

DUCT LEAKAGE TESTER

Manual – ES20180530 Rev 5.7



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The universal instrument Swema 3000md with the external differential pressure probe SWA 10, controls the leakage tester for duct, at selected pressure levels up to 1900Pa. A leakage level is saved together with the pressure level. Swema 3000md inbuilt differential pressure sensor measures the over pressure in duct and the differential pressure probe, SWA 10 measures the leakage flow over a throttle device (flange) with a certain k-factor. A radial fan is used to be able to provide highest possible pressure at these moderate air flows.

The supply and the exhaust of the ventilation are tighten with tightness bladders.

The duct leakage tester is used according to European standard EN 12237 and EN 1507.

LEAKAGE TESTER AND ACCESSORIES (Fig. 1)

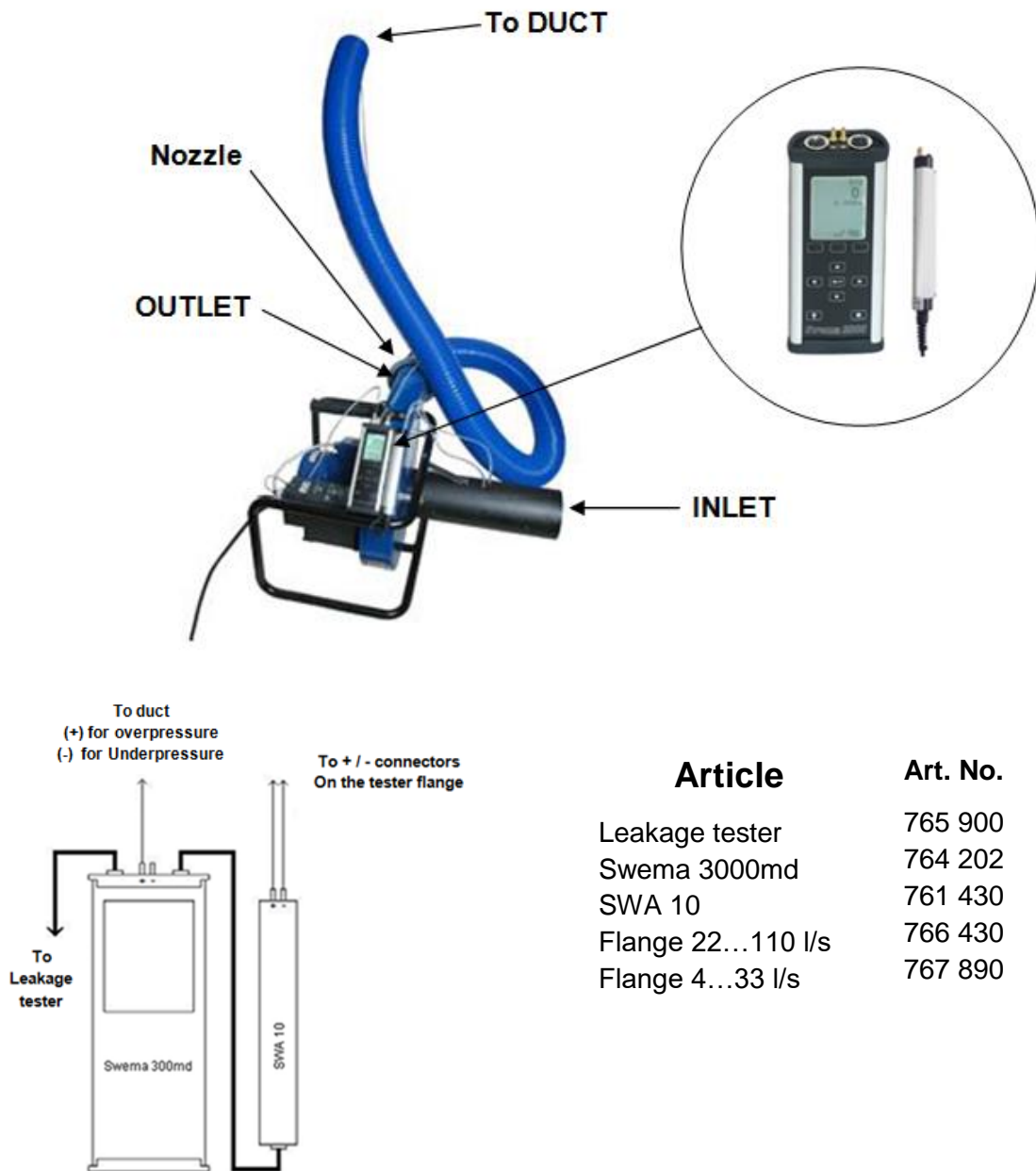


Fig. 1

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CONNECTING FOR MEASURING OVER PRESSURE AND UNDER PRESSURE (Fig 2)

