESULTS* (measurement results) using the *EXPORT TO TECTITE EXPRESS ...* button.

The file can be imported into TECTIE Express 5.1 (not into older TECTITE Express versions), in order to generate a test report from there (see BlowerDoor Standard or BlowerDoor MiniFan manual)

## 5.2 Configure default settings in TECLOG

Before using TECLOG Multiple Fan the specific country settings have to be defined and save as default settings (*DEFAULT CONFIGURATION*).



Go to *CONFIGURATION* and *SETTINGS*:

Menu: → *CONFIGURATION* → *SETTINGS*

Fig. 5.1: Menu in TECLOG MultipleFan (TECLOG4)

The *CONFIGURATION SETTINGS* window will open (default settings):

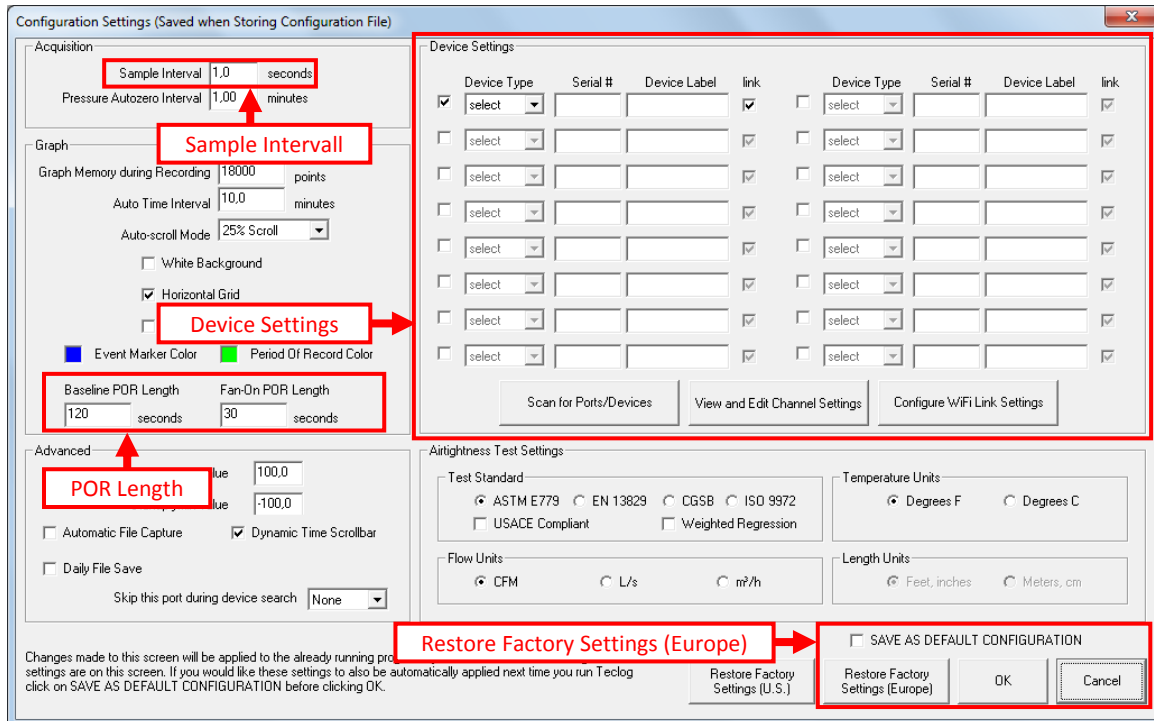


Fig. 5.2: Overview of „Configuration Settings“

### The following steps are required to define and save the default settings

Sample Interval  seconds

Fig. 5.3: Measuring interval: 1 sec

*SAMPLE INTERVAL* (measuring interval): *1,0 SEC*

The measuring interval must be set to 1 second to ensure proper control of the measuring fan when recording more than one building pressure difference.

SAVE AS DEFAULT CONFIGURATION

Restore Factory Settings (U.S.) **Restore Factory Settings (Europe)** OK Cancel

Fig. 5.4: Loading default settings (Europe)

Select the *RESTORE FACTORY SETTINGS (EUROPE)* button and confirm the entry.

Flow Units

CFM  L/s  m<sup>3</sup>/h

Fig. 5.5

- *FLOW UNITS* in *m<sup>3</sup>/h* and the
- *TEMPERATURE UNITS* in *DEGREE CELSIUS*

Temperature Units

Degrees F  Degrees C

Fig. 5.6

The *FACTORY SETTINGS (EUROPE)* provide for ISO 9972 as the measurement standard (*TEST STANDARD*). If required, the European Standard EN13829 can be selected (see below).

Test Standard

ASTM E779  EN 13829  CGSB  ISO 9972

USACE Compliant  Weighted Regression

Fig. 5.7: Selecting test standard

Select the desired standard in the *AIRTIGHTNESS TEST SETTINGS / TEST STANDARD* group field.

Baseline POR Length  seconds

Fan-On POR Length  seconds

Fig. 5.8: Defining the duration of the measuring period

The length of the measurement periods can be defined individually. The default setting is 120 seconds for the natural pressure differential (*BASLINE POR LENGTH*) and 30 seconds for each pressure stage (*FAN-ON POR LENGTH*).

We recommend setting both measuring periods to 60 seconds.

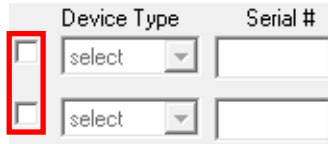


Fig. 5.9: No measuring device is activated.

Make sure that no measuring device is activated in *DEVICE SETTINGS*. All check boxes in front of *DEVICE TYPE* must be empty.

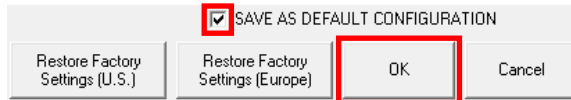


Fig. 5.10: Save as default settings.

Activate the check box in front of *SAVE AS DEFAULT CONFIGURATION* by setting the check mark.

Confirm all settings with *OK*.

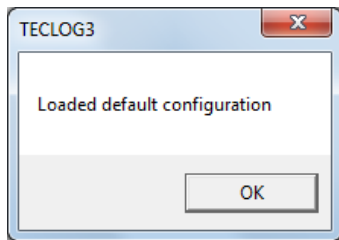


Fig. 5.11: Loading default settings

**TECLOG4** notifies you about user-defined default settings.

When opening *TECLOG4* again, the new default settings are automatically loaded. The notification window *LOADED DEFAULT CONFIGURATION* informs the user that the user-defined default settings have been loaded.

### 5.3 Registering and Setting Up Measuring Devices

#### Overview of registering and setting up measuring devices

In the setup mode (inactive mode) of *TECLOG4* the following needs to be done before starting the test:

- in the window *CONFIGURATION SETTINGS* register and activate all measuring devices (DG-1000, DG-700, APT) to be used,
- and in the window *CHANNEL SETTINGS* (see Section 5.3.3) assign the differential pressure channels (building pressure or fan model for determining the flow rate).

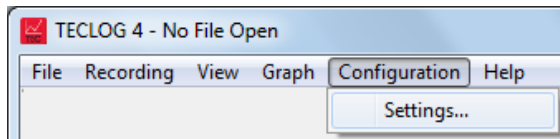


Fig. 5.12: Open Configuration Settings window

Open the window Configuration Settings:

→ *CONFIGURATION* → *SETTINGS*

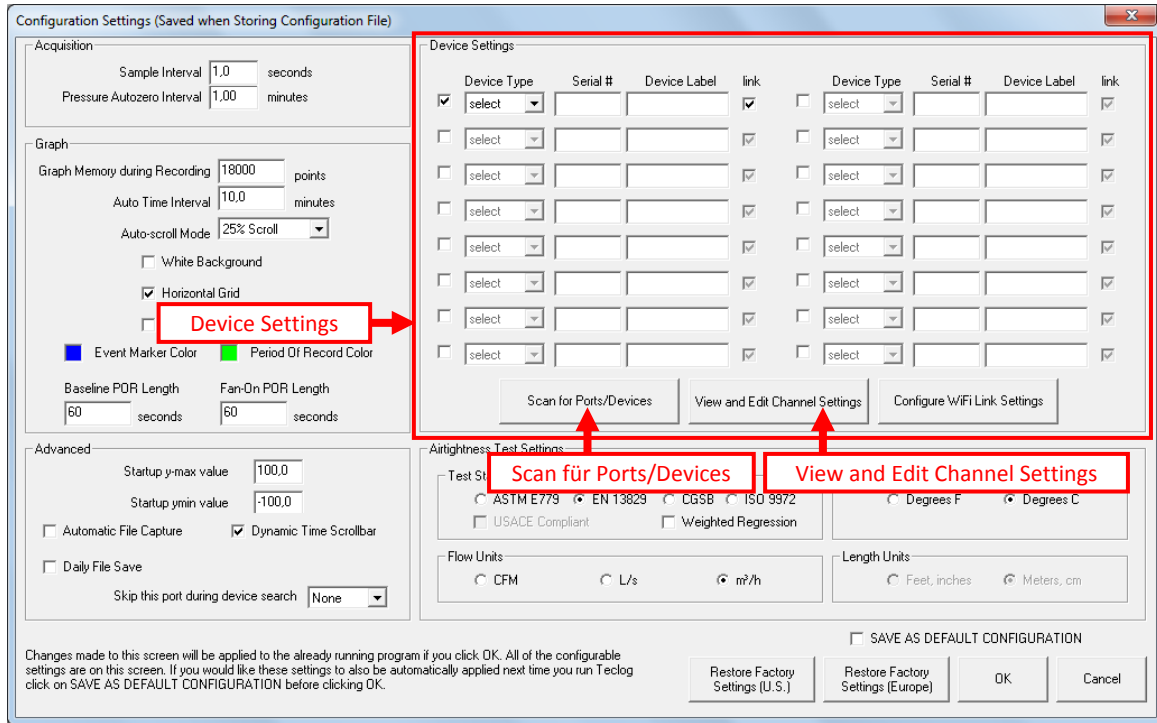


Fig. 5.13: Configuration Settings window

The login and setup of the measuring devices takes place in three steps:

- With the **SCAN FOR PORTS/DEVICES** button, it is checked whether the connected measuring devices are recognized by **TECLOG4**.  
Optionally for the WiFi connection of the DG-700, the TEC WiFi Links can be configured here in the router mode (see Section 3.4.3).
- In the **DEVICE SETTINGS** group field, the login of the devices then takes place.
- In the **CHANNEL SETTINGS** window, which is reached via the **VIEW AND EDIT CHANNEL SETTINGS** button, the assignments of the pressure difference channels are defined.

### 5.3.1 Activating the measuring devices

To activate the measuring devices in *TECLOG4*, all DG-1000, DG-700 or APT devices must be connected to the computer and switched on.

Upon starting *TECLOG4*, in inactive mode open the Configuration Settings window:

Menu: → *CONFIGURATION* → *SETTINGS* (Fig. 5.13).

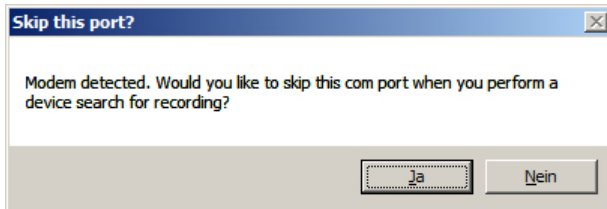
#### 5.3.1.1 Testing the connection of the measuring devices with TECLOG4



Click on the button → *SCAN FOR PORTS/DEVICES*.

All ports are scanned for connected measuring devices.

Fig. 5.14



If the computer has an internal modem, the message *SKIP THIS PORT?* will be displayed.

Confirm by clicking *YES*. The modem will no longer be considered in device searches.

Fig. 5.15: Message window *Skip this port?*



### 5.3.1.2 Display of all properly connected measuring devices

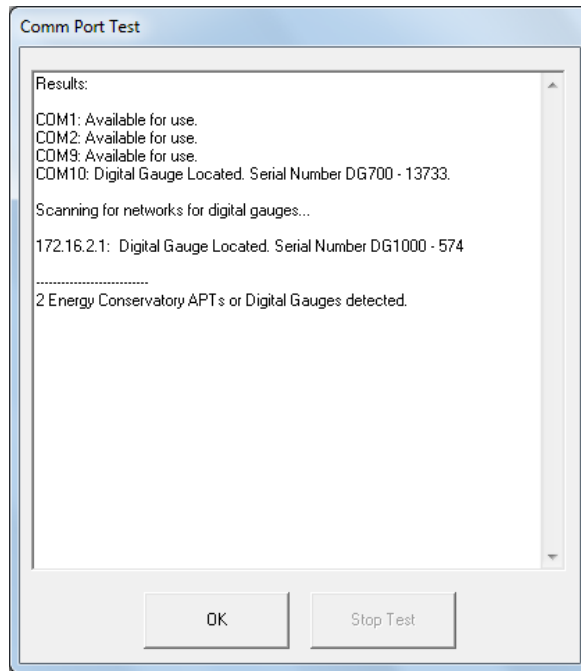


Fig. 5.16: *Comm Port Test*

Following the scan, all properly connected devices are displayed in the *COMM PORT TEST* window.

They are listed with

- the assigned COM port number or
- the network number,
- the measuring device type and
- the serial number.

Exit the window by clicking on *OK*.

If a measuring device is not listed, check the following:

- Is the device connected to the laptop?
- Is the device switched on?
- Is a COM-port configured for each measuring device in the Windows Device Manager? If not, are the drivers (e.g. USB/serial-adapter) installed correctly?
- If the Bluetooth function is active, it must be switched of.
- Then repeat the scan.

### 5.3.2 Activation of the connected measuring devices

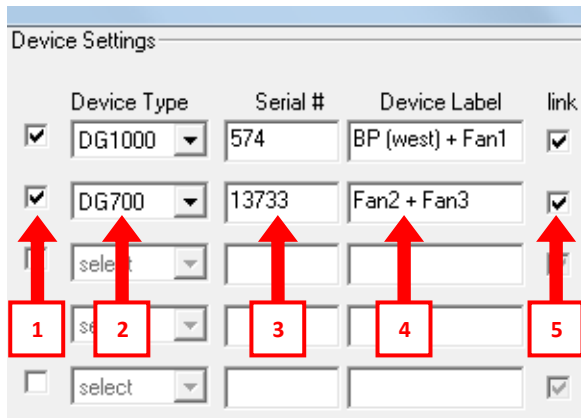


Fig. 5.17: Group field Device Settings

All connected measuring devices are activated in the group field *DEVICE SETTINGS*.

Each measuring device

1. must be activated.
2. Select the respective device type (DG-1000, DG-700, APT).
3. Enter the corresponding serial number.
4. Enter a device label (optional).
5. The *LINK* to the central *MASTER* control can be activated or deactivated.

#### 1) Activating measurement devices Input required

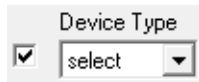


Fig. 5.18

Marking the checkbox in front of *DEVICE TYPE* activates the gauges (DG-1000, DG-700, APT) for the test. If the checkbox is not marked, *TECLOG4* will not use the device.

#### 2) Selecting Device type and

#### 3) input of Serial number Input required

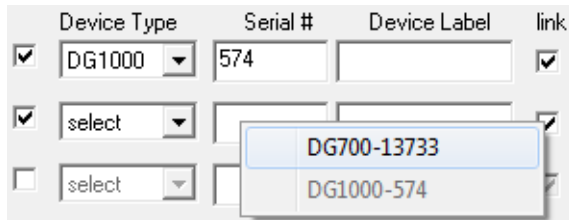


Fig. 5.19

When double-clicking on input field Serial #, a list of all the devices currently connected to the laptop and have been detected by the software will be displayed in a list so that the one you want can be selected.

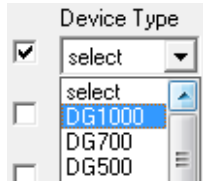


Fig. 5.20

Alternatively, select the type of measuring device connected (e.g. DG-1000) in the drop-down menu *DEVICE TYPE*.

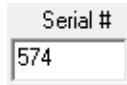


Fig. 5.21

In the input field *SERIAL #*, enter the serial number of the activated measuring device.

The number is located on the back of the device and is displayed after the *SCAN FOR PORTS/DEVICES* (Fig. 5.14).

#### 4) Device Label Input useful

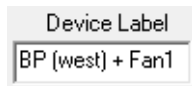


Fig. 5.22

To ensure clear differentiation between devices, it is advisable to give each device a distinct label. (Example: “BP(west)+F1”, with “BP” for building pressure, “west” for the west side of the building and “F1” for fan number 1).

