Leak Calibrator 3925-0202

Operating manual

EN 3925-0202 Leak Simulation MANUAL R03.doc

Please read these instructions, **before** installing, starting up, storing or handling this device.

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HeMaTech Prüftechnik GmbH & Co. KG
Siemensstrasse 7
DE-71409 Schwaikheim
Phone +49 (0) 71 95/13 69 0
Fax +49 (0) 71 95/13 69 29
Internet http://www.hematech.de

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Content

Introduction

In this chapter you will find some introductory remarks concerning the use of this tester, as well as explanations concerning the structure of these operating instructions and the symbols and text markings used in this manual.

The installation instructions for the device address to persons (skilled electricians and service engineers) who are entrusted with the installation and maintenance of the device. These persons must be fully familiar with and strictly follow all regulations concerning electrical engineering.

The installations for operation of the completely installed device are intended for all persons who will use and make adjustments to the device.

Concerning these operating instructions

The following pages will inform you about the proper use of the device in your production or testing environment.

HeMaTech Prüftechnik attaches great importance to the safe, appropriate and economical use of the device. However, this requires that you read these operating instructions thoroughly before you install and use the device. It contains important information, which will help you to avoid dangers and enhance the reliability and service life of the device. Always keep these operating instructions close at hand near the device and read the chapter *Safety measures* for your own safety. Strictly follow all notes, to keep yourself and other members of staff out of danger and to avoid material damage.

If you have any questions concerning work with the device, for which you have not found an answer in these operating instructions, please contact:

HeMaTech Prüftechnik GmbH & Co. KG
Siemensstraße 7
D-71409 Schwaikheim

Phone +49 (0)71 95/13 69 0
Fax +49 (0)71 95/13 69 29

www.hematech.de

Intended use

The Leak Calibrator 3925-0202 is solely intended for professional use in set-up and calibration work of Leak Tester by means of compressed air. Any use beyond these limitations is considered unintended. The user solely bears any risks.

Installation and maintenance of the device must only be performed by skilled electrical engineers.

Type plate

The type plate with model designation and serial number is located on the back of the device.

HeMaTech Prüftechnik GmbH & Co. KG
Siemensstraße 7 D 71409 Schwaikheim
Phone: +49 (0)71 95 – 13 69 0
Fax.: +49 (0)71 95 – 13 69 29
www.hematech.de

Type: _____
Serial-No.:

You require this information when consulting our Customer Service Department.
Please record this information in the following table, so that it is at hand when needed:

Device type	
Serial-Number:	
Software-Version	

Ordering spare parts
Use only original spare parts from HeMaTech Prüftechnik. If you would like to order accessories or spare parts, you not only need to specify device type and serial number, but also article number and designation of the required components, which you can take from the list of consumables and spare parts.

Article number:	
Designation:	

Reporting transport damage
If you discover any transport damage when unpacking the device, you should immediately contact the forwarding agent to report the loss or damage.
Please ask for a corresponding confirmation and return the package to us together with this confirmation and the delivery note.

Preparing a return delivery
Pack the article with all accessories (see scope of delivery) in the original packing material and return the goods to us, together with an exact fault description and the delivery note. Please frank the delivery.

Warranty

The warranty conditions for devices from HeMaTech Prüftechnik GmbH & Co. KG can be found in our terms and conditions of sales and delivery.
If no other agreement has been made, the warranty period for design, material and manufacturing faults (except consumables), as well as for the omission of explicitly guaranteed properties, is generally 1 year, starting from the date of delivery.

We reserve the right to decide whether we will rectify a fault, deliver replacement or submit a credit note covering the value of the goods.

In case of unintended use and damage caused by falling, water, dirt or any other external effects, warranty claims will become null and void.

Any malfunctions and damages caused by the user, such as soiling, faulty connections and mechanical damage are excluded from warranty.

We reserve the right to invoice the repair costs for parts which had been returned for warranty repair, but for which no or only partial warranty could be claimed.

If not agreed upon differently beforehand, HeMaTech Prüftechnik will only bear the shipment costs for outgoing deliveries of devices and parts which are covered under warranty.

However, if the delivery arrived with costs for HeMaTech Prüftechnik, these costs will be added to the repair costs.
Import and/or export duties as well as costs arising for third parties must be borne by the customer.

Structure of the manual

This manual contains the description, installation and operation of the device. It consists of the following chapters:

Safety measures
Read and follow these safety notes, because they serve the safety of persons and ensure the reliability and operational safety of the device.

Product description
Here you will become familiar with the device and its modules, functions and control elements.

Operation
Once all preparations have been made switch on the device, set the test parameters and start the test device.

The index
The index helps you to find required text passages quickly.

Symbols used

Thoroughly read and strictly follow these safety notes. They serve your own safety and will help you to avoid damage to the device.

The following symbols are used in this instruction manual:

DANGER!
This safety note points to dangers, which could cause fatal injuries or severe damage to persons.

ATTENTION!
This safety note draws the attention to dangers, which could cause material damage or incorrect tests.

NOTE!
This symbol highlights hints and special features, which will ease the operation of the flow tester.

Representation

Bold type
Designations of control keys are printed **bold**.

Italic type
Cross-references to other chapters or text passages are printed *italic*.

Operating steps
Operating steps are marked as follows:

- Turn key switch clockwise.
  Write protection is disabled, entries can be made.
- Make all following entries and confirm these individually by pressing the **ENTER**-key. The insertion point jumps to the next field.

Lists
Lists are marked as follows:

– Variant A

– Variant B

– Variant C

– …

Safety measures

Safety notes

Thoroughly read and strictly follow these safety notes. They serve your own safety, the safety of other members of staff and help to avoid damage to the device and accessory parts.

Danger caused by electric current
Make sure that no fluid can enter into control cabinet, control panel or other parts of the housing. If this should happen, immediately disconnect the device from the electric power supply, secure the corresponding socket against reconnection and inform appropriately trained expert personnel or the customer service department of HeMaTech.

Make sure that the electrical connecting leads are free of damage and well protected against buckling or squashing. If you detect any damage, immediately disconnect the device from the electric power supply, secure the corresponding socket against reconnection and inform appropriately trained expert personnel or the customer service department of HeMaTech.