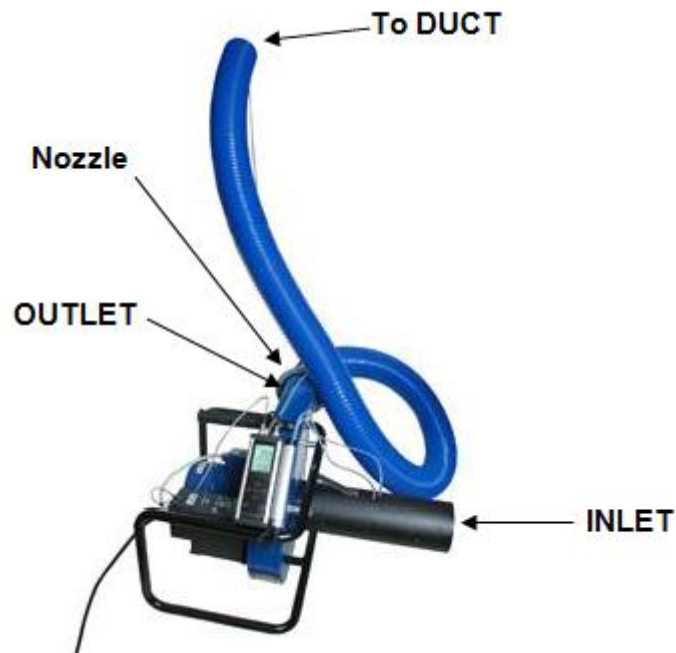


Fig. 2

For **OVERPRESSURE** measurements the nozzle of the blue hose is connected to the **OUTLET** of the leakage tester.

For **UNDER PRESSURE** measurements the nozzle of the blue hose is connected to the **INLET** of the leakage tester (the flange).

Notes:

1. For the measurements be aware that the right and corresponding K-factor must be used. Refer to the calibration certificate to see the 4 different k-factors.
2. The diameter of the Inlet and the Outlet are the same, therefore it is possible to assemble the nozzle of the hose (in the picture connected to the outlet) to the Inlet to measure under pressure.

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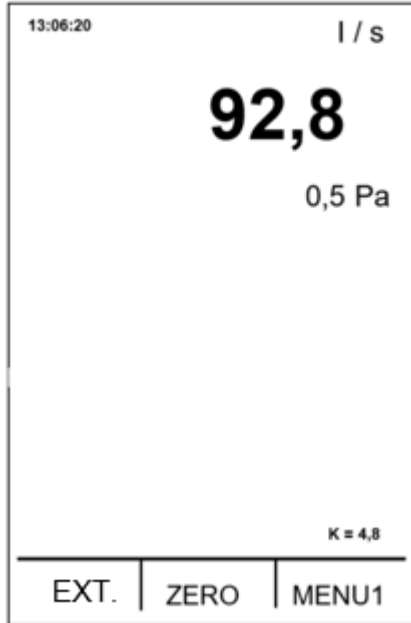


