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Duct leakage tester
Operating instructions

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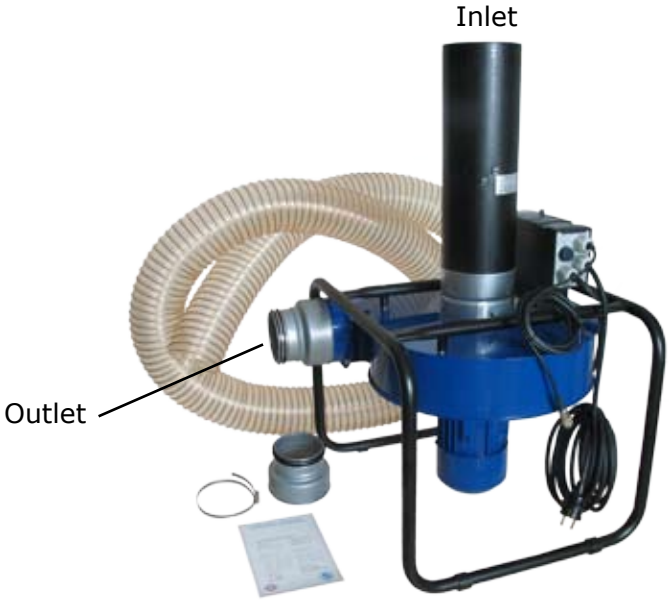
Contents:

1. Introduction

NOTE: ONLY use the pipe and flanges within their calibrated ranges. See calibartion cerificates.
A Swema 3 LH instrument with two differential pressure sensors meaures the over/under-pressure in the duct and the leakage flow over a throttle device (Flange/Orifice Pipe) with k-factor. The radial fan provides the pressure and a leakage test flow.

The meausered duct section must be sealed with tightness bladders. The duct leakage tester is used according to European standards EN 12237 and EN 1507.