Work in the electrical system – e.g. changing fuses – must only be performed by trained expert staff. Further maintenance and repair work must only be performed by the customer service of HeMaTech Prüftechnik or by persons who have been authorized by HeMaTech Prüftechnik.

Use this device and any connected devices only on a dedicated electric voltage.

Strictly follow all warnings and instructions given on the device.

If smoke or pungent smells causes suspicion of a defect, you should disconnect the device from the mains supply and from any other equipment.

Take care that no other objects find their way into the inside of the device. These may come into contact with live parts or cause a short-circuit, which in turn could cause a fire or electric shock

Before starting cleaning work disconnect the device from the mains supply and from all other devices. Use only a slightly damp cloth to clean the device, do not use fluids and sprays!

Disconnect the device from the mains supply if it is not to be used for a longer period of time. Store the device only in dry and weather protected rooms.

If safe operation of the device can no longer be assured, you must disconnect the device from the mains supply and secure it against being switched on again unintentionally.

Risk-free operation is, for example, no longer possible,

- if device or supply lead are visibly damaged,
- if the device does not work properly,
- if the devices was exposed to moisture or rain,
- if condensation water has accumulated,
- if objects have found their way into the device,
- if the device does not work properly, despite orderly performed operating steps,
- if the permissible storage or operating temperature is exceeded or fallen short of.

Installation
The device must stand in a firm position, protected against vibration.
Avoid locations near heating or air conditioning systems.

Operation
Ensure unrestricted circulation of air around the device. In case of insufficient ventilation the device will overheat. This may result in severe damage to the device and further material damage.

Maintenance
The maintenance work described in this manual must only be carried out by trained specialists. The applicable regulations for electrical engineering must in any case be observed and complied with.

Only perform the maintenance work described in this instruction manual. Any work beyond these limitations can cause damage to persons, material or device.

Repair
Do not carry out any repair work that is not explicitly permitted in these operating instructions. Consult the customer service department of
HeMaTech Prüftechnik GmbH & Co. KG.
Unprofessionally performed work can cause damage to persons, material or device.

Product description

The Leak Calibrator 3925 - 0202 is a device for set-up and calibration of Leak Tester. Its function is based on the massflow method.

The massflow methode

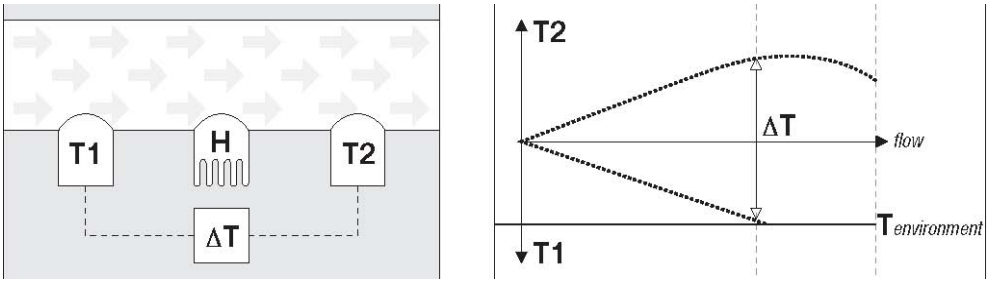
A bit of theory

Measuring principle

The measuring principle of thermal flow measurement is perfectly suited for the measurement of gas flows. One of the significant advantages is that the measurement is largely independent of pressure and temperature. By contrast to volumetric principles, pressure and temperature do not have to be additionally measured. Although the principle yields mass as a measurement result (e.g. g/min), most devices are calibrated to standard volumes (e.g. ln/min) . One possible explanation is the fact that the comparability of the measurement results with other principles is given with this. Since the thermal flow measurement depends on the type of gas, in addition to the specific heat level, the standard density (0°C, 1.01325 bar/a) for the conversion to standard volume is also used.

With all design options of the measuring principle, there is always a heater and one or more temperature-measurement points. The gas draws heat from the heater.

With the mass flow meter, a constant output of heat ensures a temperature difference that is directly proportional to the gas flow rate. In the flume, a temperature measurement is followed by heating, and then a temperature measurement again. The figure below illustrates this process.



Picture 1: Measuring principle

If the flow rate=0, the heater H uniformly distributes the heat, for which the temperature difference T1-T2 equals zero. Two effects occur with the flow rate that leads to a temperature difference: First, the temperature sensor T1 at the entrance detects a lower temperature. This happens because of the cooling of the entering gas, which theoretically drops to the ambient temperature respective of gas. Secondly, the gas flowing over the heater carries heat to the temperature sensor T2, located after the heater, and thus increases this temperature T1. The temperature difference is in direct proportion to the mass flow.

Set-up

The installation measures described in this manual must only be carried out by trained specialists. The applicable regulations for electrical engineering must in any case be observed and complied with.

Preparations

Before using the Leak Calibrator ensure that the needle valve is closed.
Open the needle valve only until the required flow has been reached.

ATTENTION!

Opened needle valve and upcoming pressure may destroy the bulit in flow sensor.

ATTENTION!

The maximal flow is 1 000 ml/min (must not be exceeded).

ATTENTION!

The maximal pressure at the needle valve (5a) of 7 bar/ü (10 bar/ü.) must not be exceeded.

Test medium

The Leak Calibrator is designed for air as test medium. The air must be dried, oil-free and filtered to 5µ.

ATTENTION!

The air must be dried, oil-free and filtered (< 5μm).

NOTE!

The flow sensor is dependant upon the type of gas used for measurement. Should you use a different type of gas, other than air, the measuring result has to be multiplied by a correction factor.
In this case, please contact the manufacturer or supplier. We will be pleased to supply you with data sheets for different gas types and its correction factors. In any case, it has to be ensured that the gas type used is dry and not corrosive.

Scope of delivery

1 Leak Calibrator 3925 - 0202

2 1,5 Volt Alkaline Battery, international size: LR6 (Mignon)

1 Operating instructions

Should one of these items be missing or damaged, you should immediately consult your supplier.

Accessories

Power suppy
With the battery-operated devices, mount the battery module. Then the measuring device is ready for use. With constantly changing flow rates, the useful life of the battery may be shorter.

Battery

We advise you to use only original battery.
As standard, the device is supplied with two 1.5 Volt Mignon batteries. One set of batteries is included so you start the device immediately.