#### 5) Connection to *MASTER* Input useful



Fig. 5.23

The central *MASTER* control in TECLOG MultipleFan allows you to control several fans simultaneously.

For any pressure gauge DG-1000 or DG-700 you would like to be controlled by the *MASTER* controller, select the *LINK* option.

For DG-1000 or DG-700 which you may wish to control independent of the *MASTER* controller, or pressure gauges (DG-1000, DG-700, APT) that only log pressure differences, do NOT select the *LINK* option. Then the check box for *LINK* remains unchecked.

### 5.3.3 Configuring the differential pressure channels

The differential pressure channels of the measuring devices are configured in the window *CHANNEL SETTINGS* (Fig. 5.25).

View and Edit Channel Settings

Access the *CHANNEL SETTINGS* window by clicking on the button *VIEW AND EDIT CHANNEL SETTINGS* in the window *CONFIGURATION SETTINGS*.

Fig. 5.24: Open the Channel Settings Window

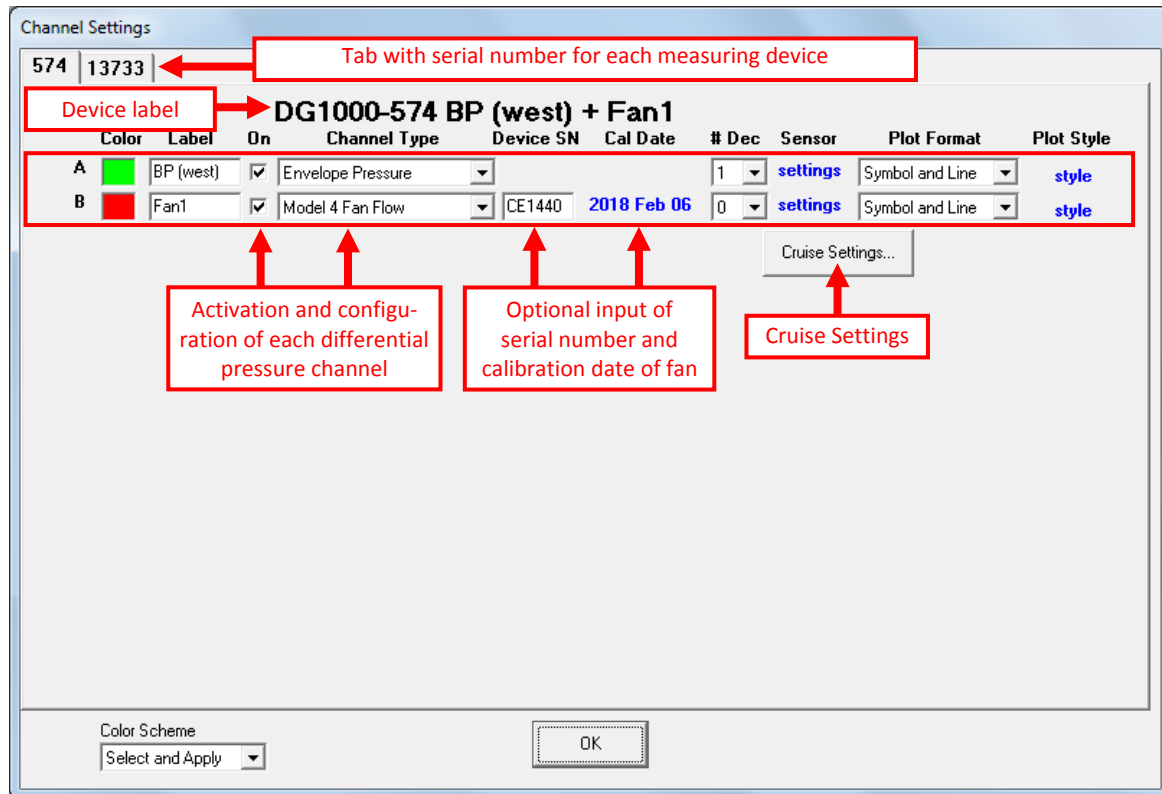


Fig. 5.25: Channel Settings

For each activated device, *TECLOG4* creates a separate tab. The tab name is comprised of the serial number of the measuring device (DG-1000, DG-700 or APT).

In each tab (= connected measuring device)

- activate the differential pressure channels required for the measurement and
- allocate the channels (building pressure or fan flow).


A rectangular button with a light gray background and a thin border, containing the text "Cruise Settings..." in a dark gray font.

Fig. 5.26

In *CRUISE SETTINGS* you can, among other things, decide for each measuring device whether you conduct a depressurization or pressurization measurement, or adjust the speed of the fan control.

This is only necessary if the fans are not controlled centrally by the *MASTER* controller.

After activating the measuring devices, assign the use of the differential pressure channels (building pressure or fan model for determining the airflow rate) for each measuring device (DG-1000, DG-700, APT).

### 5.3.3.1 Opening the Channel Settings window


A rectangular button with a light gray background and a thin border, containing the text "View and Edit Channel Settings" in a dark gray font.

Fig. 5.27: Open the Channel Settings Window

In the *CONFIGURATION SETTINGS* window, click on the button → *VIEW AND EDIT CHANNEL SETTING*.

The *CHANNEL SETTINGS* window (Fig. 5.25) will open.

### 5.3.3.2 Activating and configuring the differential pressure channels

There is a separate input line for each differential pressure channel. All channels that are to record a building pressure differential or an airflow rate (fan pressure differential) must be activated and configured (Fig. 5.28).


	Color	Label	On	Channel Type	Device SN	Cal Date	# Dec	Sensor	Plot Format	Plot Style
A		BP (west)	<input checked="" type="checkbox"/>	Envelope Pressure			1	settings	Symbol and Line	style
B		Fan1	<input checked="" type="checkbox"/>	Model 4 Fan Flow	CE1440	2018 Feb 06	0	settings	Symbol and Line	style

Fig. 5.28: Setting the differential pressure channels

#### Selecting the color for measurement curves Input useful



In the **COLOR** box click the **LEFT MOUSE BUTTON** to select a color for the channel. The measuring curve and the measured data of this channel in the Data Recording Mode will then be displayed in the color selected.

Fig. 5.29

#### Labeling the differential pressure channel Input useful



In the **LABEL** box, enter a distinct label for each channel.

Example for a building pressure differential:

- “BP(west)”: Building Pressure on the west side

Example for a fan:

- “F1”: Fan 1

Fig. 5.30

#### Activating the differential pressure channel Input required



Activate the channel of the measuring device in the checkbox **ON**. The measured values of this channel are then recorded. If the checkbox is not marked, the measured values will not be recorded.

Fig. 5.31

**Selecting the type of differential pressure channel \_\_\_\_\_ Input required**

Fig. 5.32

In the drop-down menu *CHANNEL TYPE*, select the channel use (building pressure or fan model).

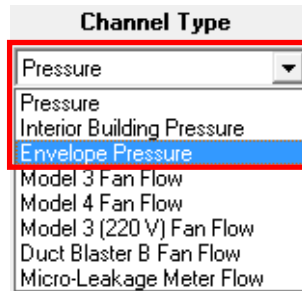
**Selecting Envelope Pressure**

Fig. 5.33: Envelope Pressure

If the pressure channel is to measure a building pressure differential between the inside and the outside of a building, select the channel type *ENVELOPE PRESSURE*.

It is possible to designate several channels to *ENVELOPE PRESSURE*. In this case, the measurement results reflect the mean of all recorded building pressure differentials.

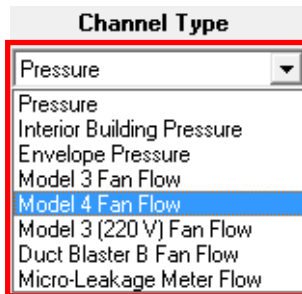
**Selecting Fan Flow**

Fig. 5.34: Model of Minneapolis BlowerDoor Fan

If the differential pressure channel is connected to a fan, select the model type of this fan so that the fan flow during the measurement can be calculated and displayed.

### Examples of Minneapolis BlowerDoor fans

#### *DuctBlasterB Fan Flow*



Fig. 5.35: BlowerDoor DuctBlaster (MiniFan)

#### *Model 4 Fan Flow*



Fig. 5.36: BlowerDoor Model 4 und Model 4.1

#### *Model 3 Fan Flow*

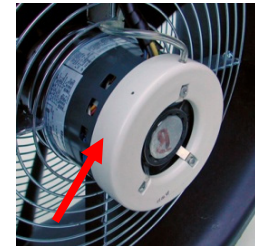


Fig. 5.37: BlowerDoor Model 3

The fan for the BlowerDoor MiniFan measuring system is the “DuctBlaster B”.

Distinguishing feature of the BlowerDoor standard fans is the pressure sensor: For models 4 and 4.1 it consists of a metal tube; on model 3 made of white plastic ring.

#### *MicroLeakageMeter Flow*



Fig. 5.38: Minneapolis Micro Leakage Meter

### Selecting Pressure

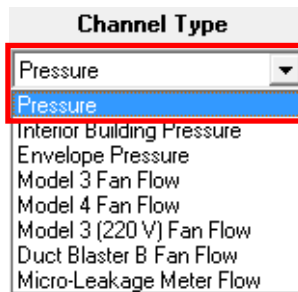


Fig. 5.39: Pressure

If additional pressure differentials are recorded, e.g. the pressure distribution within the building, *PRESSURE* is selected as the channel type to designate this differential pressure channel. The measured values of this channel are recorded, but not included in the automated evaluation of the test series. The measured curve only provides additional information.



**Entry of serial number and calibration date for each measurement fan \_\_\_\_\_ Input optional**

Device SN	Cal Date
CE1440	2018 Feb 06

The serial number (*DEVICE SN*) as well as the last calibration date of each used measuring fan are entered.

Fig. 5.40

Cal Date	# Dec	Sensor	Plot Form
-----	1	settings	Symbol and Lin

March 2018						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
25	26	27	28	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7

Today: 6/21/2018

Clicking on ----- under *CAL DATE* opens a calendar for entering the calibration date.

Fig. 5.41

Cal Date	# Dec	Sensor	P
2018 Feb 06	1	settings	Symt

Clear Date

By clicking with the right mouse button on the selected date, the date can be deleted.

Fig. 5.42

**Decimal places \_\_\_\_\_ Input optional**

# Dec
1

The number of decimal places can be adjusted in the drop-down menu *# DEC*.

Fig. 5.43

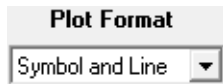
**Sensor settings \_\_\_\_\_ Input optional**

Sensor
settings

If you use an APT with sensors (e.g. a temperature or humidity sensor), click on *SETTINGS* in the Sensor menu and select the corresponding sensor settings.

Fig. 5.44

**Plot format of measured curve** \_\_\_\_\_ **Input optional**



In the drop-down menu *PLOT FORMAT*, set the plot format of the measured curve (Line, Symbol or Symbol and Line).

Fig. 5.45

**Plot style of measured curve** \_\_\_\_\_ **Input optional**



In the *PLOT STYLE* menu, set the plot style of the measuring curve (different types of lines and symbols).

Fig. 5.46

**5.3.3.3 Cruise control – Individual device settings**



Fig. 5.47: Open Cruise Control Settings window

If the gauges (DG-1000, DG-700) are to be controlled individually and not centrally, go to *CRUISE SETTINGS* to adjust the following settings:

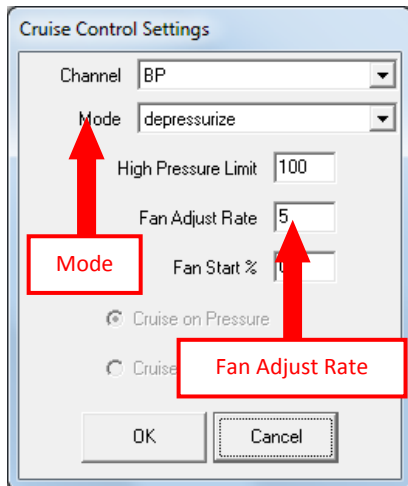


Fig. 5.48: Cruise Settings

- In the drop-down menu *MODE*, toggle between depressurization and pressurization mode:
- Depressurize
- Pressurize
- Speed of fan control: *FAN ADJUST RATE*
- default: 5
- smaller values – slower fan control speed
- greater values – faster fan control speed

Once you have configured the settings, exit all windows by clicking *OK*. *TECLOG4* again displays the start window.

## 6 Conducting measurements with TECLOG MultipleFan

**Note:**



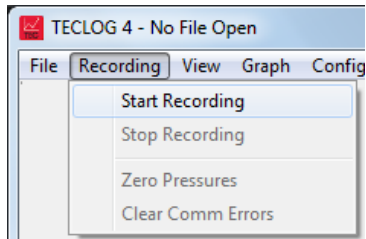
Be sure that the Bluetooth function of the laptop is turned off during the measurement. Otherwise, the communication between *TECLOG4* and the device could be interrupted.

The depressurization and pressurization measurement can be performed separately in different files or together in one file.

### 6.1 Starting and ending the measurement

Once all devices have been activated and all differential pressure channels set (building pressure / fan model), start the measurement from the Inactive Mode (see Fig. 2.2).

#### Starting the measurement



Menu: → *RECORDING* → *START RECORDING*

*TECLOG4* first scans all COM ports, WiFi Links and connected devices (DG-1000, DG-700, APT).

Fig. 6.1: Starting the recording

**Note:**

If a device is not found, the message box *DID NOT FIND...* with the device label and number is displayed. Confirm by clicking *OK*. The *CONFIGURATION SETTINGS* window opens and the selected settings and ports can be checked (see Section 5.3.1).

### Saving the measurement

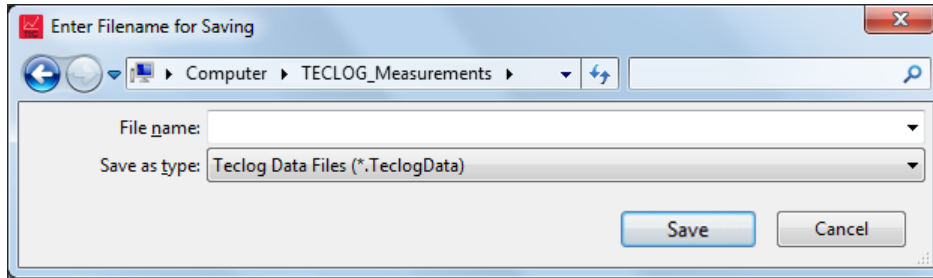
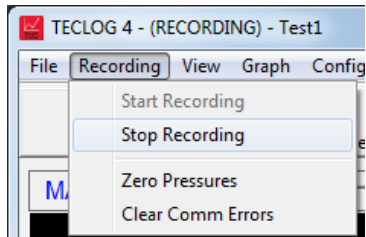


Fig. 6.2: Enter Filename for Saving

Enter a file name in the window *ENTER FILENAME FOR SAVING*. Once you start recording, all measured values are written into this file. The file is automatically assigned the file extension “*TECLOGDATA*”.

### Ending the measurement



Menu: → *RECORDING* → *STOP RECORDING*

Fig. 6.3: Stop recording

## 6.2 Data recording mode: Action window overview

Once you start the recording, the Data Recording Mode of *TECLOG4* will open. All incoming measured values are displayed graphically in a measuring curve as well as in a digital display. The measuring data is simultaneously written and saved in a file.