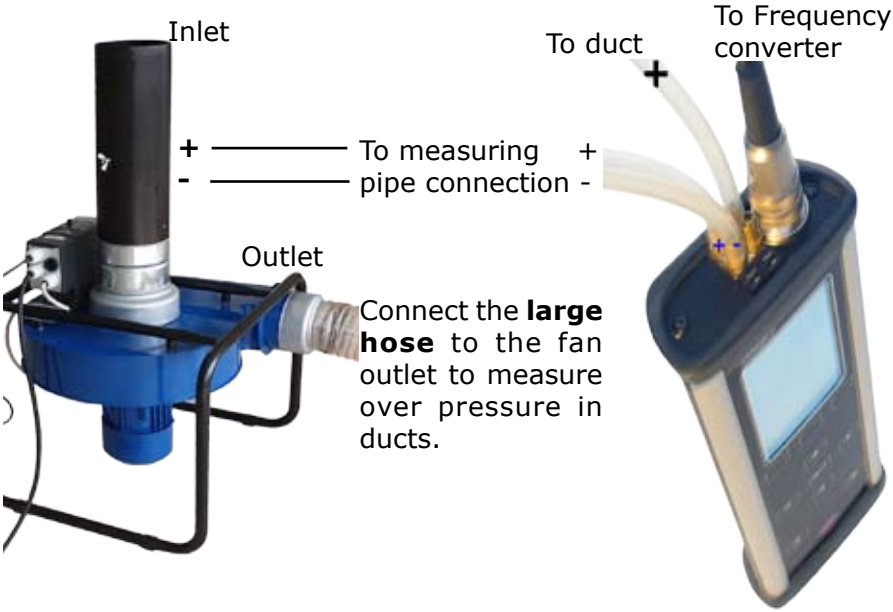
2. Leakage tester and accessories



Bladders - Pump - Silicone hose

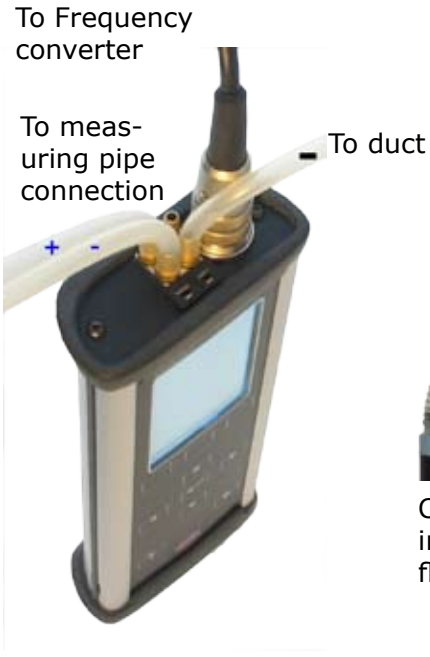
Part
771111 Duct Leakage tester 22-130 l/s
770960 Orfice plate 1-4 l/s
770970 Orfice late 4-33 l/s
764208 Swema 3 LH- or LH 771800 or LHCB 771830
762470 Silicon hose
768920 Silicon hose for measuring pipe, thinner dia.
766620 Pump, connector for bladders
765080 Ø250 mm bladder
765090 Ø400 mm bladder
765095 Ø500 mm bladder
765100 Ø600 mm bladder

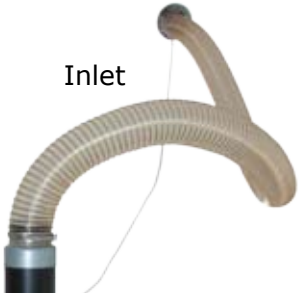
3. Overpressure



Connect the **large hose** to the fan outlet to measure over pressure in ducts.

4. Underpressure



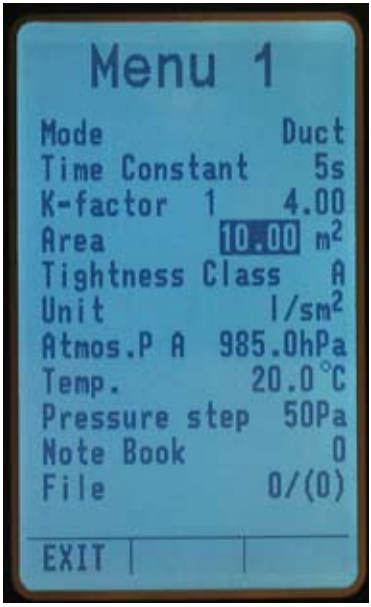


Connect the **large hose** to the inlet of the leakage tester (the flange/measuring pipe).

5. Settings

Turn Swema 3 on. Press "MENU 1".
"**Menu 1**"

1. Select measuring "**Mode**" Duct
2. Keep the recommended 5s "**Time constant**"
   The displayed value is an average over 5 second.
3. Set the "**K-factor**" according to flow direction and sticker on flange or calibration certificate. Set the exponent in MENU 2. The ***K-factor and Exponent must both be set*** to get the correct flow reading.
   With K-factor set to 0 the instrument shows only Pascals.
   After turning OFF and then ON, the instrument will forget the exponent and use 0.5. It has to be set again!
   If the exponent is **not** set to 0.5 it will show while measuring.
4. Set the "**Area**" of the duct section .
5. Set "**Tightness class**" (A, B, C or D).
6. Select "**Unit**" l/sm^2 or m^3/hm^2.
   Use the set area to calculate l/sm^2 or m^3/hm^2 to check if the leakage is within selected Class.
   "**Atmos. P A**" is the measuered amospheric Pressure.
   "**Temp.**" can be set or is measured with a Thermocouple type K.
   The barometric pressure and temperature will compensate the flow to actual or standard air flow.
   Set Density to Actual or Real in Menu 2.
7. Set the pressure step, "1-500" Pa.
   The test pressure can be altered by this pressure step.

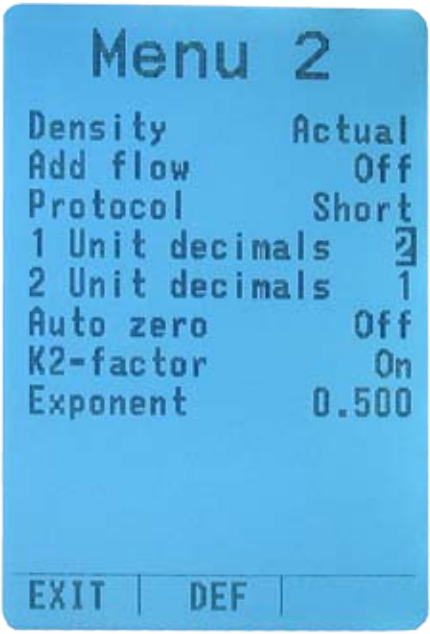


Notes:

1. There are two sets of k-factors and exponents for each Flange/Measuring Pipe. One set for Overpressure and one for Underpressure. The corresponding k-factor and exponent must be used, (see the label on the Flange/Orifice Pipe or in the calibration certificate).