Battery life with fresh set	Alkaline Batteries typically 28 hours.	(ca. 1400 mAh)
	You can also use 1,2 Volt rechargeable batteries of the same size (NiMH or NiCd-Type).	

We highly recommend the use of NiMH-type batteries for longer life time, (no memory effect), as well as for environmental considerations.

Battery life with fully charged	NiCd Accumulator typically 16 hours	(800 mAh)
	NiMH Accumulator typically 43 hours	(2100 mAh)

The battery case is located at the underside of the device and can be opened by pressing on the latch. The correct insertion and orientation of the batteries is shown on the label.

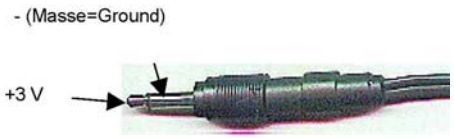
NOTE!
Low charge state of the battery – you will find the note *lo batt* on the display.
The measured value is still correct.
Please exchange the batteries!

Power suppply

The connection for the power supply is located at the lower side of the measuring instrument. The equipment is powered with 3V of regulated DC voltage. (see section voltage supply) By connecting a stabilized power pack, operation without batteries is possible.

The batteries or rechargeable batteries can remain in the measuring instrument, as they are completely decoupled when plugging-in the power pack.
However, rechargeable batteries will not be charged.

NOTE!
If you should not use an original power pack, make sure the operating voltage is 3V. (Min. 2,3 V and max. 3,3 V).



Abildung - Klinkenstecker für Netzteilbetrieb

Gas supply

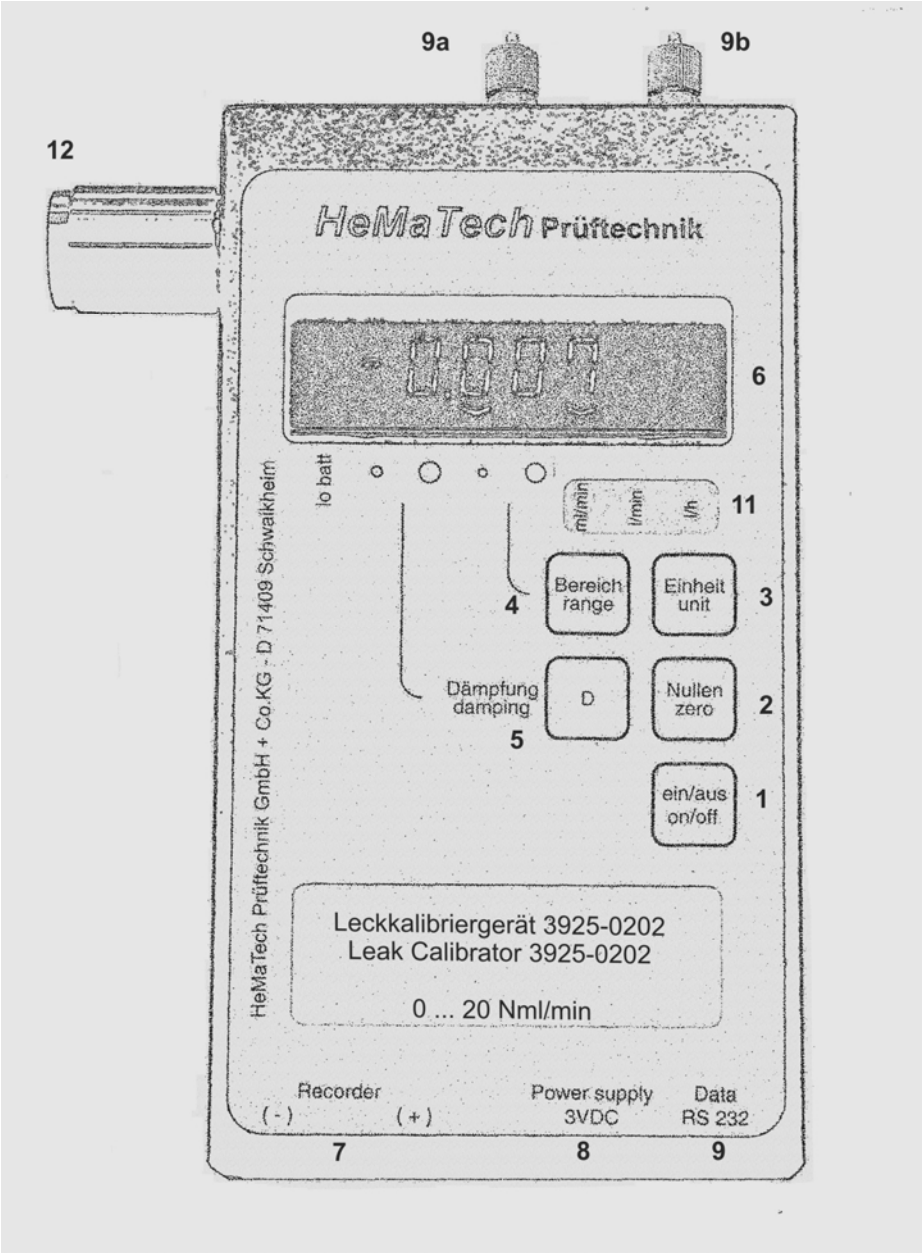
We recommend that you pay close attention to the gas supply line. Contamination in form of water, oil or dust, are harmful to any measurement principle. Particularly in the case of air supply with compressor systems, cleanliness cannot always be guaranteed. In case of doubt, install the appropriate filter. If use-related backflows are to be expected, this filter should also be installed at the outlet. Please monitor possible pressure loss due to the filter elements. The gas supply should be oversized and have the capacity of at least twice the flow rate of the attached measuring device. Monitor the performance of the pressure-reducing unit, as well. Never install the pressure regulator directly in front of the measuring device. Check for possible pressure loss along the pipeline system. Flow regulators especially require defined pressure ratios for proper functioning. With very low flow rates, pressure reduction is excessive and gas is only periodically fed (open-close regulation). This becomes evident in the form of periodic fluctuations in the regulation or changes in the flow rate. Avoid abrupt pressure build up in the system. This can lead to damage. Charge the system with pressure only after establishing the electrical connections. Be sure to have an inert gas (e.g. nitrogen) available for flushing in the case

ATTENTION!
The flow sensor is dependant upon the type of gas used for measurement. Should you use a different type of gas, other than air, the measuring result has to be multiplied by a correction factor.
In this case, please contact the manufacturer or supplier. We will be pleased to supply you with data sheets for different gas types and its correction factors.