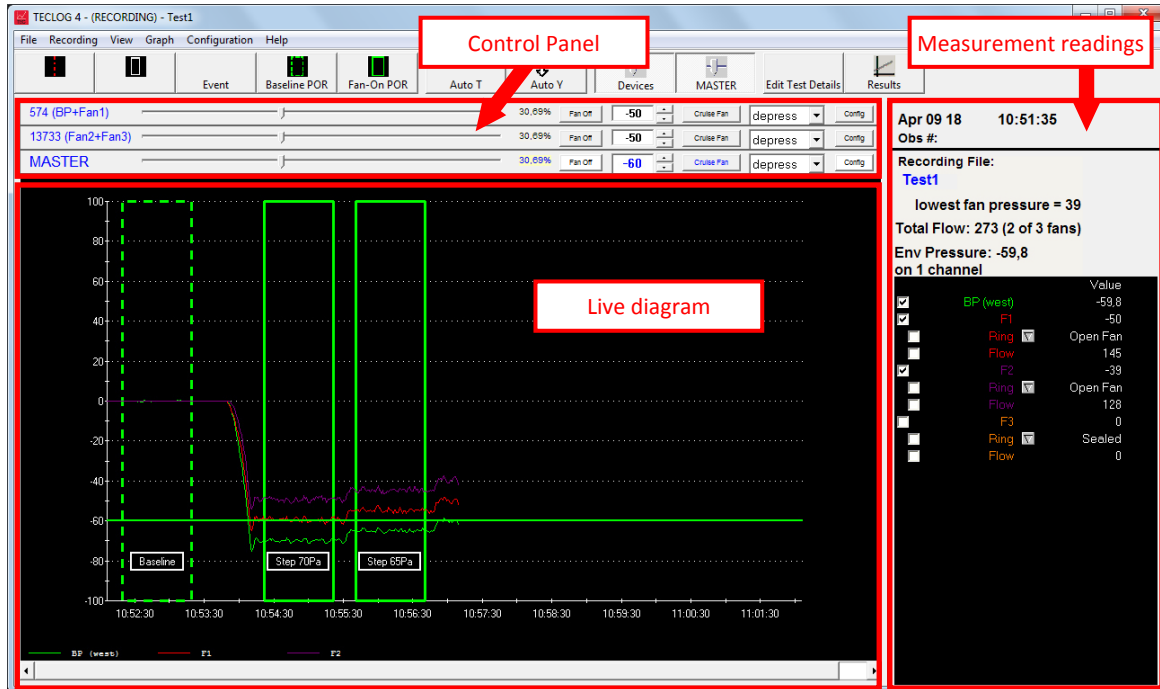


Fig. 6.4: Data recording Mode of TECLOG MultipleFan: TECLOG4 (Recording)

The action window of *TECLOG4* is divided into three parts:

- the control panel (see Section 6.2.1),
- the live diagram (see Section 6.2.2),
- the readouts of the measured values (see Section 6.2.3).

The **control panel** allows you to control the measuring devices individually or in parallel (central *MASTER* controller). Each gauge, as well as the central controller, is assigned its own control unit.

The **live diagram** displays the measured values as measuring curves. Each activated channel is assigned (at least) one dedicated measuring curve.

The **digital value display** (*READOUTS*) shows the numerical values of the measurements. It allows you to track the current measured values and to display the average for a chosen measuring period or individual measured values.

### 6.2.1 Overview: Controlling the gauges (DG-1000, DG-700) via the control panel

The pressure gauges (only DG-1000 or DG-700) which are, along with the fan speed controllers, connected to several fans, are controlled from the control panel (Fig. 6.5).

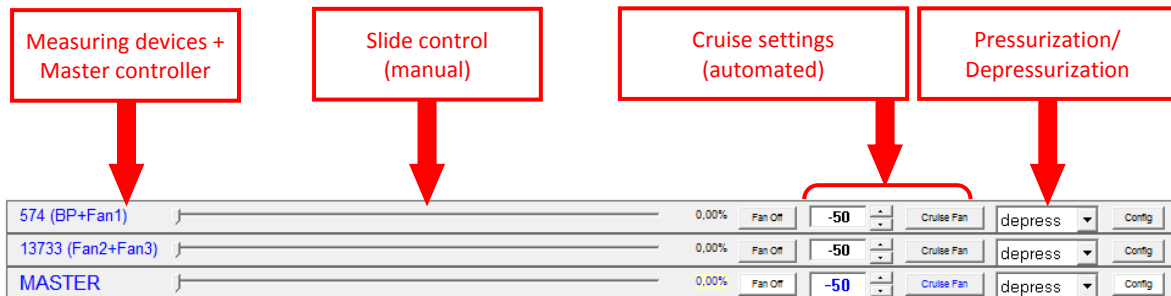


Fig. 6.5: *TECLOG4* control panel

Each connected measuring device and the *MASTER* is assigned its own **controller**. It consists of

- the serial number and device label, as well as
- a manual slide control (*LEFT MOUSE BUTTON*), and
- the automated cruise control (*CRUISE*).
- the pull down menu to choose *DEPRESS* and *PRESS*.
- The fan controller speed as well as the depressurization or pressurization mode can be set via the *CONFIG* button (Cruise Control Settings).

Each DG-1000 or DG-700 device that is connected to one or more fans can be controlled individually. With the central *MASTER* controller, it is also possible to control all DG-1000 and DG-700 devices (fans) at the same time.

### Serial number and device label

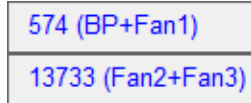


Fig. 6.6: Device serial number and device label

The serial number and user-defined device label are listed in front of the respective control units of the measuring devices. If needed, each measuring device can be controlled individually.

If the device listing **blinks**, the connection between the computer and the measuring device has been interrupted or the battery voltage is low. Placing the mouse pointer over the device label during a recording provides a popup message listing the battery status, number of communication errors which have occurred and the number of readings averaged to make up each observation.

### Central controller



Fig. 6.7: Master

The central *MASTER* controller is assigned its own control unit. The *MASTER* control allows you parallel control of all gauges.

**Note:**

To ensure smooth operation of the central controller, the *SAMPLE INTERVAL* in the *CONFIGURATION SETTINGS* window **should** be set to 1 second.

### Control slider (manual fan control)

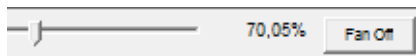


Fig. 6.8: Control slider

Use the *LEFT MOUSE BUTTON* to move the control slider. Moving it to the right will increase fan speed. Moving it to the left will decrease fan speed.

**Safety instruction:**

To stop the fans, click *FAN OFF* or hit the *ESC -BUTTON* on your keyboard.

**Automated cruise control (*CRUISE*)**

Fig. 6.9: Cruise Fan

With the help of the *CRUISE* function, TECLOG MultipleFan (*TECLOG4*) can automatically set and maintain a constant building pressure differential. It automatically readjusts when apertures in the building envelope are closed or opened (e.g. a drain is sealed).

A click on the button *CRUISE FAN* activates the cruise control. The measuring devices are adjusted up to the target pressure (in this example: 50 Pa).

**Central control of measuring devices**

To control all fans centrally, use the cruise control of the central *MASTER* controller. (Checkmark in the box assigned to the control unit of the central controller.)

**Controlling individual devices**

For individual control of a measuring device choose its cruise control. (Checkmark in the box assigned to this measurement device.)

**Safety instruction:**

To stop the fans, click *FAN OFF* or hit the *ESC-BUTTON* on your keyboard

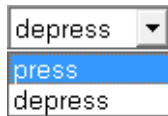
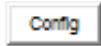
**Switch between depressurization measurement (*DEPRESS*) and pressurization measurement (*PRESS*)**

Fig. 6.10: Switch

The switching of a depressurization measurement series (*DEPRESS*) to a pressurization measurement series (*PRESS*) or the reverse, takes place in the *PRESS / DEPRESS* rolling menu. The switching must take place so that the automatic control unit functions faultlessly.



### Cruise Settings (*CONFIG*)



*Fig. 6.11: Open Cruise Settings window*

The *CONFIG* button gives you access to the cruise settings.

Among other things, you can select

- Depressurization or
- Pressurization mode,
- or adjust the fan control speed (*FAN ADJUST RATE*).

See also Section 6.3.3.

### Showing and hiding control units for measuring devices or for the central controller

For easier handling, you can hide the control units of the individual measuring devices in the control panel and only display the central *MASTER* controller. The following settings can be changed in the toolbar:

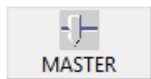
#### Displaying and hiding control units of individual devices



*Fig. 6.12: Devices*

The control units of the individual devices in the control panel can be shown or hidden by clicking on *DEVICES* in the tool bar.

#### Displaying and hiding central controller



*Fig. 6.13: Master*

The control unit for the central controller in the control panel can be shown or hidden by clicking on the *MASTER* button.

## 6.2.2 Overview: Live diagram with measuring curves

The measured values are shown in two forms: a live diagram with (at least) one measuring curve for each channel and a digital value display (Readouts). The diagram graphically displays all activated channels (Fig. 6.14).

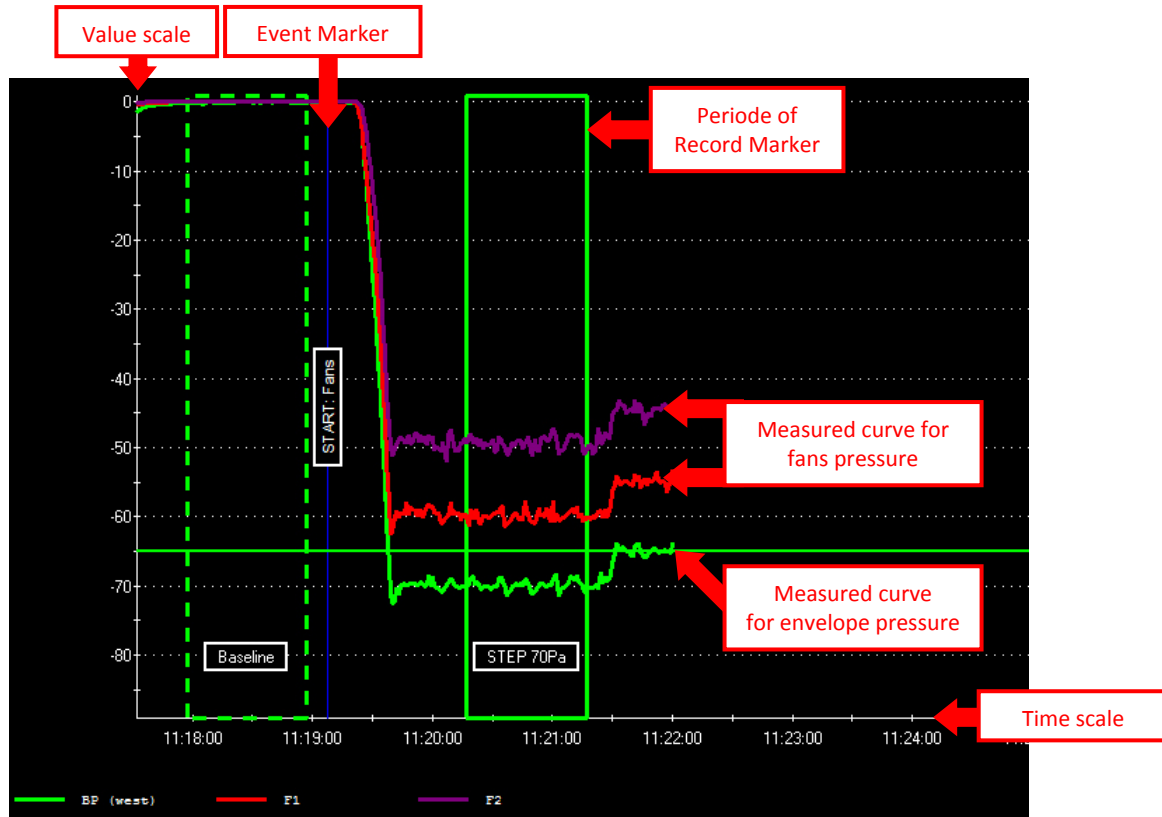


Fig. 6.14: Live diagram in TECLOG4 action window

### Axes of diagram

In the diagram, the measured values are recorded chronologically (horizontal x-axis = time axis). The y-axis (vertical axis) is the value scale. This is where the measured values (pressure differential, airflow, etc.) can be read out. For a better overview, you can select the following display modes in the toolbar:

### Set measuring curves to current time of measurement



To display the currently measured values in the diagram, click [AUTO T](#) (automatic time-axis shifting) in the toolbar.

Fig. 6.15

### Adjust diagram to measured values



By clicking on [AUTO Y](#) (automatic scale adjustment of value axis), the diagram is shrunk or expanded vertically to the minimum and maximum values.

Fig. 6.16

## Measuring Curves

Each channel configured in [CHANNEL SETTINGS](#) (Fig. 5.25) is assigned at least one measured curve in the live diagram. Differential pressure channels designated as building pressure ([ENVELOPE PRESSURE](#)) or as a simple pressure differential ([PRESSURE](#)) each show one measuring curve. For differential pressure channels that are connected to a fan (z. B. [MODEL 4 FAN FLOW](#), etc.) up to three measured curves can be displayed: the fan pressure differential, the fan flow, and the flow ring used.

### Creation of a measurement period

In the live diagram, measurement areas can be created using a freely selectable time period as a measurement period.

Measurement periods are necessary to receive an evaluation for an airtightness measurement.

#### **Example:**

For the baseline pressure differential, a measuring period of at least 30 seconds before and after the measurement is required. A measuring period of at least 30 seconds is also marked for each pressure stage.

### Creation of a measurement period in the live diagram

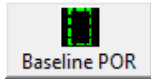


Fig. 6.17: Create measurement period for natural pressure differential

If one of the "Create measurement period" buttons (*BASILINE POR* or *FAN-ON POR*) is clicked on, the relevant measurement period will appear exactly at the time when the *POR* button was clicked on.

Automatically opens the *EDIT PERIOD OF RECORD* window.

If the new period of record applies to a natural pressure differential (baseline pressure), the checkbox *THIS IS A BASELINE PERIOD* is activated with a checkmark.

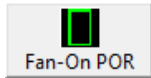


Fig. 6.18: Create measurement period for pressure stage

If a period of record is created while the fans are running, the building pressure is artificial. Consequently, the checkbox *THIS IS A BASELINE PERIOD* remains unmarked.

### Alternative: Creation of a measurement period with button *REGION SELECT TOOL*



Fig. 6.19: Region select tool

Click on the icon for *REGION SELECT TOOL*. With the left mouse button, open a field in the diagram. Then use the right mouse button to click into the field. In the context menu, click on *→CREATE PERIOD OF RECORD* to create a measuring period (Sections 6.3.4 and 6.3.5).

The *EDIT PERIOD OF RECORD* window will open.

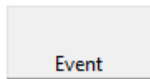
If the new period of record is a natural pressure differential (baseline), the checkbox *THIS IS A BASELINE PERIOD* must be marked and activated (Fig. 7.24).

If a period of record is created while the fans are running, the building pressure is artificial. Consequently, the checkbox *THIS IS A BASELINE PERIOD* remains unmarked.

## Marking events (times of measurement)

In the live diagram, individual times of measurement (events) can be marked, e.g. the start of a measurement. These event markers do not affect the airtightness test evaluation, but can be used for making note of important events. They are not required for conducting an airtightness test.

### Marking the current time of measurement



Use *EVENT* to highlight the current time of measurement with a blue line. The marking can also be labeled.

Fig. 6.20: Event button

### Marking any time of measurement



To mark any time of measurement, first click on the icon with the red line. A dotted red line will appear in the diagram. Using the left mouse button, shift it to the desired time of measurement. Then click on the *EVENT* button. The blue marking line will be placed exactly on the dotted red line. Again, it is possible to label the time of measurement.

Fig. 6.21: Mark any measurement time

### 6.2.3 Overview: Digital value display

On the right side of the live diagram, the current measured values, the measured values for a selected time, or the mean values for a period can be displayed.

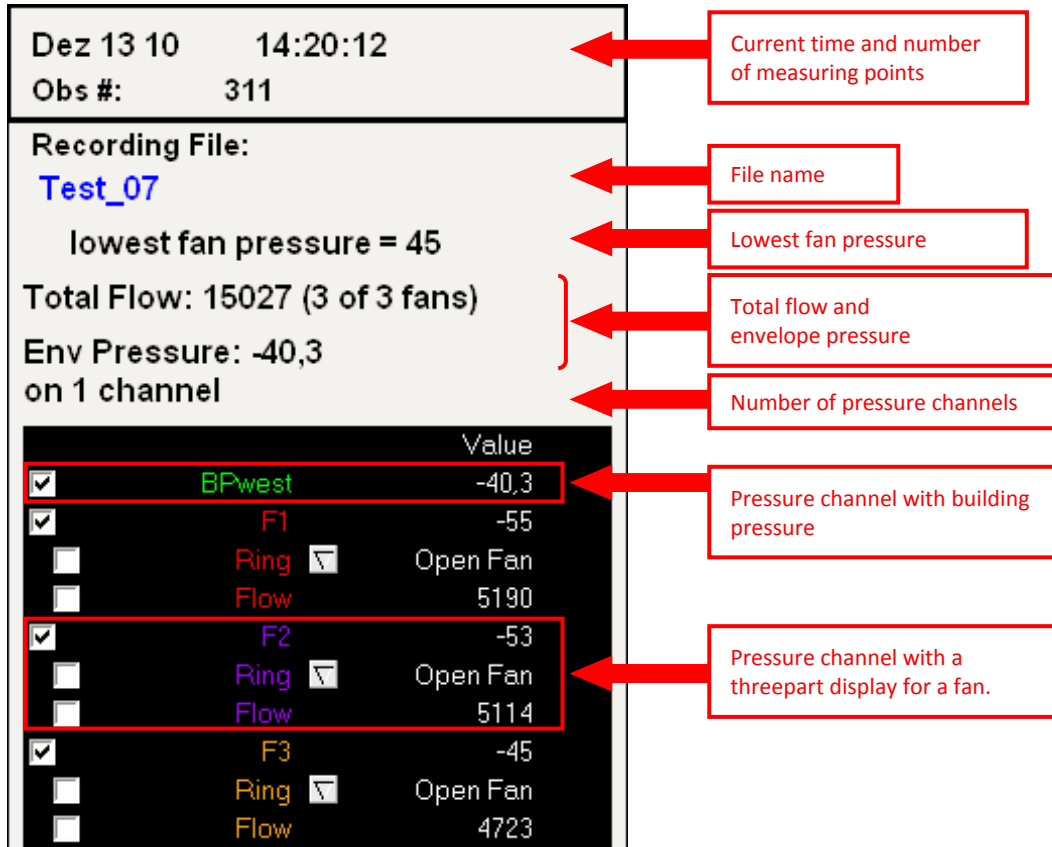


Fig. 6.22: Value readouts in (TECLOG4)

In the digital value display *READOUTS*, all data for monitoring the measurement is displayed:

- the current time,
- the number of measuring points (*OBS #*),
- the file name (*RECORDING FILE*),

- the lowest fan pressure of all fans,
- the total flow (*TOT FLOW*) of all fans,
- the building pressure (*ENV PRESSURE*) or the building pressure mean, if several building pressure differentials have been set up,
- the number of channels with building pressure differential (*ON X CHANNEL*), and
- the settings and measured values for each activated pressure channel.

