

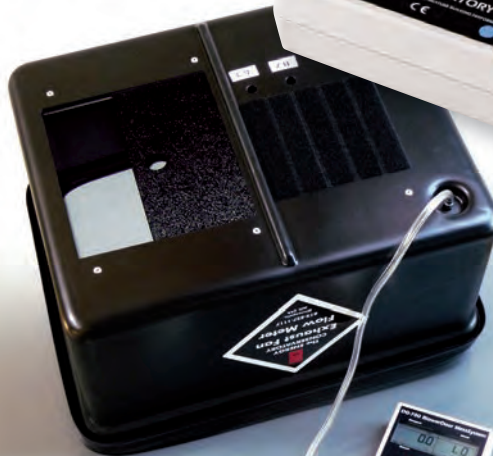


**BlowerDoor GmbH**  
MessSysteme für Luftdichtheit



## BlowerDoor Exhaust Fan Flow Meter

Measurements of airflow through  
residential exhaust fans





The Energy Conservatory

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



**BlowerDoor GmbH**  
MessSysteme für Luftdichtheit

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# 1 Introduction

The Exhaust Fan Flow Meter is designed to take quick and accurate measurements of airflow through residential exhaust fans.

The device should be used along with a digital pressure gauge from BlowerDoor GmbH. We recommend the DG-700. The DG-700 is a digital pressure gauge with extended functions, e.g., automated BlowerDoor tests. The particular advantage of the DG-700 as pressure gauge for this test is that it shows the pressure difference and the airflow at the exhaust fan simultaneously.

The principle of the measurement is shown in Fig. 1. The components of the Exhaust Fan Flow Meter are itemized in Fig. 2 and Fig. 3.