2. The diameter of the Inlet and the Outlet are the same, therefore it is possible to connect the nozzle of the large hose to both **outlet** and **inlet**.

"**Menu 2**"
"**Denisty**" *Actual* will present the flow at the the current density. *Standard* will convert the flow rate to standard conditions of 1013 hPa and 20 deg C.
"**1 Unit decimal**" can be changed to present the flow with that number of decimals.
"**Auto zero**" will check the differential pressure zero point of the two sensors and compensate for an eventual off-set when taking a measurement by pressing "Enter".
Set the "**Exponent**" according to flow direction and sticker on flange or calibration certificate. Set the K-factor in MENU 1. The ***K-factor and Exponent must both be set*** to get the correct flow reading. After turning off and then ON, the instrument will forget the exponent and use 0,5. It has to be set again!



All other settings are not for duct leakage testing.

Press "Batt" and "SYSTEM" to go to the menu System

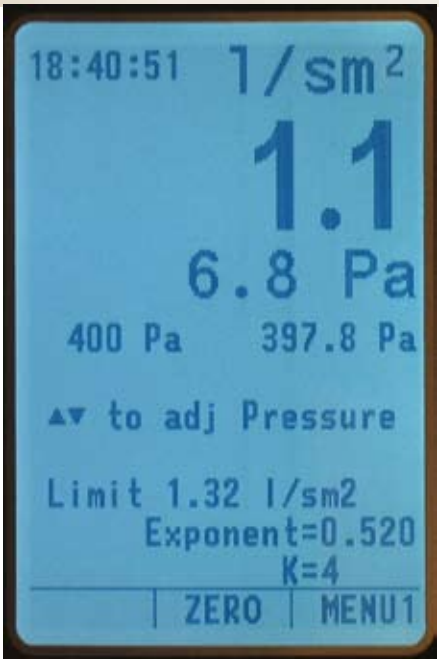
"**System**"
"**Unit System**" US will keep the surface area in m^2 but change to CFM or CFM/ft^2.
"**I-factor**" is an integration factor (for with PID-control) that controls the fan frequency. 1000 is default and controls the fan without oscillation.

6. Extra Flanges

The leakage tester 77110 has two orfice plates as accessories, part no. 770960 and 770970 that measures in lower ranges. They have a seal and can be inserted in the measuring pipe. Change the K-factor and exponent in Menu 1 and Menu 2 in Swema 3. The flange is inserted in an angle to fit tight inside of the metal pins. Then the flange is leveled so it is clamped inbetween the fixed flange and the screw in pin.

8. Measurement

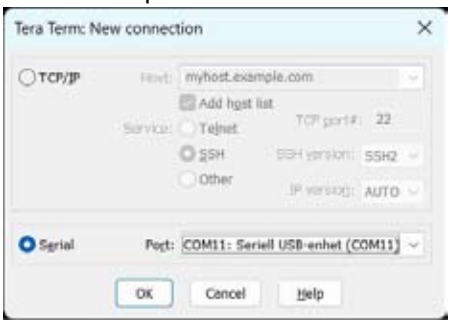
Press Zero to zero booth sensors.
The largest digits at the top show the actual leakage flow, l/s, m^3/h, l/sm^2 or m^3/hm^2 depending on the selected unit. Below the pressure drop measured by left sensor over the flange. Below is the set (selected pressure value in the tested duct) to the left and the measured pressure to the right. Press UP/DOWN to adjust the pressure in the tested duct. Wait until the pressure is stabilized.(right value).
Take a measurement by pressing the ENTER button on the instrument. After that a SAVE button is shown. Save the measurement by pressing the Save button.