Fig. 3

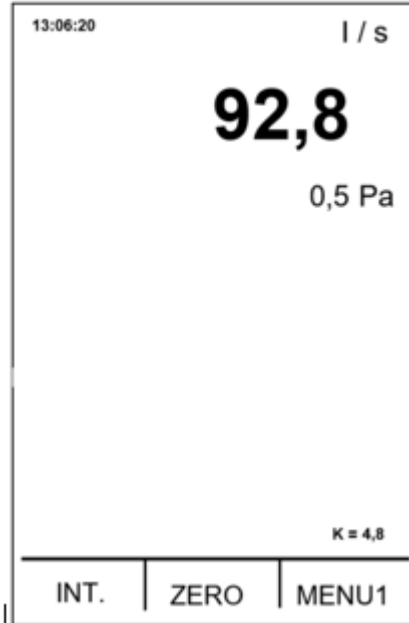


Fig. 4

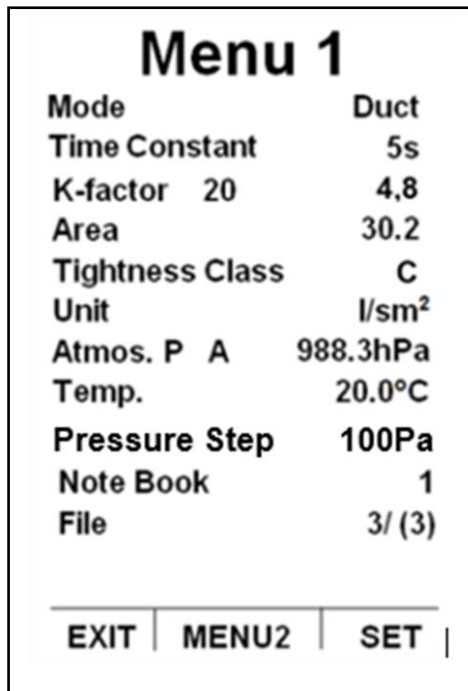


Fig. 5 Menu 1

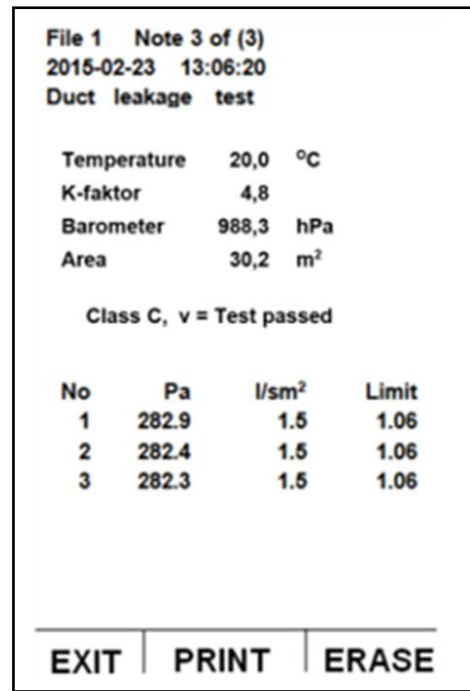


Fig. 6 Saved measurement file

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SETTINGS

1. Control the leakage tester automatically with Swema 3000md and the sensor Swema SWA 10. Before connecting Swema 3000 to the leakage tester, connect the external sensor Swema SWA 10 to Swema 3000md. Select on the Swema 3000md the external probe, pressing down the left button **EXT** under the display (See fig. 3). When it is done you can read instead **INT.** (see fig. 4) If you press **INT.** the internal differential pressure is selected. This way you can zero both differential pressure before you start measuring.

Note: The button to press is outside the display, in the body of the instrument.

2. The built-in differential pressure sensor in Swema 3000md measures over and under pressure in the duct. Connect the pressure hose (silicone hose) on the positive pressure connector (marked with +).
3. Connect the valves of the external probe Swema SWA 10 to the valves on each side of the orifice plate in the flange with the pressure hoses (silicone hoses) to measure the leakage flow. Follow the convention + to + and – to -.
4. Connect the cable from the leakage tester to the RS232 contact on Swema 3000md.
5. Turn Swema 3000md on and select measuring mode DUCT in MENU1. (See Fig. 5).
6. Select in Swema 3000md, the K-factors shown on the label of the flange. (See Fig. 5).
7. Set the surface area of the duct to be tested in m^2 (if that is the chosen unit). The selected area is used to calculate l/sm^2 and m^3/hm^2 if these units are selected. (See Fig. 5).
8. Set the tightness (density) class to be used for the measurement of the leakage in the duct. See Fig. 5). Select between classes A, B, C or D. In the saved protocol the selected class, used for calculations, and the limit for the leakage on the test are shown See Fig. 6). The limit depends on the selected class and the pressure during the test.
9. Set the unit for the measurement, select between l/s , m^3/h , l/sm^2 or m^3/hm^2 . The unit l/sm^2 or m^3/hm^2 are calculated with the selected area of the duct. (See Fig. 5).
10. Set the I-factor for duct leakage tester in Menu 3. 1000 is the standard factor for Swema 3000md to control the fan with PID-regulation, however any other factor can be selected.
11. Set the actual ambient temperature. Swema 3000md compensates for air density calculating with the selected temperature and the measured barometric pressure. The temperature can be measured also with a thermocouple type-k connected to Swema 3000md. (See Fig. 5).
12. Set the pressure step to be used during the measurement. i.e. 100 Pa to change the pressure in steps of 100. (See Fig. 5).