ATTENTION!

The air must be dried, oil-free and filtered (< 5μm).

View of device



Control elements

1 Key ON/OFF
to switch ON/OFF the device

2 Key Zero
to activate the function tare

3 Key Unit
Key to select the required measuring unit

4 Key Range
Key to select the number after decimal point

5 Key Damping
Key to activate the damping

6 Display (LCD)

7 Recorder output

8 Power supply

9 Port test media
9a Inlet (+)
9b Outlet (+)

10 Port Serial interface RS 232

Key ON/OFF (1)

The device features a foil covered keyboard. With the press of the finger tip on the on/off key the device can be switched on.
Repressing this key switches the unit off. When switched on, the display is activated. To achieve higher measuring accuracy, wait for a few minutes until the device has warmed up.

Afterwards, the software version and software date is shown on the display.

ATTENTION!

If the message „Err.Spng“ or „Err.Flo.“ appears, the calibration data can not be loaded correctly, resulting in incorrect measuring values. The device has to be returned to the manufacturer.

Key Tare / Zero (2)

The leak calibrator possesses an automatic zero adjustment. When switching the device on, it is not set to zero.

Check the zero adjustment shortly after switching the unit on. Make sure that no airflow is present and press the “Zero-key”. The display will show the word “ Nullen ”. In case that the flow varies during the zero adjustment, (approx. 400 ms) the display will show “ Nullen NIO ” = Zero setting not correct. Repeat the procedure by pressing the “ Key Zero” again.

Key Unit (3)

Depending on the instrument type, you can display three different measurement units. The display shows measurement unit 1 (arrow) when the instrument is switched on. You proceed to the next unit whenever you press the Unit button (see Fig. 1, Unit field). The arrow jumps back to unit 1 when you press the Unit button while the arrow points to the last unit.

Key Range (4)

The unit has one measuring range. The resolution of the display can be decreased or increased by pressing the Range button. One fractional digit is added or removed whenever the Range button is pressed.
The selected range is indicated by an arrow segment on the display.

Example:

The arrow points to ? on the display 0.00 = 2 fractional part digits are displayed.

The arrow points to ? on the display 0.0 = 1 fractional part digit is displayed.
The number of fractional part digits depends on the range of the unit and of the accuracy of the measuring instrument.

Key Damping (5)

The measuring instrument offers the option of damping the display and the signal output in two steps. The measured value is not damped when the unit is switched on. With a pulsating pressure, the measured value reading on the display (6) is unsteady and may be difficult to read. Pressing the Damping button (5) steadies the display and damps the signal output. The display of the current measured value is now stabilized, but sluggish.

No arrow:		No damping swift measured value display
Arrow points to:	?	Small damping, steadied measured value display
Arrow points to:	?	Large damping, very stable and sluggish measured value display.

Display (6)

The display is an 8-digit low-current 7-segment LCD (Liquid crystal display). A positive measured value is displayed without a sign. A negative measured value is displayed with a negative sign. The display reads “oL” (Overload) when the measuring range is exceeded. “uL” (underLoad) on the display shows that the measured value is below the negative measuring range limit. The display starts flashing. Vent the unit immediately to prevent the pressure sensor from being damaged.

The absolute pressure instrument displays the atmospheric pressure when the unit is switched on and there is no external pressure applied to the unit. The displayed measured values are always positive since the pressure is referenced to the vacuum.

Recorder output (7)

The logger output is marked "recorder". This electrical analog output provides a voltage signal in the range of 2 V (the zero point is at approximately +2 V).
Although the voltage output signal is short-circuit-proof, the input resistance of a connected recorder should not be less than 10 kOhm.

The voltage is output at two coloured 4-mm sockets. (7 black) = (- reference point = “real” earthing point) (7 red) = (+)

Range Zero Recorder Signal:

0...200 ml/min	ca. +1 V + 2V	(1 ml/min = 10 mV)
0...2000 ml/min	ca. +1 V + 2V	(1 ml/min = 1 mV)

Ab Software Version V 2.0 ist der Schreiberausgang kalibrierbar.

Wenn Sie den Nullpunkt neu einstellen möchten, so fordern Sie beim Hersteller eine Kalibrieranweisung für den Schreiberausgang an.

Operating mode

The "Leak calibrator preflo" offers three different modes of operation:

1. Operation as Flow Meter
2. Operation as Leak Calibrator
3. Operation as Master Leak

Operating mode Flow Meter

Your measuring device is a practical combination of a flow measuring device with a precision needle valve. If you have to measure small amounts of air as on a daily basis, this device offers the ideal solution. Open the needle valve (12) completely, so that it does not create any additional resistance for your measurement. The measuring instrument has an air inlet (9a) and an air exhaust opening (9b).

The air exhaust fitting is for hoses of 4 mm of outside and 2 mm inside diameters. Thus, you can use the measuring instrument in a closed hose system.

Air inlet (9a) = P2 (+)
Air exhaust (9b) = P1 (-)

If the direction of the flow is (+) to (-), the measuring result is displayed without sign.

If the direction of the flow is (-) to (+), the measuring result is displayed with a negative sign.

NOTE!
Note the rotation direction of the needle valve.

Operating mode Leak Calibrator

Before we start to explain the procedure in the mode Leak Calibrator, we would like to address some points, which are often forgotten.
Most leak measuring instruments on the market operate on the basis of the pressure loss or pressure difference method.
It is proprietary to both methods that a leakage is shown as a pressure loss per unit of time. This unit is not very useful for practical applications, as it is expressing the result of a method rather than expressing the amount of air that caused this effect.
When comparing measured values "pressure loss / time", always remember to include the volume of your test specimen and at what test pressure the pressure loss took place.
Only that way, a mathematical conversion with application of the Gas Law is possible and the leak calibrator can be employed professionally.

The leak rate in ccm/min can be calculated as follows:

$$L = (GW * V * 60) / (p * t)$$

L = Leak rate in scm/min (ml/min)

GW = Measuring value on the Leak Tester in Pa

V = Test volume in scm (ml)

p = Atmospheric pressure in Pa

t = Measuring time in sec.