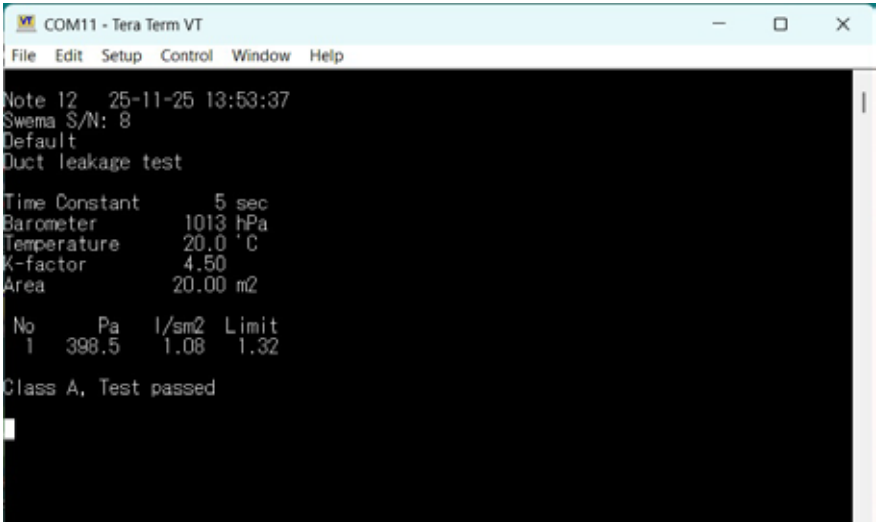
9. PC-transfer

Download for example Tera Term. On your PC, get TeraTerm from
https://github.com/TeraTermProject/teraterm/releases/tag/v5.5.1
For Windows select
Installer
Download@5.5.1 29k [teraterm-5.5.1-x64.exe]
Run
teraterm-5.5.1-x64.exe to install. Select your language, agree and select programs to install.

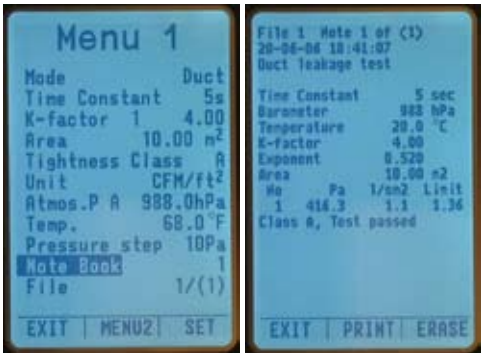
Connect Swema 3000md to the PC over an USB-port with an USB-cable.
Run Tera Term from your desktop.
Select Serial.
Go to Setup - Terminal -
Encoding - receive
välj "ISO8859-1 Latin-
1 Western European"
Go to Setup – Save Setup –
Replace TERATERM.INI
On Swema 3 go to
Menu 1
Note book



press Enter and Arrow up and down to select the selected saved measurement.
Press Print to transfer Note. It will appear in Tera Term
Mark with curser and copy and paste into for example Word.
See also the Swema 3 Manual.



Meny 1 with One Note
in One File.



10. Technical data

Flow over / under-pressure
Leakage tester with hose Ø100mm:
22...130 l/s at ±400 Pa duct pressure
C-class Duct area 95...800 sqm at 400 Pa
(EN 12237, 1507)
25...103 l/s at +850 Pa duct pressure
Lower duct pressure extends the flow range.

Measurement Uncertainty:	±6.5% read value (when used together with Swema 3)

95% coverage probability in non condensing, non moist air, <80%RH, non aggressive gases. It is important to correct the measurement values with the corrections stated in the calibration certificate to obtain the above uncertainties.

Weight:	Leakage Tester:	20 kg
	Maesuring Pipe:	0,8 kg
Size:	57x40x48 cm	
Hose, diameter:	Ø100 mm	
Power supply:	200-240 VAC, +/-10%, 50-60 Hz (0.55 kW)	

11. Frequency converter

Potentiometer

Standby
Press this button to stop automatic or manual control and put the frequency converter in standby

Manual control
Press this button to control the leak tester manually with the potentiometer.

Automatic control
Press this button to have Swema 3000md run the leakage tester automatically.

If the power plug is disconnected from the leakage tester without first stopping by pressing standby (Off Reset), will the converter remember the last used control option. When the power plug is plugged in again, the converter will go back to either manual or automatical control, depending on what was used last.