## The elements of the digital value display

### Header colors in the display

Depending on the type of marking, the color changes in the header of the measurement value display:

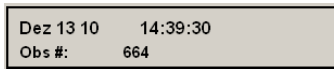


Fig. 6.23: Current measurement values

Grey: Displays the current measured values

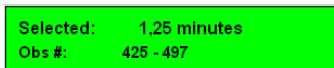


Fig. 6.24: Measurement period marked

Green: When a measuring period is marked or a new period is created, the display is green.



Fig. 6.25: Measurement time marked

Red: When a time of measurement is marked or a new time of measurement is marked in the live diagram, the display is red.

### Lowest fan pressure

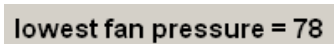


Fig. 6.26: Lowest fan pressure

The line *LOWEST FAN PRESSURE* shows the lowest fan pressure differential of the fans in Pascal (here: 78 Pa).



Fig. 6.27: Lowest fan pressure near calibration limit

When the lowest fan pressure of one fan falls below 35 Pa, the display will start to blink: the fan pressure is approaching the lowest calibration limit. This indicates that you will soon have to remove one fan from the measurement. However, only if the fan pressure of a fan falls below 25 Pa (open fan), will this pressure stage become unusable for the evaluation. One fan must then be taken out, closed

with the fan cover, and be marked in *TECLOG4* as *SEALED*. The test is then continued with one less fan.

### Total Flow

**Total Flow: 15467**

Fig. 6.28: Total flow

The total flow (*TOT FLOW*) is the sum of all flows of the connected fans. It is displayed in the unit (m<sup>3</sup>/h, l/s, cfm) selected.

### Envelope Pressure

**Env Pressure: -39,9**

Fig. 6.29: Envelope pressure

The building pressure differential (*ENV PRESSURE*) is displayed in Pascal. If you only establish a building pressure differential between the inside and the outside of the building, this will be the differential displayed.

When recording several building pressure differentials between the inside and the outside (e.g. at each side of the building), the mean value of the building pressure differentials will be displayed.

#### **Safety instructions:**

Should one of these channels fail (e.g. because a tube comes loose), the mean value displayed will no longer correspond to the actual building pressure differential. **The actual envelope pressure is higher!** Turn off the fans and check the device connections.

### Display of fan configuration (ring), pressure differentials, and fan flow rates

		Value
<input checked="" type="checkbox"/>	BP (west)	-39,9
<input checked="" type="checkbox"/>	F1	-81
<input type="checkbox"/>	Ring <input type="checkbox"/> Open Fan	
<input type="checkbox"/>	Flow	6272
<input checked="" type="checkbox"/>	F2	-81
<input type="checkbox"/>	Ring <input type="checkbox"/> Open Fan	
<input type="checkbox"/>	Flow	6261

Fig. 6.30: Digital display of the measurement values

If the checkbox in front of the channel label is activated, the measuring curve of this channel will be displayed in the live diagram. If the checkbox is not marked, the curve will not be shown.

In the center column you find the channel labels and possible settings for the fan configuration (*RING*).

On the right-hand side, the measured values and fan configurations are shown.



BP (west) -39,9

Fig. 6.31: Building pressure

F1 -81  
 Ring ▾ Open Fan  
 Flow 6272

Fig. 6.32: Measurement fan with fan pressure, ring and airflow

### Example of a building pressure differential:

- BP (west) is the user-assigned label for this channel.
- -39.9 Pa is the current building pressure differential of this channel.

### Example for a fan:

The fan display is sectioned into three parts.

- Line 1
  - **F1**: user-defined fan label
  - **-81**: *MEASURED* value of fan pressure differential in Pascal
- Line 2:
  - **RING**: Click on this item with your left mouse button to change the flow ring settings of the fan.

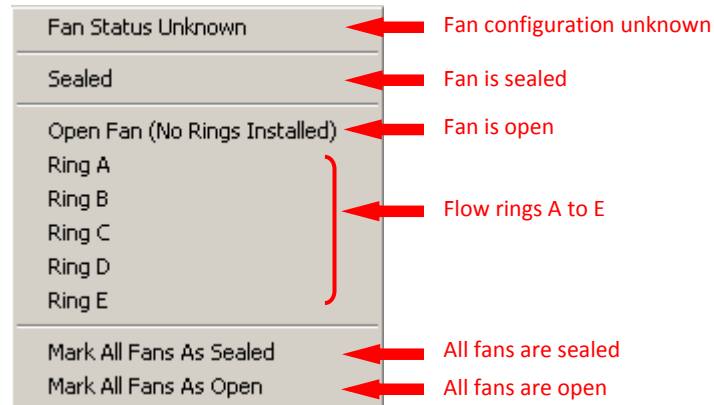


Fig. 6.33: Context menu for ring selection

- "OPEN FAN": flow-ring setting of fan
- Line 3:
  - **FLOW** : *DISPLAY* label
  - **6272**: *CURRENT* flow calculated on the basis of the fan pressure differential of the fan type and the flow ring currently used.



Fig. 6.34: *Unknown – ring unknown*



Fig. 6.35: *No Data – fan differential too low*

### Fan-section of the display blinks

There are several reasons why the three-part display for one or more fans may blink:

- The fan configuration **RING** is **UNKNOWN**. To change the configuration, use your left mouse button to click on the button to the right of **RING**.  
If you want to measure a baseline pressure, select the configuration **SEALED** under **RING**.  
If you measure an artificial pressure stage created by fans, select the corresponding rings below **RING**.
- You have selected a ring, but **NO DATA** is displayed below **FLOW**:  
The fan pressure of this fan is lower than the permissible limit. If you conduct measurements with several fans, one fan must be turned off and sealed with a fan cover. In the **RING** settings, set the configuration for this fan to **SEALED**.

## 6.3 Recording a test series

A series of measurements for airtightness testing consists of:

- the baseline pressure differential before the test,
- at least 5 different artificial building pressure differentials (for example, for depressurization measurements: -60, -55, -50 Pascal, etc. and for pressurization measurements: 60, 55, 50 Pascal, etc.) created with fans
- the baseline pressure differential after the test.

For further information, consult ISO 9972 or EN13829 and the national regulations.

With *TECLOG4*, the data can be recorded for the measurement series and an estimate of the measurement result can already be displayed during the measurement.



**The depressurization measurement series and the measurement series for pressurization can be recorded in one file or in separate files.**

### 6.3.1 Starting the measurement

Once all pressure gauges are registered in *TECLOG4* and all pressure channels set up (Section 5.3), start the measurements in the menu via: → *RECORDING* → *START RECORDING*.

### 6.3.2 Displaying central controller (*MASTER*)

With the central *MASTER* controller, all fans are controlled in parallel at the same time.

To offer a better overview, the control units of the other measuring devices are hidden. (Deactivate the *DEVICES* button in the tool bar.) Activate the *MASTER* button for the central controller (Fig. 6.36).

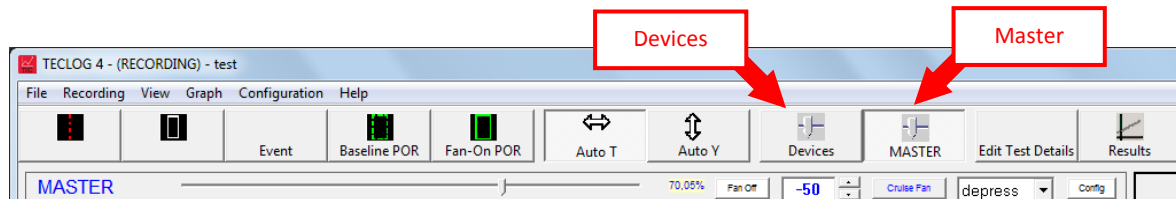


Fig. 6.36: For easier tracking, only show the Master control

### 6.3.3 Configuring the test mode: depressurization or pressurization

To set a depressurization or pressurization measurement, click on the *DEPRESS/PRESS* roll menu in control unit of the master control (*MASTER*) (Fig. 6.37).

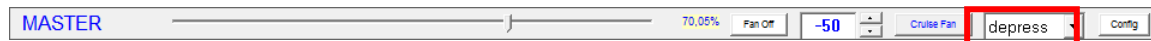


Fig. 6.37: Switching from depressurization to pressurization measurement

In the *DEPRESS/PRESS* roll menu in the control unit of the master control for

- a depressurization measurement select: *DEPRESS*,
- a pressurization measurement select: *PRESS*.



The measurement series for depressurization and the measurement series for pressurization can be recorded in one file or in separate files.

### 6.3.4 Recording the baseline pressure differential before the test

The recording of the natural pressure differential (baseline pressure) takes place in the following steps:

- Sealing fans with fan covers.
- Mark fans as sealed in *TECLOG4* software.
- Mark start of baseline pressure measurement in live diagram (optional)
- Create measurement period for the “natural pressure differential”

#### A) Sealing fans with fan covers

To record the natural pressure differentials, seal all fans with fan covers.

1. Set speed controller to *OFF*.
2. Seal all fans with fan cap.



Fig. 6.38: Speed controller



Fig. 6.39: Fan with fan cap

## B) Mark fans as “sealed”



Fig. 6.40: Mark All Fans As Sealed

In the digital value display, all fans must be defined as *SEALED*.

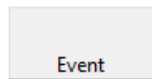
With your *LEFT MOUSE BUTTON*, click on the *RING* button (Fig. 6.40).

In the context menu, mark all fans as *SEALED*:

With your left mouse button click on  
→ *MARK ALL FANS AS SEALED*

## C) Mark start of baseline pressure measurement in live diagram (optional)

Once all fans are closed and set to *SEALED*, it is useful to mark this time of measurement.



Use *EVENT* to mark the current measurement time. The *EDIT EVENT MARKER* window will open (Fig. 6.42).

Fig. 6.41: Event

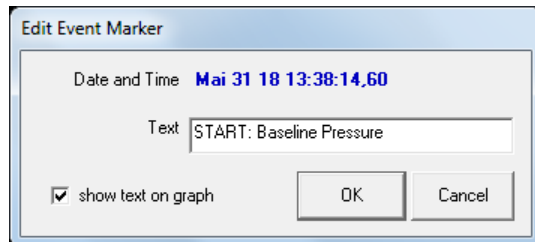


Fig. 6.42: Edit Event Marker

Enter a suitable label in the *TEXT* field (e.g. *START: Baseline Pressure*).

Exit by clicking *OK*.

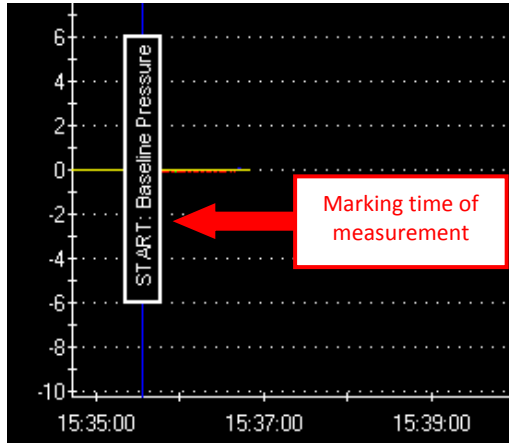


Fig. 6.43: Edit Event Marker (Start of baseline pressure measurement)

A vertical blue line with the respective label appears in the diagram.

#### **Length of recording period**

From the marked start time, record the baseline pressure differential for **at least 30 seconds**. In unfavorable conditions, this measurement period can be extended as needed.

## D) Create measurement period for the “natural pressure differential”

For an evaluation of the measurement to be performed later, a measurement period must be created for the natural pressure differential (baseline period).

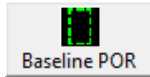


Fig. 6.44: Create natural pressure differential measurement period

In the symbol bar, click on the [BASELINE POR](#) button (measurement period for natural pressure differential).

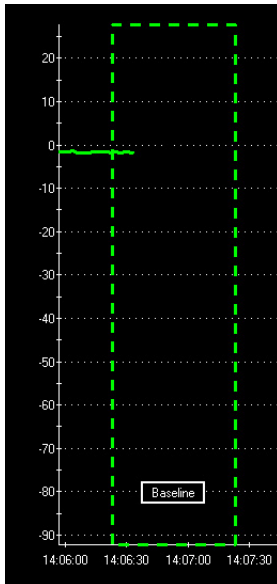


Fig. 6.45: Marking of measurement period

In the live diagram, the “Natural pressure differential measurement period” begins exactly at the time when the [BASELINE POR](#) button was clicked on.

The “Natural pressure differential measurement period” appears in the graphic display as a green dotted-line rectangle with a measurement period length, as defined in the configuration screen ([CONFIGURATION SETTING](#)). The factory setting is 120 seconds, we recommend 60 seconds.

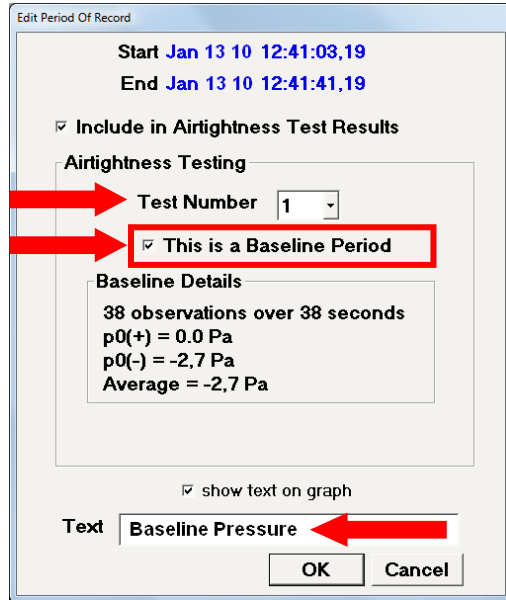


Fig. 6.46: Edit Period Of Record (Baseline pressure)



Fig. 6.47: Create individual measurement period with *REGION SELECT TOOL*

Alternatively, the measuring period can be created using the “*REGION SELECT TOOL*” button (see Section 7.5.2).



**For deleting and renaming an applied measurement period, see chapter 7.5**

The *EDIT PERIOD OF RECORD* window automatically opens, in which the information about the measurement period can be edited.

- Select test number (*TEST NUMBER*) (1 or 2). For example: Test Number 1 for the depressurization measurement and Test Number 2 for the pressurization measurement.
- As the marked period is a natural pressure - differential, the *THIS IS A BASELINE PERIOD* checkbox **must** be **ticked** (This is a natural pressure differential).
- In the *TEXT* field, a relevant name can be entered for the measurement period (example: Baseline Pressure = nat. pressure differential).

The entry is ended with *OK*.



### 6.3.5 Measurement series (depressurization or pressurization)

Following the measurement of the baseline pressure differential, the measurement series is then recorded.

The following steps are necessary:

- Remove fan caps from the measurement fans.
- Mark the measurement fans as "open" in *TECLOG4*.
- Mark the start of the measurement series in the diagram.
- Control the fan with the master control (*MASTER*).
- Adjust a specific building pressure differential with the measurement fans.
- Create measurement period for the relevant "building pressure stage" in *TECLOG4*.
- Check measurement result.
- Adjust next pressure stage.

#### A) Remove fan covers from fans

Remove all fan covers from the fans and set the speed controller to *ON*. Open fans (without flow rings) are generally used to test larger buildings.