If you want to test if your leak tester is functioning properly, make sure it is working in the pressure change mode.
If that is the case, connect the test specimen with the air-inlet (9a) of your leak calibrator with a suitable connection hose.
Before you should set your Leak Calibrator to zero and turn the needle valve (12) to the closed position, thus simulating an air tight test specimen.
After the operating sequence of the leak test in accordance with manufacturer specifications has been finished, no decrease of pressure should be shown at the leak test instrument.
The leak calibrator should not indicate any air flow. In the next step, slowly open the needle valve and repeat the leak test. The air flow now indicated on the Leak Calibrator is shown in units of ml/minute and can now be related to pressure loss / time.
When the conversion of the measured value shows the same results the leak tester is working correctly. To be able to make this conversion, an exact knowledge of the dead volume in the equipment and in the hoses is necessary.
All manufactures of leak test equipment try to keep these dead volumes as low as possible, in order to measure also small test specimens properly. If no data are provided by the manufacturer, you should connect a large test specimen of known volume parallel. In comparison to the test specimen the dead volume of the measuring instrument is now comparatively small. Repeat the leak test with the same test pressure and convert the new measured values again. You will notice that the reading in the Leak Calibrator has not changed.
The simulated hole has remained the same, the pressure loss / time value became much smaller due to the larger volume of the test volume.

Please consult your manufacturer should the calculated value not correspond with the reading of the Leak Calibrator.

Operating mode Master Leak

As explained earlier, it is advantageous to take the reading of an actual leak in ml / Minute units. If you want to become independent of “pressure loss / time” values in the future, use the Leak Calibrator as an adjustable test leak unit.
Measure a test specimen with the leak calibrator needle valve fully closed. Note the resulting pressure loss / time values.
Upon replacing the leaking test specimen with an air tight specimen you will obtain a leakage value of zero. Now open the needle valve (15) until you repeatedly arrive at the same pressure loss / time values noted for the specimen previously. The flow measurement reading of the leak calibrator now shows the pressure loss / time equivalent of this specimen.

With this procedure the leak test device becomes independent of the accuracy and unknown sizes of dead volumes no longer represent a problem as the reading of the leak tester is used for comparison purposes only.

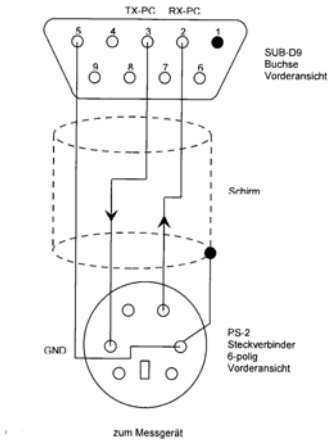
Seriel Interface RS232

The serial interface allows communication of the measuring instrument with other data processing devices. A terminal program e. g. Hyperterminal has to be installed on your PC, which is included in the Microsoft Windows operating system.
However, you can use any other program supporting communication with the serial data interface.

RS232 Interface Protocol:

1 Startbit,
8 Databits,
1 Stopbit,
No Parity
19 200 Baud
Type of communication: ASCII-characters

Connection between measuring instrument and PC via cable.



Connection PC and Leak Calibrator

Operating and Service

Heat-up time

Right when the device is turned on, red-yis ready for use. For the most precise measurements, however, is ready in 20 minutes (option of external feed). Before turning on, please be sure that the wiring is correct and is installed according to the installation plan, and that the gas connections are also mounted in accordance with the installation instructions of the manufacturer.

Zero Piont Check

Without any special specifications for the installation position of the device, the zero point is aligned at operating temperature and horizontal installation position before delivery. If the device is installed vertically, a value can be read out at a zero flow rate according to operating pressure. During the check, be completely sure that no gas is flowing.

Service

With proper operation, the Leak Calibrator does not require any routine service at all. If the measurement value is in a quality-relevant range (e.g. ISO 9001), we recommend a periodic check of calibration. The interval depends strongly on use.

Maintenance

Maintenance of the device should be performed at regular intervals, depending on the utilization level (at least once per year). Maintenance of the device should be included in the company internal inspection intervals.

Maintenance contract

For devices manufactured by us you can, if desired, enter into a maintenance contract with HEMATECH PRÜFTECHNIK for regular inspections and preventive maintenance. We will inform you about the exact terms and conditions on request.

Wartungsvertrag

Für Geräte aus unserer Fertigung sind wir bereit, Wartungsverträge für die turnusmäßige Überprüfung und Instandhaltung abzuschließen. Die genauen Bedingungen teilen wir Ihnen auf Anfrage gerne mit.

Kalibrierung

At shipment, the Leak Calibrator was adjusted to the best – possible accuracy. The measuring instrument is supplied with a calibration certificate, which is a manufacturers test certificate M (in accordance with DIN 55350 part 18). This document certifies an accuracy of <1,5% of its final value.
The serial number of the device refers to the documentation of the flow reference equipment used, thus providing traceability to national and international standards. The manufacturer test certificate M thereby complies with the requirements of the ISO 9000 standard. We recommend a re–calibration with 1-2 years intervals at the manufacturer, who maintains qualified personnel and equipment to meet highest quality demands.
If your company meets the requirements for own calibration, this task can also be carried out on site by your own staff. We will be pleased to provide you with detailed calibration instructions upon request.

NOTE!
We recommend a re–calibration with 1-2 years intervals at the manufacturer.

There are different standardized operating condition / standard conditions of gases:

	Reference Temperatur	Air pressure	Rel. Humidity	Weight of air
Standard State DIN 1343 *	273 K (0°C)	1013 hPa	0%	1,294 kg/m³
DIN 102 (ISO 1-1975)	293 K (20°C)	981 hPa	keine Angabe	keine Angabe
Techn. Standard State DIN 6358 ISO 8778 **	293 K (20°C)	1000 hPa	65% r.H	
ISO 2533 ***	288 K (15°C)	1013 hPa	0%	1225 kg/m³

* from HeMaTech Prüftechnik used as Standard.

With the serial interface you can switch to different DIN / ISO standards

Example:

w<Parameter>;

w1343; = DIN1343
w102; = DIN102
w2533; = ISO2533
w8778; = ISO8778

If not mentioned otherwise, our company calibrates in acc. with the standard conditions of DIN 1343. The equipment setting can be changed with a terminal program and a suitable interface cable to two different standard conditions. (see command table).