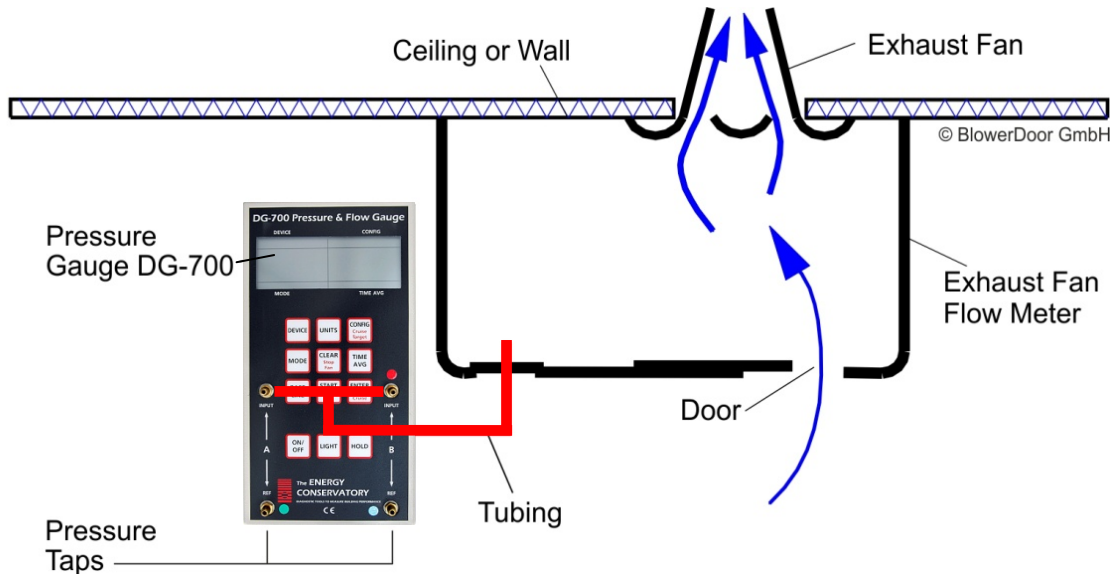


Fig. 1: The principle of the measurement with Exhaust Fan Flow Meter and DG-700

## 2 The Devices

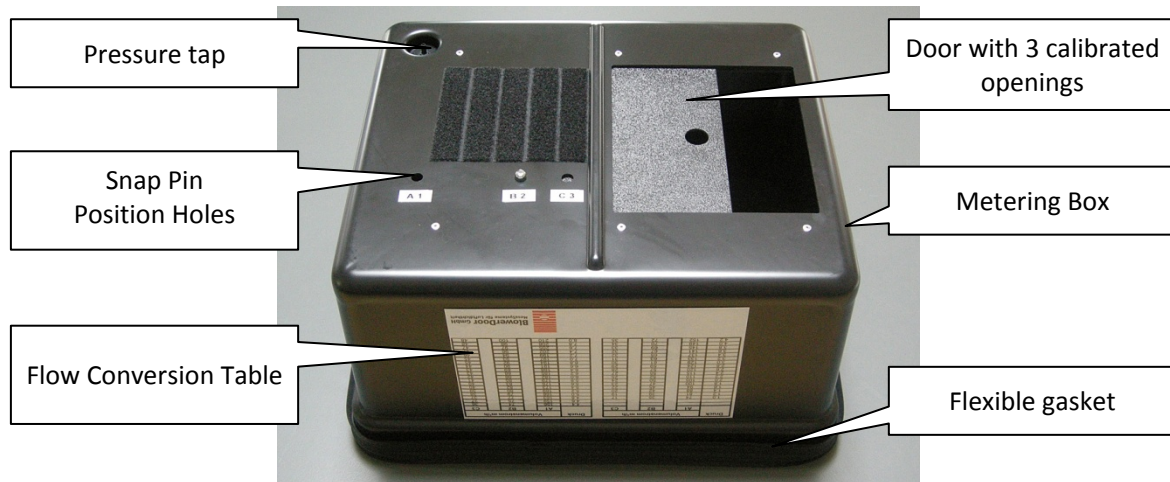


Fig. 2: The Exhaust Fan Flow Meter



Fig. 3: Telescopic bar and handle with Velcro strips for Exhaust Fan Flow Meter.

The Exhaust Fan Flow Meter has three calibrated openings to provide an accurate measurement over the full range of the device. A telescopic bar and a separate short handle with Velcro strips provide access to exhaust fan grilles mounted high on walls or on ceilings.

To clean the devices, only use water, dish liquid and a soft cleaning cloth.

The effective airflow measurement range for the Exhaust Fan Flow Meter is 17 - 210 m<sup>3</sup>/h.

### 3 Exhaust Fan Flow Meter Test Procedure

#### 3.1 Connect the Metering Box to the DG-700

First connect one end of a piece of flexible tubing to the pressure tap located in the corner of the Metering Box.

Now connect the other ends of the tubing to Channel A "Input" pressure tap and Channel B "Input" pressure tap at DG-700.



Fig. 4: Connect tubing to Metering Box



Fig. 5: Connect tubing to the DG-700

### 3.2 Select the Door Position

The Exhaust Fan Flow Meter comes with an adjustable opening which provides three ranges of fan flow measurement. The door position (A1, B2 or C3) is determined by the position of the snap pin located on the top of the Metering Box. The door position can be adjusted by pushing down on the snap pin and sliding the door until the snap pin locks into a new position hole.

Door Position	Flow range [m <sup>3</sup> /h]
A1	74 – 210
B2	35 – 100
C3	17 – 47

Table 1: Flow range of door positions

#### Acceptable Metering Box Pressures:

When using the Exhaust Fan Flow Meter, the measured Metering Box pressure should never be greater than 8.0 Pascal, and never lower than 1.0 Pascal. If the measured Metering Box pressure is above 8.0 Pascal, stop the measuring and check the door position. If the door position was set to C3, adjust the position to create a larger opening in the Metering Box (B2 or A1).

#### Example:

The door position is set to B2 and the measured Metering Box pressure is e.g. 6.4 Pa. The door position is set to A1 and the measured Metering Box pressure is e.g. 2.5 Pa. Then the door opening A1 should be selected, because the Metering Box takes the lowest effect on the flow rate in the residential exhaust fan.

The DG-700 warns you if the Metering Box pressure is less than 1.0 Pascal.