1. Set the speed controller to *ON*.
2. Remove fan covers and flow rings from fans.



Fig. 6.48: Speed controller



Fig. 6.49: Fans open

If the airflow of one of the fans falls below the calibration limit, one fan is switched off, closed with the fan cover, and marked as *SEALED* in *TECLOG4* (Section 6.3.6).

## B) Marking fans as “open”

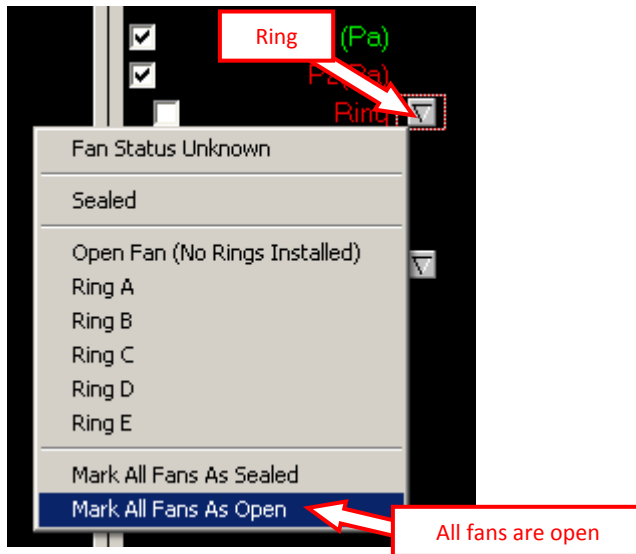


Fig. 6.50: Mark All Fans As Open

Mark all fans as *OPEN* in *TECLOG4*.

With your *LEFT MOUSE BUTTON*, click on the *RING* button.

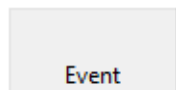
A context menu will open, where you can set all fans to *OPEN*.

With the left mouse button click on  
→ *MARK ALL FANS AS OPEN*.

## C) Marking the start of a measurement series in the live diagram (optional)

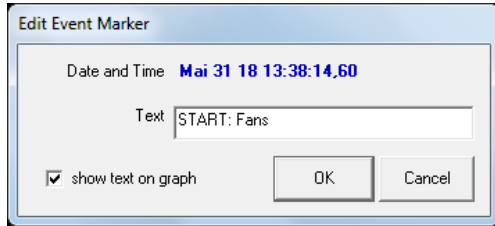
Only mark this time of measurement (event) once

- all fan covers have been removed from the fans,
- all speed controllers have been set to *ON*
- all fans have been marked as *OPEN*



Use *EVENT* to establish the current time of measurement. The window *EDIT EVENT MARKER* will open. The *EDIT EVENT MARKER* window will open (Fig. 6.52).

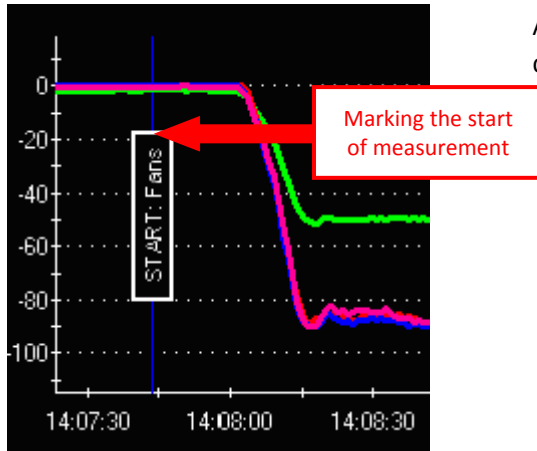
Fig. 6.51: Event



Enter a suitable label in the *TEXT* field (e.g. START: Fans).

Click *OK* to exit.

Fig. 6.52: Edit Event Marker (start test series)



A blue vertical line with the label will appear in the diagram.

Fig. 6.53: Blue line marks start of measurement

#### D) Controlling fans with central controller (*MASTER*)

With the *CRUISE FUNCTION*, *TECLOG4* automatically controls the fans at a constant building pressure differential. The different pressure stages are selected individually by the user. They can also be set manually via the slide control.

### Automated control with *CRUISE*

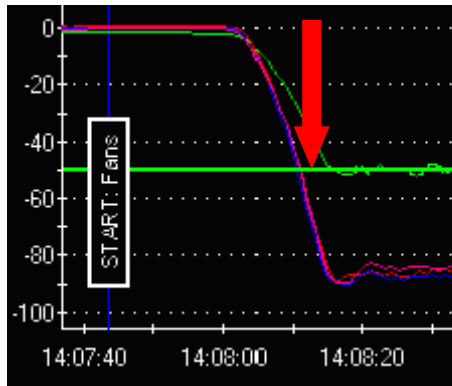


The *CRUISE* function automatically controls the configured constant building pressure difference.

Fig. 6.54: Cruise control

- The target building pressure differential can be changed in the text box (default setting: -50 Pa).
- For a **depressurization** measurement, the values must be **negative**.  
For a **pressurization** measurement, they must be **positive**.
- The numerical value can also be entered manually. The limits for the building pressure are +/-100 Pa.

The Cruise function is activated by clicking on *CRUISE FAN* button and the fans are set to the target pressure.



The configured target pressure appears in the live diagram as a green line.

Fig. 6.55: Green line in the live diagram depicts target pressure

### Alternative: Use of slide controller for manual fan control

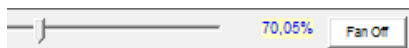


Fig. 6.56: Slider controller

With the *LEFT MOUSE BUTTON*, slowly move the slider to the right until you have reached the desired building pressure.



#### SAFETY INSTRUCTION

To stop the fans, click *FAN OFF* or hit the *ESC BUTTON* on your keyboard.

## E) Adjusting building pressure stages

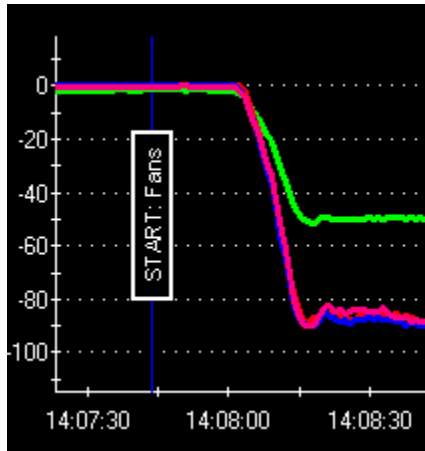


Fig. 6.57: Measuring curve (Fan-On)

In the live diagram, the measuring curves for the building pressure differential (here: green) and the fan pressure differentials (other colors) increase up to the target values.

During depressurization, the building pressure differential is negative. During pressurization, it is positive.

The fan pressure differentials are always negative.

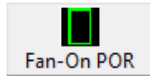
The time of the build-up phase for an artificial building pressure differential depends on the airtightness of the building. The more airtight the building, the longer it takes until the pressure is built up.

The desired building pressure differential is reached when the measurement curves run parallel or horizontal to the time, or x-axis. This phase should take at least half a minute (even longer if it is windy or the building is highly airtight) before the next pressure stage is set.

If the target value is not reached, an additional fan should be switched on.

## F) Create measurement period for “pressure stage”

For an evaluation of the measurement to be performed, a measurement period of at least 30 seconds (longer in wind and very airtight buildings) must be created for each created building pressure differential. We recommend measurement periods with a length of at least 60 seconds.



Click on the [FAN-ON POR](#) (Create measurement period (with running fans) for pressure stage) button in the symbol bar.

Fig. 6.58: Create measurement period for pressure stage

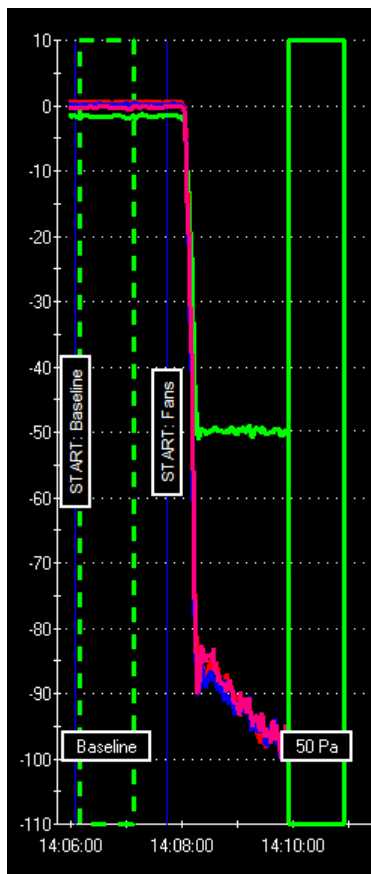


Fig. 6.59: Measurement period

In the live diagram, the measurement period begins exactly at the time when the [FAN-ON POR](#) button was clicked on.

The "Measurement period for pressure stage" appears in the graphic display as a green rectangle with a measurement period length, as defined in the configuration screen (→ [CONFIGURATION SETTING](#)). The factory setting is 30 seconds, we recommend 60 seconds.

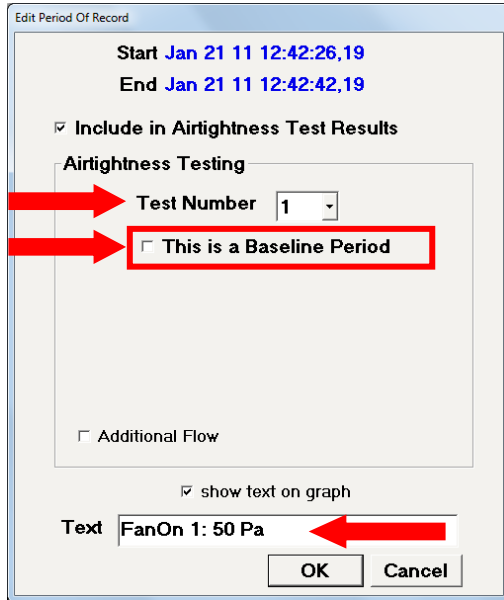


Fig. 6.60: Edit Period Of Record (pressure stage)



Fig. 6.61: Create individual measurement period with [REGION SELECT TOOL](#)

Alternatively, the measuring period can be created using the “[REGION SELECT TOOL](#)” button (see Section 7.5.2).



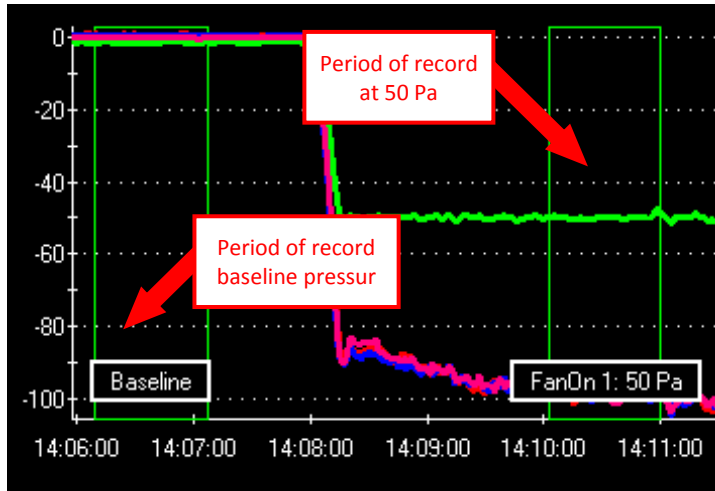
**For deleting and renaming an applied measurement period, see chapter 7.5**

The *EDIT PERIOD OF RECORD*, window automatically opens, in which the following settings are made:

- Select test number (*TEST NUMBER*) (1 or 2). For example: Test Number 1 for the depressurization measurement and Test Number 2 for the pressurization measurement.
- As the marked period is a natural pressure differential, the *THIS IS A BASELINE PERIOD* checkbox remains **empty** (This is a natural pressure differential).
- In the *TEXT* field, a relevant name can be entered for the measurement period. (example: FanOn 1: 50Pa = Pressure stage 1: 50Pa)

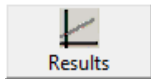
The entry is ended with *OK*.

### G) Reviewing the measurement results



If at least one baseline pressure differential and one artificially created pressure stage (with the fans running) are established as periods of record, an approximate result of the measurement can be displayed.

Fig. 6.62: Live diagram with periods of record



For a first overview of the measuring results, click on [RESULTS](#) in the toolbar.

Fig. 6.63: Show results



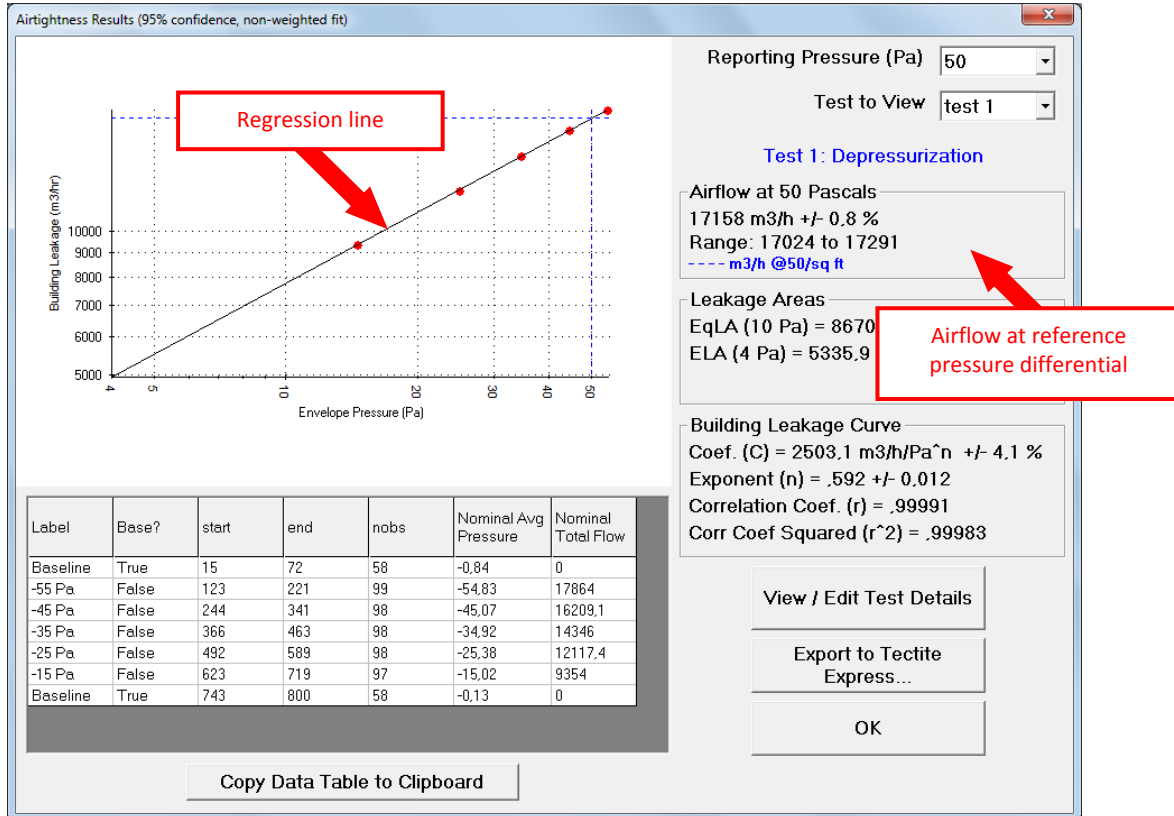


Fig. 6.64: Approximate measurement result with one baseline pressure differential and one pressure stage

In the **AIRTIGHTNESS RESULTS** window, you can access the evaluation of the values recorded thus far.

The diagram depicts all measured values (red dots) and the regression line (leakage curve). The measurement is acceptable when, with the exception of small deviations, all measurement points are on the regression line. If one of the measured values strongly deviates from the regression line, the test setup and the building envelope must be reviewed.

A table below the diagram lists the individual measured values. The airflow at the selected reporting pressure differential (75 Pa, 50 Pa, 25 Pa, 10 Pa or 4 Pa) is displayed to the right of the diagram.

## H) Setting the next pressure stage



Fig. 6.65: Next pressure stage

Set the next pressure stage in the *CRUISE* function (here: -45 Pa).

Alternatively:

Move the slide controller to the next pressure stage

- A minimum of 5 pressure stages must be configured. The difference between the individual pressure stages must not exceed 10 Pascal. The distances between the pressure stages should ideally be the same (also see ISO 9972 or EN13829 and country-specific regulations).
- All periods of record (pressure stages) that are to be included in the evaluation should be of the same length (at least 30 seconds).

### 6.3.6 Continuing measurement series with one less fan

When centrally controlling several fans, one fan must be removed from the measurement as soon as the fan pressure differential of one fan falls below 25 Pascal (open fan, no flow ring installed). In this case, the speed of this fan is so low that the fan pressure differential falls below the calibration limit.