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MEASUREMENT

1. Before measuring starts, both differential pressure sensors must be zeroed
2. In measuring mode the display shows 4 measuring parameters. The largest digits at the top show the actual leakage flow (in l/s, m³/h, l/sm² or m³/hm² depending on the selected unit), below the actual leakage flow, It is shown the pressure drop over the orifice plate in the flange used to calculate the actual leakage flow. The two pressures shown below the pressure drop, and with small digits, are the expected pressure value at the left and the read value (actual value) of the measured pressure to the right. (See Fig. 7) below.
3. Press the arrow keys UP/DOWN to adjust the value of the pressure to be measured, wait until Swema 3000md is stabilized at the read value (true value) of the pressure. (See Fig. 7) below.
4. Measure by pressing the ENTER button.

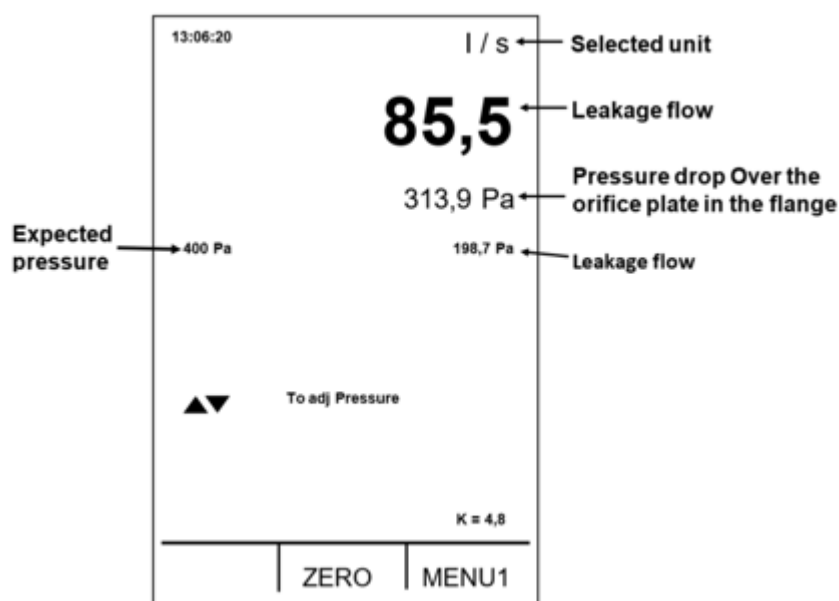


Fig. 7 Measuring

TRANSFERRING MEASURING PROTOCOL TO PC

1. Open the downloaded program SwemaTerminal 2. SwemaTerminal 2 is a free program runs on Windows 7, 8 and 10. The program transfers data from Swema 3000md (Note book and Log book) to a PC over a USB-port
2. Anslut handheld instrument Swema 3000md to the PC.
3. Click on the button "**Search**" for the PC to find Swema 3000md, the serial number of the instrument is shown once the instrument is found. See Fig. 4 below.
4. Click on the button "**Open**" to initiate the communication. See Picture 4 below.
5. Choose in the instrument the saved protocol to be transferred to the PC. See Fig. 1. on page 4.
6. Press "**Print**" on the instrument and the displayed measurement protocol is transferred to the PC. See Fig. 4 below.
7. To save the measurement protocol in the PC, click on the button "**Save sorted data**" on SwemaTerminal 2. Select or create a map and give a name to the file. See Fig. 4 below.