### 3.3 Configuration at the Pressure Gauge DG-700

- Connect the DG-700 to the Metering Box (see Fig. 5).
- Turn on the DG-700 using the *ON/OFF* button.
- Then adjust the selected test device (shown in the upper left hand corner of the gauge display) by pressing the *DEVICE* button until the *DEVICE* icon is set to *EXH*.
- Now put it in the *PR/.....FL* mode by pressing the *MODE* button.
- Finally, adjust the selected device configuration (shown in the upper right hand corner of the gauge display) by pressing the *CONFIG* button until the *CONFIG* icon is matched with the chosen door position.

**Note:**



If you change the door position on the Metering Box, be sure to change the *CONFIG* setting on the gauge to match the new door position.

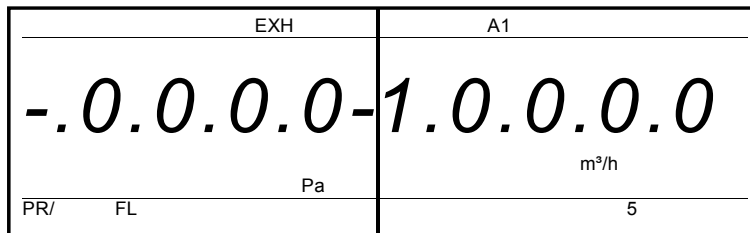


Fig. 6: Display of DG-700 when using with Exhaust Fan Flow Meter.



### 3.4 Place Metering Box over Exhaust Fan Grille and Determine Flow Reading

With the exhaust fan turned on, place the Metering Box completely over the fan grille so that the flexible gasket on the end of the Metering Box creates an air tight seal around the grille (see Fig. 1 and Fig. 7). Hold the gauge DG-700 steady for at least 10 seconds so that the gauge auto-zeros.



*Fig. 7: The Exhaust Fan Flow Meter is placed directly over the exhaust fan grille and is pushed up against the wall or ceiling.*

#### **Determine the airflow reading with DG-700**

The airflow reading from the exhaust fan will be shown directly on the Channel B display.

If the flow reading is fluctuating, you may want to change the time-average setting on the gauge (*TIME AVG* button). The displayed flow units can also be changed by pressing the *UNITS* button (default units are  $\text{m}^3/\text{h}$ ).

## **4 Technical Specifications**

### **4.1 Flow Accuracy**

When used with DG-700 digital pressure gauges, the accuracy of the exhaust fan flow measurement is +/- 10%.

### **4.2 Flow Range**

The effective airflow measurement range for the Exhaust Fan Flow Meter is 17 – 210 m<sup>3</sup>/h (see Table 1).

### **4.3 Inside Opening Dimension**

44 cm x 36 cm x 23 cm

#### 4.4 Flow Conversion Table

Meter Pressure [Pa]	Airflow [m <sup>3</sup> /h]			
	A1		B2	C3
1.0	74		35	17
1.2	81		39	19
1.4	88		42	20
1.6	94		45	22
1.8	100		47	23
2.0	105		50	24
2.2	110		52	25
2.4	115		55	27
2.6	120		57	28
2.8	124		59	29
3.0	129		61	30
3.2	133		63	31
3.4	137		65	32
3.6	141		67	32
3.8	145		69	33
4.0	149		70	34
4.2	152		72	35
4.4	156		74	36

Meter Pressure [Pa]	Airflow [m <sup>3</sup> /h]			
	A1		B2	C3
4.6	159		75	37
4.8	163		77	37
5.0	166		79	38
5.2	169		80	39
5.4	173		82	40
5.6	176		83	40
5.8	179		85	41
6.0	182		86	42
6.2	185		88	43
6.4	188		89	43
6.6	191		90	44
6.8	194		92	45
7.0	197		93	45
7.2	199		94	46
7.4	202		96	47
7.6	205		97	47
7.8	208		98	48
8.0	210		100	48

Table 2: Flow Conversion Table for Exhaust Fan Flow Meter.

## **Our Service Offer**

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

At  $\pm 4\%$  (BlowerDoor standard flow rings A – C respectively BlowerDoor MiniFan flow rings 1 – 4 ) and  $\pm 5\%$  (standard flow rings D + E), both the accuracy of the BlowerDoor testing flow rings as well as that of the pressure gauge DG-700 at  $\pm 1\%$  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.

BlowerDoor GmbH not only offers regular fan calibration, but also manufacturer's calibration of pressure gauges at favorable prices.

### **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).





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