This may also occur during a test series: for example, when you start the measurement with 5 fans, but after e.g. 3 pressure stages, one fan had to be turned off and sealed. The measurement is then continued with 4 fans.

#### Low fan pressure warning

*TECLOG4* issues a warning before a fan must be sealed. When the lowest fan pressure of a fan falls below 35 Pa, the *LOWEST FAN PRESSURE* display in the digital value display starts to blink.

A screenshot of the digital display showing the text 'lowest fan pressure = 31' in red. The text is enclosed in a grey rectangular box.

Fig. 6.66: Lowest fan pressure

As long as the fan pressure differential of a fan (without flow ring) does not fall below 25 Pa, the pressure stage can be included in the evaluation.

### Fan pressure falls below calibrated limit

Only when the fan pressure differential of a fan (without flow ring) falls below 25 Pa, can the pressure stage no longer be used for the evaluation.



Fig. 6.67: Warning: Fan pressure is lower than the calibrated limit.

The fan info of this fan in the digital value display will blink and *No DATA* appears below *FLOW*.

When attempting to create a period of record containing at least one building pressure differential lower than the calibrated limit, the following warning is displayed:

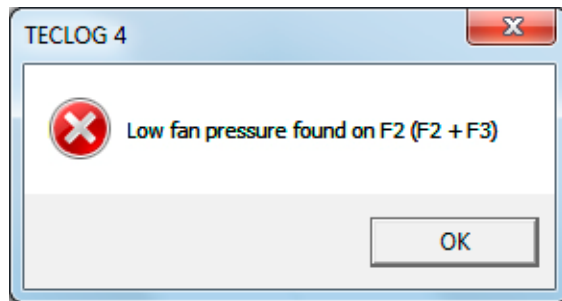


Fig. 6.68: Note: Fan pressure is too low.

Fan pressure on fan “F2” of the measuring device “F2+F3” is too low.

In this case, one fan must be removed from the measurement.

Carry out the following steps:

1. Set speed controller to **OFF**.
2. Seal the fan with fan cover.
3. Mark fan as **SEALED**.



Fig. 6.69: Fan speed controller



Fig. 6.70

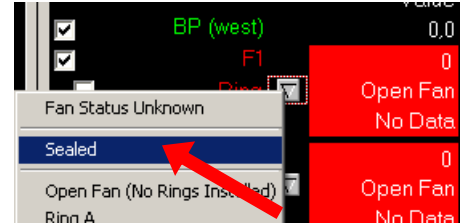


Fig. 6.71

Then continue the measurement with one less fan

### 6.3.7 Recording the baseline pressure differential after the measurement

Once the test series is recorded, the measurement is concluded by recording the baseline pressure after the test.

The recording of the natural pressure differential takes place in the following steps:

- Close all measurement fans with fan caps.
- In **TECLOG4**, mark the measurement fan **SEALED**.
- Optionally, the start of the measurement period for the natural pressure differential can be marked in the diagram.
- Create measurement period for the “natural pressure differential”.

## A) Seal fans with fan covers

To record the natural pressure differential, turn off the speed controllers of the fans and seal the fans with the fan covers.

1. Set speed controller to **OFF**.
2. Seal all fans with fan cover.



Fig. 6.72: Fan Speed Controller



Fig. 6.73

## B) Marking fans as “sealed”

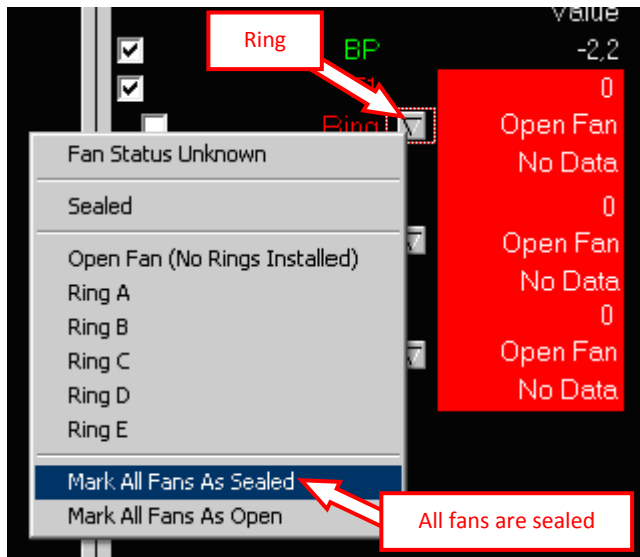


Fig. 6.74: Mark All Fans As Sealed

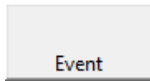
In the digital value display, mark the fans as **SEALED**.

With your **LEFT MOUSE BUTTON**, click on the **RING** button.

In the context menu:  
→ **MARK ALL FANS AS SEALED**

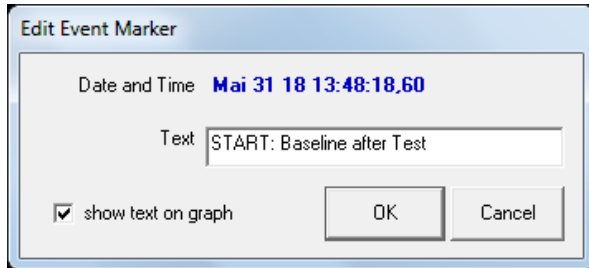
### C) Marking the start of the baseline pressure measurement in the live diagram (optional)

It is useful to mark this time of measurement in the live diagram.



Click on *EVENT* in the toolbar. The *EDIT EVENT MARKER* window will open (Fig. 6.76).

Fig. 6.75: Event



Enter a label in the *TEXT* field (e.g. START: Baseline after Test).

Exit by clicking *OK*.

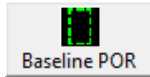
Fig. 6.76: Edit Event Marker

The time of measurement (event) is marked by a blue line with the label in the live diagram.

From the start of the measurement, the baseline pressure should be recorded for at least 30 seconds. Under unfavorable conditions, this recording period can be extended as needed.

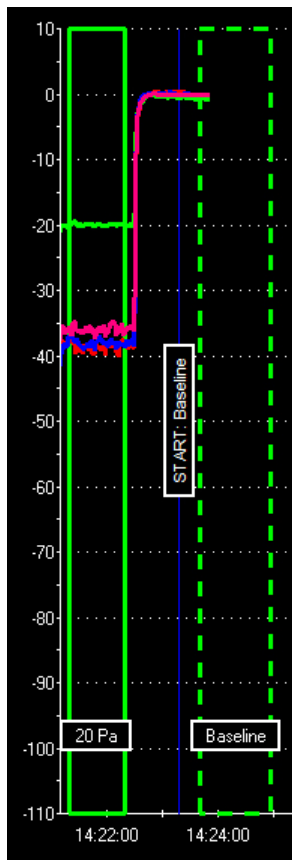
## D) Create measurement period for the “natural pressure differential”

A measurement period must be created, so that the natural pressure differential flows into the evaluation after the measurement.



In the symbol bar, click on the *BASILINE POR* button ("Natural pressure differential measurement period").

*Fig. 6.77: Create natural pressure differential measurement period*



In the live diagram, the "Natural pressure differential measurement period" begins exactly at the time when the *BASILINE POR* button was clicked on.

The "Natural pressure differential measurement period" appears in the graphic display as a green dotted-line rectangle with a measurement period length, as defined in the configuration screen (→ *CONFIGURATION SETTING*). The factory setting is 120 seconds, we recommend 60 seconds.

*Fig. 6.78: Measurement period*

Fig. 6.79: Edit Period Of Record (Baseline pressure)



Fig. 6.80: Create individual measurement period

Alternatively, the measuring period can be created using the “[CREATE INDIVIDUAL MEASURING PERIOD](#)” button (see Section 7.5.2).



**To delete or rename a created measurement period, see Section 7.5).**

The [EDIT PERIOD OF RECORD](#) window automatically opens again, in which the information about the measurement period can be edited.

- Select test number ([TEST NUMBER](#)) (1 or 2). For example: Test Number 1 for the depressurization measurement and Test Number 2 for the pressurization measurement.
- As the marked period is a natural pressure - differential, the [THIS IS A BASELINE PERIOD](#) checkbox **must be ticked** (This is a natural pressure differential).
- In the [TEXT](#) field, a relevant name can be entered for the measurement period (example: Baseline Pressure = nat. pressure differential).

The entry is ended with [OK](#).



### 6.3.8 Reviewing the series of measurements

Once the last period of record has been established (baseline pressure differential after the test), the measurement series and the measuring results should again be reviewed.

Fig. 6.81 shows a complete test series with a building pressure differential (green curve) and the flow curves of three fans (blue, red, and pink curves).

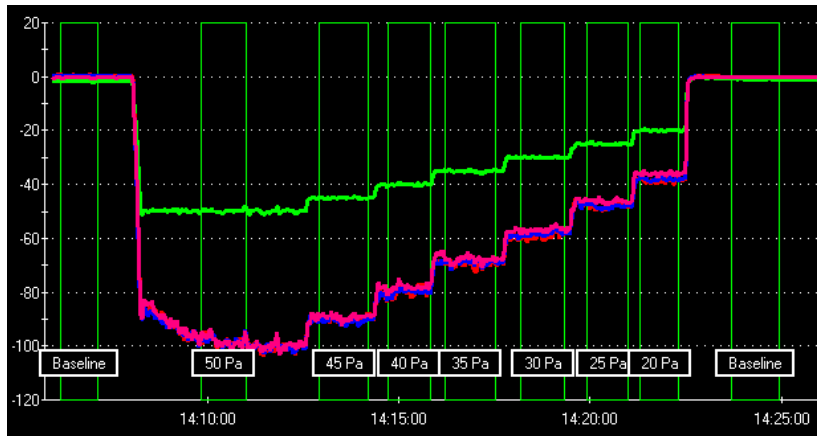
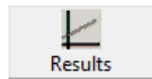


Fig. 6.81: Example of a complete series of measurements



Access the results of the test series by clicking on [RESULTS](#) in the toolbar.

Fig. 6.82:  
Show results

Fig. 6.81 shows an example of a test series. All measured values (red dots) in the diagram are closely aligned with the regression line (see Fig. 6.83).

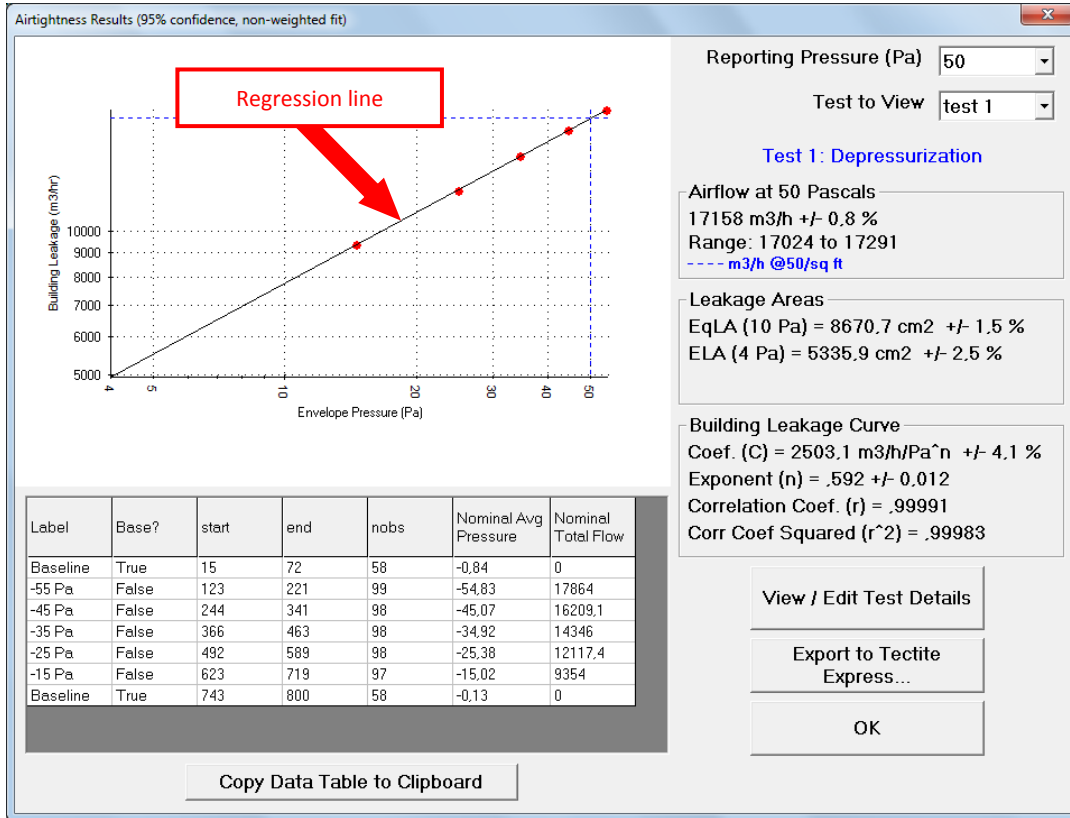


Fig. 6.83: Measuring results

### 6.3.9 Ending the measurement

End the measurement by clicking on → *RECORDING* → *STOP RECORDING* in the menu bar.

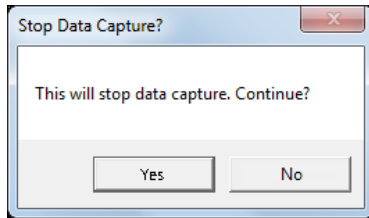


Fig. 6.84: Stop Data Capture?

The message box *STOP DATA CAPTURE?* opens.

To end the measurement click *YES*.

To continue the measurement click *NO*.

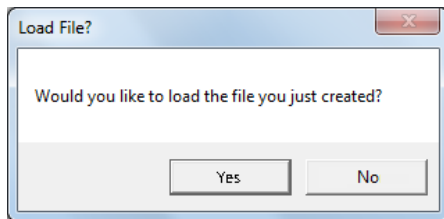


Fig. 6.85: Load File?

The message box *LOAD FILE?* then asks if you want to open the file you just created.

To display the measurement, click *YES*.

If you do not want to display the measurement, click *NO*.

## 6.4 Displaying the measurement result in TECLOG MultipleFan

Upon ending the measurement, the file containing the measurement results can be displayed in the File View Mode.

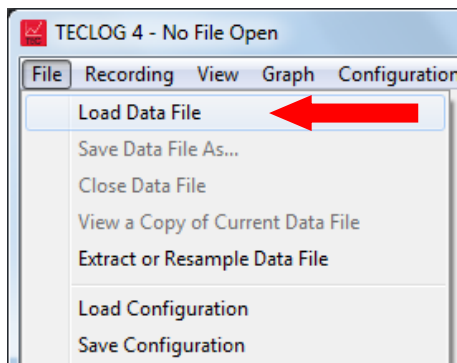
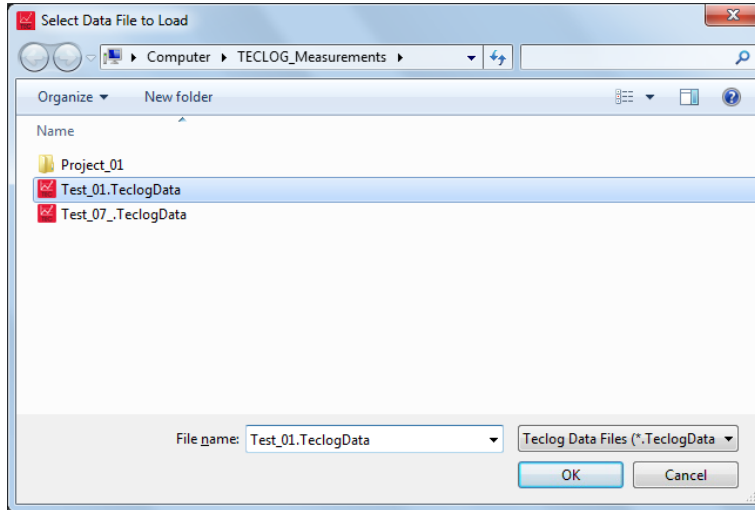


Fig. 6.86: Load Data File

Access → *FILE* → *LOAD DATA FILE* in the menu.



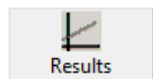
Open the file you want to view.

Fig. 6.87: Select Data File to Load



The measurement is displayed in the *TECLOG4* File View Mode.

Fig. 6.88: View of a series of measurements



The total measurement result is accessible in the *DATA RECORDING MODE* and in the *FILE VIEW MODE*.

Fig. 6.89: Show results

Click on → *RESULTS* in the toolbar.

The *AIRTIGHTNESS RESULTS* window will open. It shows the measuring result of the airtightness test.