Example:

Sie möchten in DIN102 anzeigen, so schicken Sie mit dem Terminalprogramm: w102;

ACHTUNG!
Der neue Zustand wird im Gerät gespeichert. Das Gerät zeig solange nach DIN 102 an, bis es auf einen anderen Normzustand geändert wird.

Befehlsübersicht

Tabelle 1

Befehlskürzel	Parameterbereich	Funktion	Erklärung
E<space><Einheit>; e<space><Einheit>;	<mögliche Einheit> ml/min l/min l/h für Sondergeräte: ml/min mm^3/sec cm^3/sec	Einheitenwechsel	schaltet in die gewünschte Einheit
n; oder N;	keiner	nullt bzw. tariert die Anziege	
b; oder B;	<keiner>	wechselt den Messbereich b = kleiner Bereich B = großer Bereich	
Dämpfungen			
_;	keiner	keine Dämpfung	der Messwert wird sofort angezeigt
d;	keiner	kleine Dämpfung	aus mehreren Messwerten wird der Mittelwert gebildet
D;	keiner	große Dämpfung	aus vielen Messwerten wird der Mittelwert gebildet. Die Anzeige wird ruhiger, aber langsamer
w<Parameter>;	102 1343 2253 8778	stellt eine neue DIN/ISO ein.	Das Gerät speichert eine neue DIN ISO Norm dauerhaft im EEProm ab. Die DIN/ISO wird nach dem Einschalten kurz angezeigt

Fehlertabelle

Tabelle 2

Fehlermeldung in der Anzeige	Ursache	Behebung
ERR.FLO.	Stützstelle <x> EEPROM Faktor für den Flow konnte nicht ausgelesen werden.	Kalibrierfaktoren sind falsch. Messgerät einschicken.
ERR-SPNG	Stützstelle <x> EEPROM Faktor für Spannung konnte nicht ausgelesen werden.	Kalibrierfaktoren sind falsch. Messgerät einschicken.
PAR.ERR	Der übergebene Parameter hat einen falschen Wert.	Parametergrenzen einhalten
PAR.NIO	Der übergebene Parameter hat einen falschen Wert.	Parametergrenzen einhalten
NR.NIO	Stützstellennummer liegt ausserhalb des zulässigen Bereiches.	überprüfen der Stützstellenanzahl mit R;
ERR.KL.SP.	Spannung zu klein	Sensor i.O.?
NULL-NIO	Nullung ist fehlgeschlagen. Während des Nullens veränderte sich der Druck.	noch mal Nullen

Batteriewechsel

The battery case is located at the underside of the device and can be opened by pressing on the latch. The correct insertion and orientation of the batteries is shown on the label.

In the case, batteries are inserted not correct, a built-in protection circuit prevents destruction of the device (Thermal fuse). Remove power supply and re-insert batteries. Wait for five minutes and switch device on again.

Picture 2a

Insert screwdriver between battery frame and lid and press down gently. Remove lid.

Picture 2b

Label at the bottom of the case shows correct orientation / polarity of both batteries.

Picture 2c

Insert hinges of lid first, than press down gently until lid locks.

Elapsed batteries

Due to their high heavy metal content batteries are not included into the domestic waste. Please give it to appropriate sites to the recycling process.

Reinigung bei Verschmutzung

Sollten Verdachtsmomente auf eine Verschmutzung hinweisen (plötzliche Abweichung des Messwertes bei bekannten Prozessen, sichtbare Spuren in der Verrohrung usw.) versuchen Sie zuerst, das Gerät mit trockenem Inertgas zu spülen. Je nach Verschmutzung kann es erforderlich sein, das Gerät zu demontieren.

HINWEIS!
Verwenden Sie ausschließlich die vorgesehenen fachgerechten Werkzeuge.
Gehen Sie äußert behutsam mit dem Gerät und den einzelnen Komponenten um.
Sorgen Sie für eine saubere Demontage-Umgebung.
Die Garantie erlischt auf jeden Fall mit der Demontage des Gerätes.
Lösen Sie nie eine Torx Schraube.
Berühren Sie auf keinen Fall die Elektronikplatine oder elektronische Komponenten.
Nach der Reinigung sollten Sie das Gerät bei Gelegenheit durch Ihren Vertriebspartner
überprüfen lassen.

Rücksendung

Bei Rücksendung eines Mess- oder Regelgerätes verwenden Sie nach Möglichkeit die Originalverpackung oder eine entsprechend zweckmäßige andere Verpackung.
Teilen Sie uns bitte den Grund der Rücksendung mit. Damit ersparen Sie sich unnötige Rückrufe und Verzögerungen.

Sollte das Gerät mit gefährlichen Medien in Berührung gekommen sein, bitten wir Sie, das Gerät sorgfältig zu reinigen, uns dies mitzuteilen und das Gerät dicht zu verpacken.

Bitte füllen Sie unbedingt die Kontaminierungserklärung aus. Diese finden Sie auf der letzten Seite dieses Handbuchs.

Wenn Sie weitere Fragen haben, wenden Sie sich an Ihren Vertriebspartner.

Technische Informationen

Allgemeine Gerätespezifikationen

Das Leckkalibriergerät 3925-0202 ist ein portables, batteriebetriebenes Handgerät. Es ist die Kombination eines Durchflussmessgeräts für kleine Luftmengen mit einem Präzisions-Nadelventil. Wird das Nadelventil vollständig aufgedreht wird (kleiner Widerstand), dann kann das Messgerät auch als Luft-Durchflussmessgerät für allgemeine Anwendungen eingesetzt werden.