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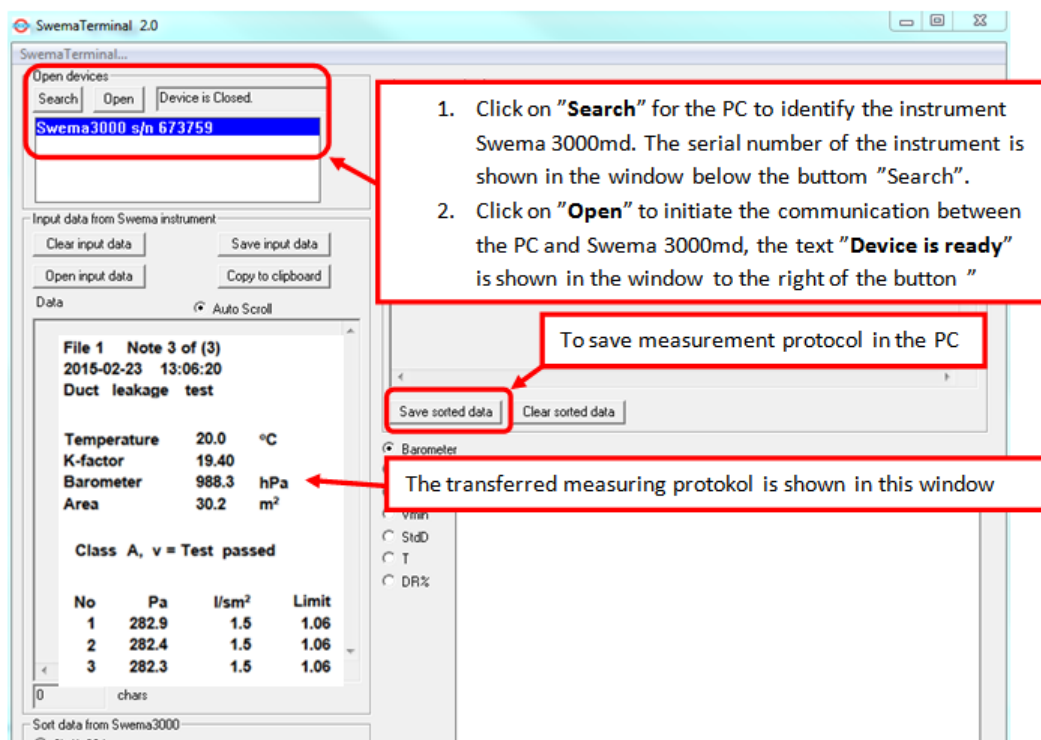


Fig 4. Transferred measurement protocol

Instrumentation:

- Duct leakage tester (765900) with measuring flange for 22...120l/s (766430)
- Optional measuring flange for 4...33l/s (767890)
- Swema 3000md (764202)
- SWA 10(761430)
- Holder(764760) 2pcs, to attach SWA 10 to Swema3000md
- Stop (764870) 1pc, to prevent SWA 10 from sliding on Swema3000md
- Silicon hose (762470) 3500mm, between leakage tester and duct

Accessories:

With the bladders below, tighten the ventilation supply and exhaust.

- Bladder Ø 250mm (765080) To seal duct, as many as needed
- Bladder Ø 400mm (765090) To seal duct, as many as needed
- Bladder Ø 600mm (765100) To seal duct, as many as needed
- Pump (766620) Pump with connector to pump up bladders by hand

TECHNICAL DATA

Max flow (without hose): 144 l/s

Max Flow (leakage tester with hose Ø 100mm):

Overpressure	
16 l/s	at 1900 Pa
50 l/s	at 1500 Pa
73 l/s	at 1200 Pa
85 l/s	at 1000 Pa
110 i/s	at 500 Pa
114 l/s	at 400 Pa
122 l/s	at 200 Pa

Underpressure	
128 l/s	at -500 Pa
120 l/s	at -750 Pa



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Min Flow: 10 l/s

Uncertainty: ±4.5% read value (when used together with Swema 3000md and SWA10
95% coverage probability for non-condensing, non-moist air
<80% RH for non-aggressive gases)

Spare part: Measuring flange for 10...140l/s (766430)
Measuring flange for 3...30l/s (767890)

Weight: Motor 20,6 kg
Flange 0,8 kg

Size: 57x40x48 cm

Power supply: 220 VAC (0.37 KW)