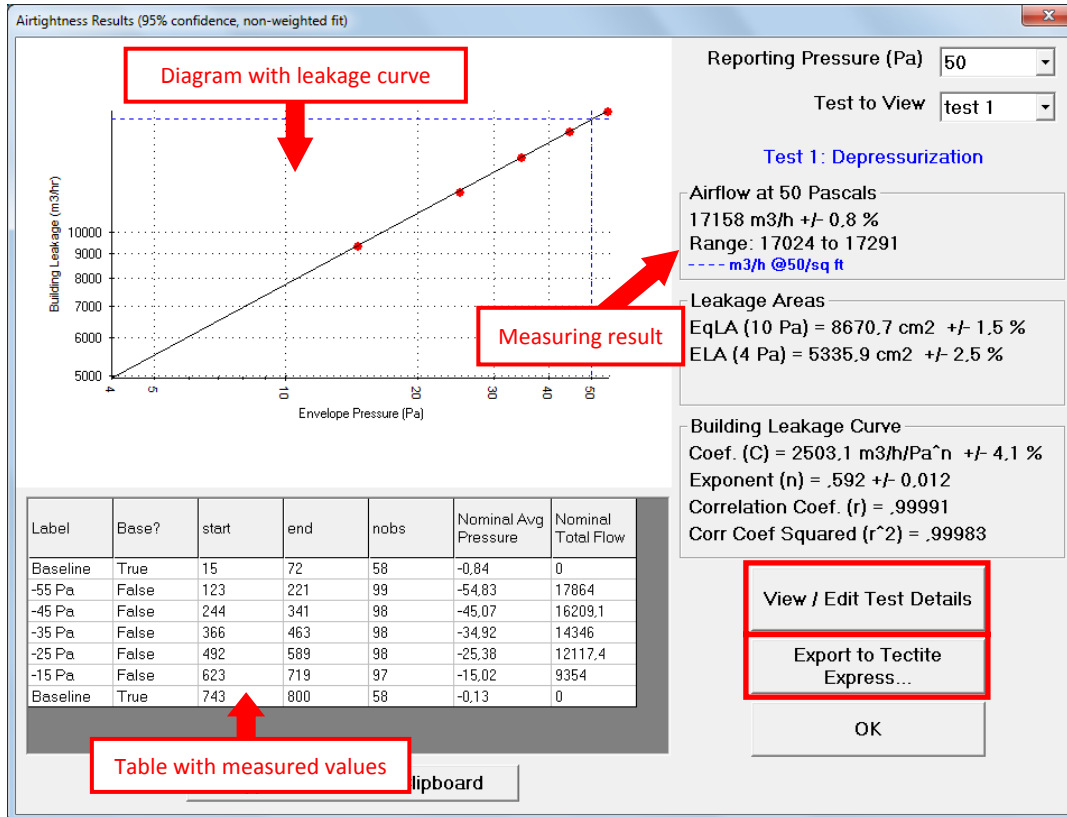


Fig. 6.90: Measurement results

The **AIRTIGHTNESS RESULTS** (measurement results) window shows

- the diagram with the leakage curve,
- the measurement results,
- the table with the individual measurement data and
- the **VIEW / EDIT TEST DETAILS** buttons and
- **EXPORT TO TECTITE EXPRESS ...** to create a ".bld" file.

### 6.4.1 Diagram with measuring curve

The diagram shows the leakage curve of the building as a line. The horizontal x-axis shows the *ENVELOPE PRESSURE* in Pascal and the vertical y-axis the *BUILDING LEAKAGE* (airflow) in the unit selected (cfm, m<sup>3</sup>/h, l/s).

#### Measuring points

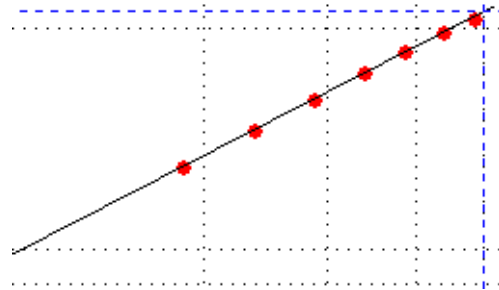


Fig. 6.91: Series of measurement

Each measuring point in the diagram represents one of the created periods of record with the fans in operation. The horizontal x-axis shows the building pressure differential, and the vertical y-axis the airflow. In the diagram, the building pressure differentials are corrected by the baseline pressure differential.

Each period of record consists of the average of the building pressure differentials (all pressure channels allocated to *ENVELOPE PRESSURE*) and the corresponding total flow. The latter consists of the sum of all mean values of the individual fan flows.

The measurement series can be approved if, with the exception of small deviations ( $r \geq 0.98$ ), all measuring points are located on one line.

Step 40 Pa: Pressure = 38,7, Flow = 18611

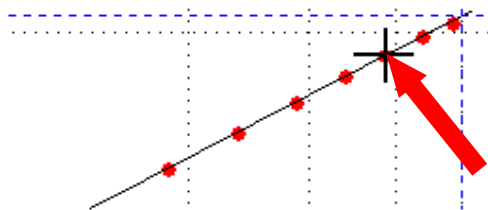


Fig. 6.92: Value for individual measuring point of the series

The measurement value for individual measuring points can be displayed by holding the mouse cursor over each point. The measuring point's label, the building pressure differential, and the total flow will appear above the diagram.

## 6.4.2 Display of measurement result

### Selected reference pressure differential

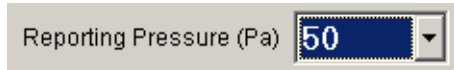


Fig. 6.93: Selected reference pressure differential

In the drop-down menu *REPORTING PRESSURE*, select the pressure differential for which to conduct the evaluation. The following building pressure differentials can be selected: 75 Pa, 50 Pa, 25 Pa, 10 Pa or 4 Pa.

### Measurement result

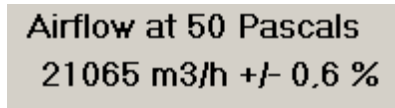


Fig. 6.94: Display airflow in relation to the reference pressure

The measuring result is displayed in relation to the selected reporting (reference) pressure.

## 6.4.3 Measuring data in Airtightness Results table in TECLOG4

Label
Baseline
STEP 50 Pa

The column *LABEL* shows the user-defined label for the period of record.

Fig. 6.95

Base?
True
False

The *BASE?* column marks the average of the baseline pressure differentials (period of record with sealed fans) as *TRUE* and the artificially created building pressure differential (period of record with open fans) as *FALSE*.

Fig. 6.96

start
14

The column *START* shows the start of the period of record by indicating the number of measuring points following the start of measurement.

Fig. 6.97

end
69

The end of the period of record is indicated in the *END* column with the number of measuring points following the start of the measurement.

Fig. 6.98

nobs
56

The **NOBS** (number of observations) column shows the number of measuring points for the respective period of record.

Fig. 6.99

Avg Pressure
-1,67
-49,87

The column **AVG. PRESSURE** shows the average of the building pressure differential of the individual pressure stages.

Fig. 6.100

Total Flow
0
20661,7

The **TOTAL FLOW** column shows the sum of all airflows of the pressure stage.

Fig. 6.101

#### 6.4.4 Enter climate parameters (View/Edit Test Details)

For each measurement series, the indoor and outdoor temperature and the barometric pressure can be entered.

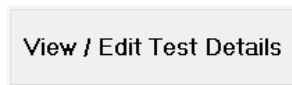


Fig. 6.102: Button for displaying and editing the environmental parameters

For this, click on the **VIEW / EDIT TEST DETAILS** buttons.

The **EDIT ENVIRONMENTAL PARAMETERS** window opens.

In the **EDIT ENVIRONMENTAL PARAMETERS** window (Fig. 6.103) the following parameters can be entered:

- Indoor Temperature
- Outdoor Temperature
- Barometric Pressure



Fig. 6.103: Enter temperatures and barometric pressure

#### 6.4.5 Creation of a .bld file with the Export to TECTITE Express button

With the [EXPORT TO TECTITE EXPRESS ...](#) button, the measurement results can be exported to an external file with the ending ".bld".



Fig. 6.104: Export measurement results to .bld-file

This file can be imported into [TECTITE EXPRESS 5.1](#) in order to create a test report that complies with the standard. Please refer to the BlowerDoor Standard or BlowerDoor MiniFan manual.

It is possible to import the measurement values manually into older TECTITE Express Versions.

## 7 Menu Bar, Toolbar, Zooming, Periods of Record, Data Export

### 7.1 Menu bar

#### File

<i>LOAD DATA FILE</i>	Open file
<i>SAVE DATA FILE AS</i>	Save file
<i>CLOSE DATA FILE</i>	Close file
<i>VIEW AND COPY OF CURRENT DATA FILE</i>	Create and view a copy of the measurement file during the current measurement
<i>EXTRACT OR RESAMPLE DATA FILE</i>	Create an extract from an existing file or resample (for example change 1 sec averages into 5 sec averages) a current file
<i>LOAD CONFIGURATION</i>	Load previously saved settings
<i>SAVE CONFIGURATION</i>	Save setting
<i>IMPORT ASCII TEXT DATA</i>	Import ASCII text data
<i>EXPORT</i>	Export data in image or text format
<i>PRINT</i>	Print
<i>EXIT</i>	Close program

#### Recording

<i>START RECORDING</i>	Start recording / measurement
<i>STOP RECORDING</i>	End recording / measurement
<i>ZERO PRESSURES</i>	Manual zero-setting of pressure sensors
<i>CLEAR COMM ERRORS</i>	Clear communication error message of measuring device

**View**

<i>TOOLBAR</i>	Show / hide toolbar
<i>READOUTS</i>	Show / hide digital value display
<i>SORT CHANNEL READOUTS BY TYPE</i>	Sorting channel readouts by type
<i>DEVICE STATUS / FAN CONTROL</i>	Show / hide control unit for measuring devices
<i>SHOW MASTER CONTROL</i>	Show / hide central <i>MASTER</i> control
<i>SHOW MARKERS</i>	Show / hide markers in diagram
<i>SHOW PERIODS OF RECORD</i>	Show / hide periods of record in diagram
<i>AIRTIGHTNESS RESULTS</i>	View measurement results of airtightness measurement
<i>OPERATION LOG</i>	View operation log of <i>TECLOG4</i>
<i>FILE COMMENTS</i>	File comments
<i>EVENT MARKER SUMMARY</i>	Summary of marked events (times of measurement)
<i>SUMMARY STATISTICS</i>	Statistics summary
<i>DAB / DG INFORMATION</i>	Information on measuring devices

**Graph**

<i>FULL AUTO SCALE (AUTO Y AND AUTO X)</i>	Show complete series of measurement
<i>HORIZONTAL GRIDLINES</i>	Show / hide horizontal gridlines
<i>VERTICAL GRIDLINES</i>	Show / hide vertical gridlines
<i>INVERT</i>	Toggle between black and white background
<i>LEGEND</i>	Show / hide legend
<i>HELP ON ZOOMING</i>	Open help for zooming

## Graph

### *SPECIFY CURRENT AXIS LIMITS*

Manual setting of minimum and maximum values of the time and value axis (x- and y-axis)

### *ZOOM OUT TIME SCALE (2X)*

Double time-scale zoom out (x-axis)

### *ZOOM OUT Y SCALE (2X)*

Double value-scale zoom out (y-axis)

### *SAVE DATA TO FILE AND CLEAR GRAPH*

Save data to file and clear graph.

### **ATTENTION:**

DO NOT USE THIS WHILE CONDUCTING AN AIRTIGHTNESS TEST.

## Configuration

### *SETTINGS*

Settings for measuring devices and pressure channels

## Help

### *ABOUT TECLOG*

*TECLOG4* version number

### *CONTENTS*

*TECLOG4* help file contents

## 7.2 Toolbar



Fig. 7.1: *TECLOG4* menu and toolbar



Fig. 7.2

### **Red marking line:**

When this button is clicked and activated, a dotted red, vertical line appears in the diagram. It can be moved in the diagram with the *LEFT MOUSE BUTTON* or the *ARROW KEYS*. At the measured observation points, the individual measured values that are met by the line are displayed in the digital value display on the right of the diagram. Clicking on the button again will hide the line.



Fig. 7.3

### Creating a period of record:

Activating this button allows you to open a field across any measurement area in the diagram with the left mouse button. The mean values of the marked area for each measuring curve are displayed in the digital value display. If this area is to be saved in the diagram (e.g. as pressure stage of a series of measurements), click into the marked field with the right mouse button. A menu will open, where you can select [CREATE PERIOD OF RECORD](#) to create a new period of measurement.

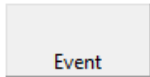


Fig. 7.4

### Event Marker:

Mark current time of measurement

With [EVENT](#), you fix the current time of measurement in the diagram with a blue line. This marking can be labeled.

### Mark any time of measurement:

To mark and fix any time of measurement, click on the button with the red marking line. The dotted red line will appear in the diagram. Use your left mouse button to shift it to the desired time of measurement. Then click on the [EVENT](#) button. The blue marking line is placed exactly on the red dotted line. Again you can label the time of measurement. The "m" key on the keyboard is a shortcut for the Mark button.

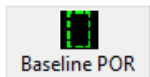


Fig. 7.5

### Create measurement period in natural pressure differential in live diagram:

The "Natural pressure differential measurement period" begins exactly at the time when the [BASELINE POR](#) button was clicked on.

It appears in the graphic display as a green, dotted-line rectangle. The length of the measurement period is defined in the ( → [CONFIGURATION SETTING](#)) configuration screen.

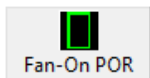


Fig. 7.6

### Create measurement period for pressure differential in live diagram:

The "Pressure differential measurement period" begins exactly at the time the [FAN-ON POR](#) button was clicked on.

It appears in the graphic display as a green rectangle. The length of the measurement period is defined in the ( → [CONFIGURATION SETTING](#)) configuration screen.



Fig. 7.7

**Auto T:**

When the button *AUTO T* is activated in the Data Recording Mode, the diagram will automatically shift to the currently measured data. When the *AUTO T* button is activated in the File View Mode, the entire time scale of the measurement is shown.



Fig. 7.8

**Auto Y:**

*Auto Y* in the Data Recording Mode, as well as in the File View Mode, adjusts the diagram to the maximum and minimum values of the value scale (y-axis).



Fig. 7.9

**Show / hide control units of measuring devices**

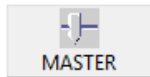


Fig. 7.10

**Show / hide central *MASTER* control**

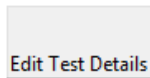


Fig. 7.11

**Show test details**

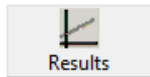


Fig. 7.12

**Show measuring results of airtightness measurement**

### 7.3 Shortcuts

- m** The “m” key on the keyboard is a shortcut for the Mark button.
- a** When recording more than one building pressure differential while in the *AIRTIGHTNESS RESULTS* window, the “a” key on the keyboard allows you to view the measurement results with all possible combinations of building pressure differentials.

## 7.4 Working in the diagram (zooming etc.)

### Zoom in



Fig. 7.13

Press the **SHIFT-BUTTON** and, using the left mouse button, draw out a rectangle. Upon releasing the mouse button, the framed area is zoomed in.

### Scrolling with mouse button



Fig. 7.14

The diagram or diagram section can be scrolled through freely with the **LEFT MOUSE BUTTON** pressed down.

## Zooming in on the measuring curve



Fig. 7.15

Click on the legend icon with your left mouse button to zoom in on an individual measuring curve. Hold down the control key (**CRTL**) during this operation if you only wish to expand the vertical scale and not reduce it. This is useful for scaling to view more than one channel.

## Doubling the x-axis (time scale) or the y-axis (value scale)

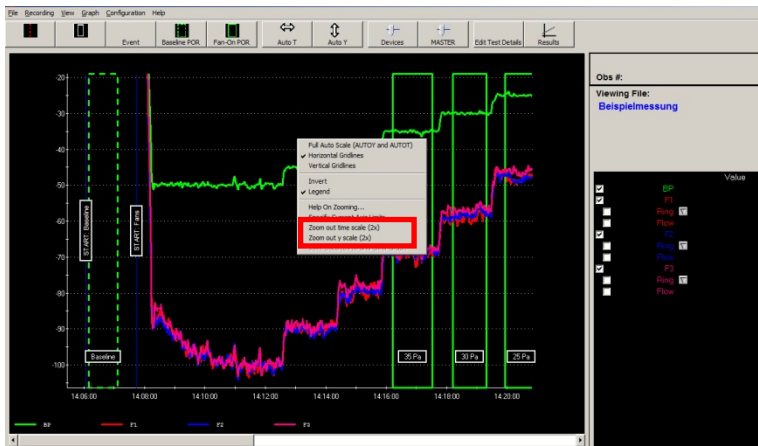


Fig. 7.16

With your right mouse button, click on the diagram.