Technische Daten

Spannungsversorgung:	
ext. Betriebsspannung:	2.3 V...3.3 V / DC geregelt Mignon Batterien 2 x 1.5 V Mignon Akkus 2 x 1.5 V
Messbereich/max. Messfehler	0…2 / 20 ml/min
max. Messfehler:	<=1.5 % vom Endwert je Teilmessbereich

Der negative Messbereich ist nicht spezifiziert und nicht kalibriert. Es sind Werte bis zu –20 ml/min darstellbar.

max. zul. Durchfluss:	5000 ml/Minute
max. statischer Druck:	max. 10 bar
Messrate / Anzeigerate:	
f Abtastrate:	ca. 20 Hz (t=50 ms) *)
f Anzeigerate:	ca. 20 Hz (t=50 ms) *)
Schreiberausgang	
f Schreiber Aktualisierungsrate:	ca. 20 Hz (t=50 ms) *)
Differenz-Spannung:	0..1 V je Teilmessbereich Der Schreiber / Voltmeter oder das Datenerfassungssystem sollte über Differenzeingänge von 0...5V verfügen, da der Nullpunkt bei ca. 1,25 V über Batteriemasse/Netzteilmasse liegt.
min. R Last:	10 kOhm
RS232 Schnittstelle	
Baudrate:	19 200 Baud, 1 Startbit, 8 Datenbits, 1 Stopbit, kein Paritätsbit.
ESD-Schutz:	± 15 kV

*) mit Option Totalisatorfunktion alle 250 ms – wenn die Totalisatorfunktion eingeschaltet ist. Mit ausgeschalteter Totalisatorfunktion ebenfalls ca. 50 ms.

Mechanische Spezifikationen

Werkstoffe

Ausführung Code A (Alu) Aluminium, Messing vernickelt, Edelstahl

Sensorbereich PBT, Epoxy und Silikon

Dichtungsmaterial Viton, optional EPDM oder PTFE

Mechanischer Anschluss Innengewinde M5 beidseits, optional mit Verschraubungen (siehe Anhang Zubehör)

Messbereiche

Die Leckkalibriergeräte 3925-0202 werden standardmäßig mit Normmessbereichen für Luft ausgeliefert.
Als Option sind die Geräte selbstverständlich mit individuellen Messbereichen erhältlich und können auf Wunsch auch mit anderen Gasen kalibriert werden.

Normmessbereiche

0 ... 20 Nml/min
0 ... 200 Nml/min
0 ... 2000 Nml/min

Umrechnungsfaktoren für andere Gase

Jedes Mess- und Regelgerät wird auf einer Kalibrieranlage vollautomatisch kalibriert. Der Anwendung entsprechend wird intern auf das definierte Medium umgerechnet. Sollten Sie das Messmedium ändern, so kann dies mittels Umrechnungsfaktoren entsprechend korrigiert werden.

Kontaktieren Sie dazu Ihren zuständigen Vertriebspartner.

Je nach Medium erzeugen diese Umrechnungsfaktoren einen zusätzlichen Messfehler.

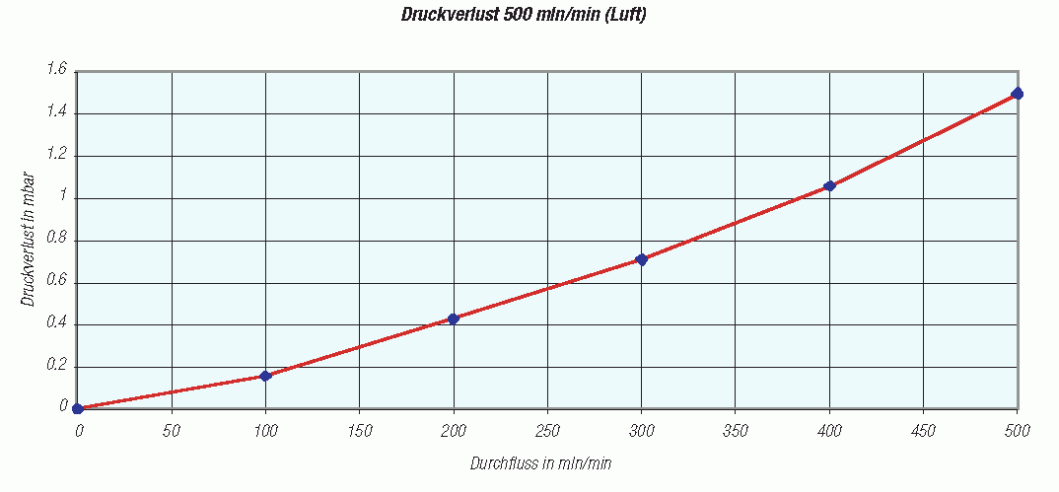
HINWEIS!
Beachten Sie, dass sich bei Werkskalibrierung mit einem anderen Gas als Luft ein erhöhter Nullpunkt-Offset zeigen kann, wenn das Gerät nicht mit dem kalibrierten Gas betrieben wird

Druckverlust

Die thermischen Massemesser weisen einen sehr geringen Druckverlust auf. Dieser ist im wesentlichen abhängig vom Medium, dem Betriebsdruck und dem entsprechenden Durchfluss. Mit Hilfe der folgenden Formel lässt sich der Druckverlust für andere Gase berechnen.

$$\Delta P_{aktuell} = \Delta P * \sqrt{\frac{\rho_{aktuell}}{1{,}250}}$$

Beachten Sie, dass zu klein dimensionierte Leitungen und nicht geeignete Anschluss-Verschraubungen häufig Ursache für zu großen Druckverlust im System sind. Geräte mit Handregelventil benötigen für den einwandfreien Betrieb eine gewisse Druckdifferenz, welche auf dem Typenschild spezifiziert wird.



Temperaturkompensation

Thermische Massemesser messen den Durchfluss von Gasen weitgehend Druck- und Temperatur unabhängig. Wechselnde Temperaturen werden vom Messgerät automatisch miteinbezogen. Das Messelement misst die Gastemperatur und berechnet mit Hilfe einer dreidimensionalen Stützwerttabelle automatisch einen Korrekturwert.

Druckkompensation

Bei der Kalibrierung wird der bei Bestellung spezifizierte Betriebsdruck mitberücksichtigt. Bei Änderungen der Druckverhältnisse kann ein zusätzlicher Fehler entstehen. Bitte beachten Sie, dass die Funktion des Regelgerätes bei zu kleiner oder zu großer Druckdifferenz nicht gewährleistet werden kann.

Kontaminierungserklärung

Wir bitten Sie, bei Rücksendung von Geräten nachstehende Erklärung vollständig auszufüllen. Insbesondere der Grund der Rücksendung, bei Verschmutzung die Art der Rückstände und Reinigung sowie Hinweise auf Gefährdungen.

Geräte

Typenbezeichnung: .....

Seriennummer: .....

Ursache der Einsendung: .....
.....
.....
.....

Art der Kontaminierung

Gerät kam in Berührung mit: .....

Wurde durch uns gereinigt mit: .....

Zum Schutze unserer Mitarbeiter und zur allgemeinen Sicherheit beim Transport ist es zwingend, eine sachgemäße Reinigung durchzuführen und eine entsprechende Verpackung zu verwenden.

Können Sie weitere Angaben zur Kontaminierung machen?

inert (keine Gefahr) .....

korrosiv .....

ätzend .....

darf nicht mit Feuchte in Berührung kommen
.....

oxydierend .....

sonstige Gefährdung .....

Rechtsgültige Erklärung

Hiermit bestätigen wir die Korrektheit und Vollständigkeit obiger Angaben.

Firma: .....

Adresse: .....

Telefon: .....

Kontaktperson: .....

Datum: .....

Unterschrift: .....

Im Namen des gesamten Teams danken wir Ihnen für Ihr Verständnis.

Weitere Informationen

Für weitere Informationen wenden Sie sich bitte an:

HeMaTech Prüftechnik GmbH & Co. KG
Siemensstrasse 7
D-71409 Schwaikheim
Telefon +49 (0) 71 95/13 69 0
Telefax +49 (0) 71 95/13 69 29
Internet http://www.hematech.de

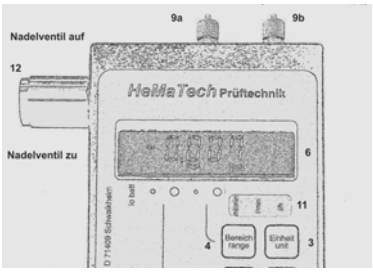
Connect the Leak Calibration device

1. Connect the Leak Calibrator via port “Leak Simulation”

Connect the Leak Calibrator to the port *„leak“* to the Leak Tester.

For pressure devices use the port „+“ (9a).

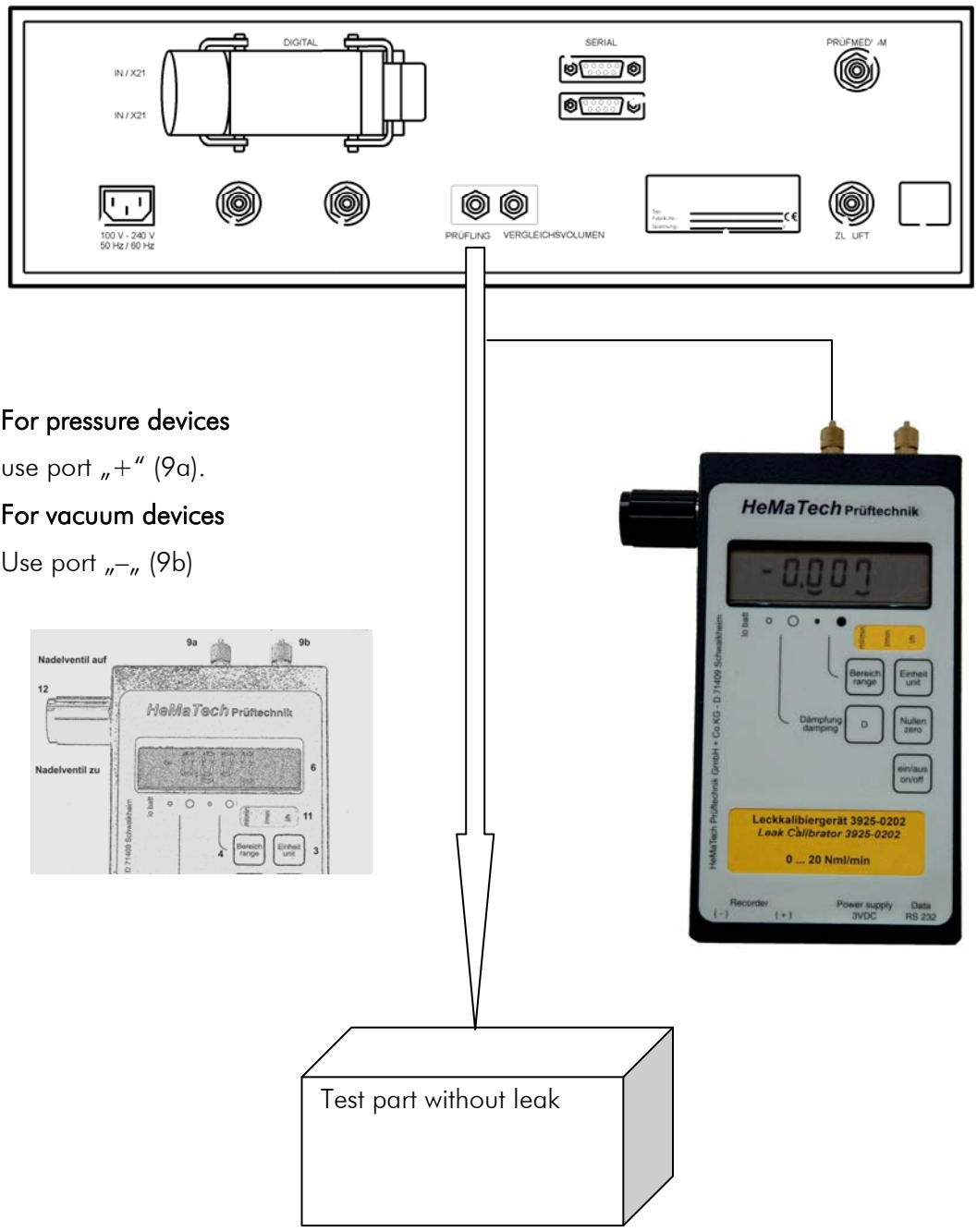
For vacuum devices use the port „-„ (9b).



Set the required leakage via the needle valve on the leak detector (in this case, the needle valve at the Leak Calibrator has to be opened).

Alternative set required leakage via the needle valve (12) on the Leak Calibrator (in this case, the needle valve at the Leak Tester has be opened).

2. Connect The Leak Calibrator to port “test part”



For pressure devices

use port „+“ (9a).

For vacuum devices

Use port „–„ (9b)

Set the required leakage via the needle valve (12) on the Leak Calibrator.