In the context menu

Click on → **ZOOM OUT TIME SCALE (2x)** to double the x-axis section (time scale).

To double the y-axis section (value scale), click on → **ZOOM OUT Y SCALE (2x)**.



## Viewing the total time and value section



Fig. 7.17

### File View Mode:

To show the complete x-axis (time scale), click on [AUTO T](#).

To show the complete y-axis (value scale), click on [AUTO Y](#).

### Data Recording Mode:

To show the current measured values on the time axis, click on [AUTO T](#).

To zoom the diagram to the minimum and maximum values of the value scale, click on [AUTO Y](#).

## Showing and hiding measuring curves

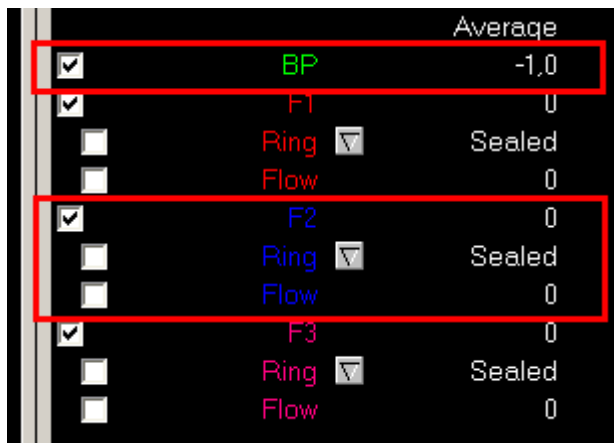


Fig. 7.18

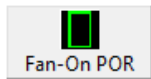
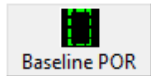
Mark the checkbox corresponding to a measuring curve to show it in the diagram.

In the digital value display, you will find a checkbox for each building pressure differential (or pressure differential).

A fan is assigned three checkboxes (fan pressure, *RING*, *FLOW*) that can be activated independently.

## 7.5 Creating, deleting, or renaming periods of record

### 7.5.1 Create measurement period in live diagram



To create a measurement period in the live diagram during the measurement, click on the *BASILINE POR* button ("Natural pressure differential measurement period") or the *FAN-ON POR* button ("Create measurement period (with running fans) for pressure stage").

Fig. 7.19



Fig. 7.20: Marking of measurement period

In the live diagram, the "Natural pressure differential measurement period" or "Measurement period for pressure stage" begins exactly at the time when one of the *POR* buttons was clicked on.

A green or green dotted-line rectangle appears in the graphic display for the measurement period with the default measurement length. The length of the measurement period can be defined individually in the configuration screen (menu: → *CONFIGURATION* → *SETTINGS*) in the left-hand dialogue field *GRAPH*. We recommend measurement periods with a length of at least 30 seconds.

## 7.5.2 Create measurement period subsequently



With the **LEFT MOUSE BUTTON**, click on the button **REGION SELECT TOOL** in the toolbar.

Fig. 7.21



Fig. 7.22

In the diagram, draw up a field with the **LEFT MOUSE BUTTON**. It is framed in white.

The selected field length of the measurement period should be at least 30 seconds long (longer in wind and airtight buildings).

The area must only be comprised of measurement curves that are constant (parallel or horizontal to the x-axis).

Its location can be fine tuned with the following keys on the keyboard, in conjunction with the left and right arrow keys. Hold down the control key (**CRTL**) to adjust the left hand side of the rectangle. Hold down the **ALT** key to adjust the right hand side. Hold down **SHIFT** to adjust both sides at the same time.

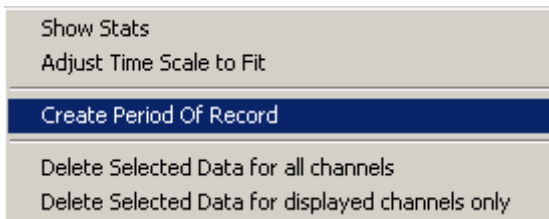


Fig. 7.23: Create a Period Of Record

Click with the **RIGHT MOUSE BUTTON** in the white field and click on the opening **→ CREATE PERIOD OF RECORD** context menu to create a measurement period.

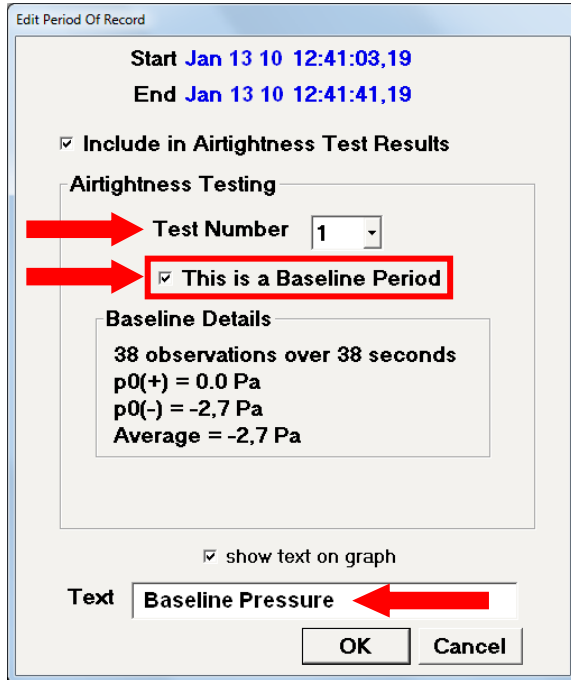


Fig. 7.24: Edit Period Of Record

The *EDIT PERIOD OF RECORD* window opens.

The following settings must be made beforehand:

1. Select **test number** (*TEST NUMBER*) (1 or 2). For example: Test Number 1 for the depressurization measurement and Test Number 2 for the pressurization measurement.
2. If the marked period is a **natural pressure - differential**, the *THIS IS A BASELINE PERIOD* checkbox **must** be **ticked** (This is a natural pressure differential).  
If the marked period is **not** a natural pressure differential, the **checkbox remains empty**.
3. In the *TEXT* field, a relevant name can be entered for the measurement period.

**(Example:** Baseline Pressure = natural pressure differential or Fan-On 1: 50 Pa = Pressure stage 1: 50 Pa).

The entry is ended with *OK*.

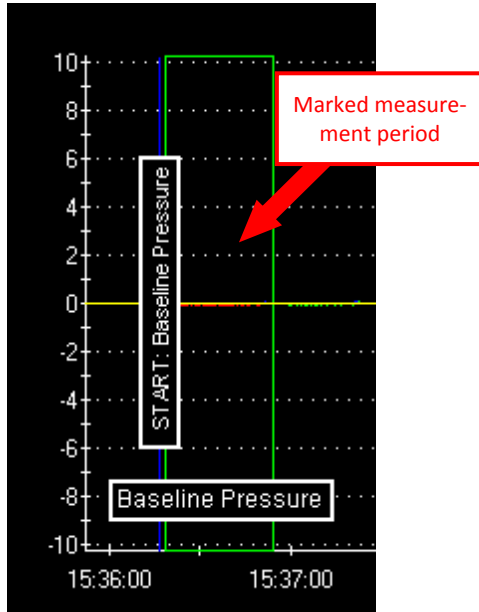


Fig. 7.25: Marked measurement period

In the diagram, the create measurement period is displayed with a green (for the pressure stages) or dotted-line green outline (for the natural pressure differential).

To delete or rename a created measurement period, see Section 7.5.3 and 7.5.4.

### 7.5.3 Deleting periods of record

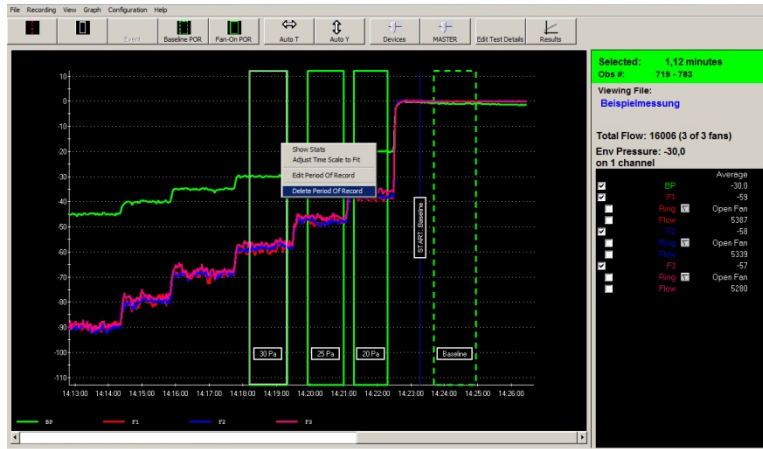


Fig. 7.26

With the **LEFT MOUSE BUTTON**, click into the established green-framed period. A white frame is applied to the marked period.

Then click into the white field with your **RIGHT MOUSE BUTTON**. In the context menu, click on **DELETE PERIOD OF RECORD**.



Fig. 7.27

## 7.5.4 Renaming periods of record



Fig. 7.28

With the **LEFT MOUSE BUTTON**, click into the established green-framed period. A white frame is applied to the marked period.

Then click into the white field with your **RIGHT MOUSE BUTTON**. In the context menu, click on **EDIT PERIOD OF RECORD** to rename the period.

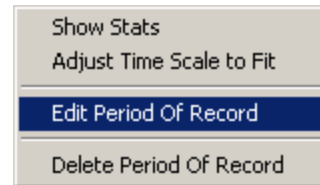


Fig. 7.29

## 7.6 Export in different file formats

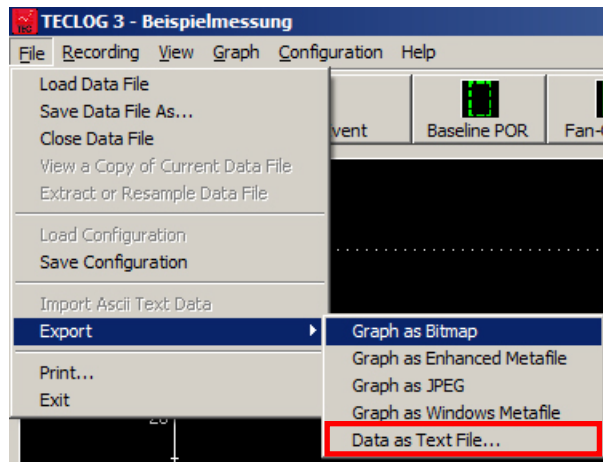


Fig. 7.30

The test file can be exported in different file formats.

The *GRAPH AS JPEG* function, for example allows you to save image sections as jpg-files.

For further processing and adapting of the data in Excel, export *DATA AS TEXT FILE* and then import it into an open Excel program (good Excel skills are required here).



## 8 Troubleshooting

### 8.1 No connection between TECLOG MultipleFan and measurement device

**Possible causes:**

- The measurement device is not connected to the laptop.
- The measurement device is not switched on.
- The charge of batteries of the measurement device is too low (at DG-700 at least 6 Volts are necessary).
- The wireless connection between laptop and WiFi router or the access point of the emitting DG-1000 is not configured correctly.
- The TEC WiFi Links of DG-700 are not connected to the WiFi router or the access point of the emitting DG-1000.
- Laptop and pressure gauges are not connected to the same WiFi network.
- For a wired connection of DG-700 or APT: If the serial-USB-adapter (e.g. COM Port Box) is not listed at the Windows Device Manager, possibly the driver is not installed correctly or the adapter is defect.
- Bluetooth function of the computer is not turned off. It must be deactivated.

### 8.2 Measurement is interrupted

**Possible causes:**

- Bluetooth function of the computer is still active. It must be turned off.
- The charge of batteries of the measurement device is too low (at DG-700 at least 6 Volts are necessary).

## **Our Service Offer**

### **Calibration of your BlowerDoor Measurement Systems**

At  $\pm 4\%$  (flow rings A – C) and  $\pm 5\%$  (flow rings D + E), both the accuracy of the BlowerDoor testing flow rings as well as that of the pressure gauge DG-1000 at  $\pm 0.9\%$  clearly exceed the legal minimum requirements.

To maintain the high measuring accuracy of the BlowerDoor Measurement System, we recommend ensuring regular calibration according to the manufacturer's specifications: The accuracy of the BlowerDoor testing fan should be checked by calibration every four years. A previous fan check forms part of each fan calibration.

In addition to the very high quality manufacturer's calibration, BlowerDoor GmbH also offers accredited calibrations with DAkkS calibration, which are conducted according to a standard defined by the German accreditation body (Deutsche Akkreditierungsstelle GmbH, DAkkS).

BlowerDoor GmbH offers calibration of fans and of pressure gauges at favorable prices. Details are available on [www.blowerdoor.com](http://www.blowerdoor.com).

### **Seminars and in-house training**

In addition to the extensive seminar program covering aspects of an airtight building envelope offered by the Energie- und Umweltzentrums am Deister, BlowerDoor GmbH and its contract partners also provide individual training on site or on-demand webinars. Contact us for more information!

### **Service at your construction site**

If required, we will lend our competence to support you in conducting a BlowerDoor measurement at your construction site. Contact us for an offer tailored to your needs!

### **Listing in the directory of providers of BlowerDoor measurements**

As a BlowerDoor testing team, your listing in our online database is free of charge. Contact us at [info@blowerdoor.com](mailto:info@blowerdoor.com) if you would like an address entry, including a link to your email address and website in our directory of BlowerDoor test providers.

### **CompetenceCenter**

All BlowerDoor testing teams receive access to our virtual Center of Competence at [www.blowerdoor.com](http://www.blowerdoor.com) free of charge, where we regularly provide you with news and offer interesting information for download. Contact us if you have not yet received your client number and access data from BlowerDoor GmbH.

### **Advertising material for BlowerDoor testing teams**

Upon request, we support BlowerDoor testing teams with professional printable files on BlowerDoor measurements free of charge. The material will feature your own contact data and company logo. (View a sample at [www.blowerdoor.com](http://www.blowerdoor.com).) If interested, send us an e-mail with your complete address and your company logo as a jpg file in printable resolution to [info@blowerdoor.com](mailto:info@blowerdoor.com).

### **Technical Support**

Should you have unexpected technical problems while conducting BlowerDoor measurements, our tech support team is available free of charge during our office hours at the following number: +49(0)5044/975-57 (chargeable call to German landline).

## Guarantee

### Object of the guarantee:

#### **BlowerDoor standard, BlowerDoor MiniFan and BlowerDoor MultipleFan system**

Besides the guarantee set forth in the law, BlowerDoor GmbH offers you a total of four years of guarantee for the complete BlowerDoor Measurement System (BlowerDoor fan including low flow rings and fan cover, DG-1000, mounting frame and nylon panel, speed controller, tube set, and accessory bag). The guarantee starts with date of purchase. It takes into account all claims under guarantee submitted to BlowerDoor GmbH in writing during the period of guarantee.

Should a claim under guarantee require the measuring equipment to remain at the premises of BlowerDoor GmbH for more than 7 days, customers upon request will be loaned a corresponding replacement for the duration of the repairs. BlowerDoor GmbH will bear the cost of shipping to the client's premises on the basis of standard cost of freight. Upon repair and on receipt of the repaired measuring device, customers shall send the measuring device loaned to them back to BlowerDoor GmbH at their own expense immediately. The costs as well as the risk of loss or damage on the way to or from the point where the claims under guarantee are accepted are borne by the respective shipping party.

Claims under guarantee cannot be considered

- when the measuring device or the object under guarantee has not been operated according to specifications, e.g. has not been properly handled or stored, in particular also when the operating instructions have not been observed or maintenance has been neglected,
- when the measuring device or the object under guarantee has been opened or repaired by non-authorized workshops or other people,
- when the measuring device or the object under guarantee shows damages that can be traced to wear or tear.

In accordance with this guarantee, BlowerDoor GmbH shall only provide guarantee services if the guarantee case is immediately and without any delay communicated to BlowerDoor GmbH in writing.

This guarantee shall not cover consequential damages, in particular financial losses for the customer caused by failure of the equipment.

Upon completion of the guarantee service, ownership of the parts replaced shall fall to BlowerDoor GmbH.

### **Process/Delivery**

Only BlowerDoor GmbH, Zum Energie- und Umweltzentrum 1 in 31832 Springe-Eldagsen/Germany (Tel.: +49(0)5044/975-40) shall be entitled to accept claims under guarantee. Customers shall send the faulty measuring device or component to BlowerDoor GmbH. BlowerDoor GmbH shall bear the cost of return shipping on the basis of standard cost of freight.

The costs and risk of loss or damage on the way to or from the point where the claims under guarantee are received are borne by the respective shipping party.





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