

# MicroLab

## Operating Manual

085-40

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# Introduction

The MicroLab is mains/battery operated portable spirometer with the unique combination of ease of use and sophistication. Ease of use is assured through the use of context sensitive help screens, accessed at a touch of a button, that explain every MicroLab feature.

The MicroLab uses the Micro Medical Digital Volume Transducer, an extremely stable form of volume transducer, which measures expired air directly at B.T.P.S (Body Temperature and Pressure with Saturated water vapour) thus avoiding the inaccuracies of temperature corrections. The transducer is insensitive to the effects of condensation and temperature and avoids the need for individual calibration prior to performing a test.

Test results may be uploaded to a PC using the optional Spida 5 or SpidaXpert software and patient details may be downloaded to the MicroLab.

Stored data may be printed to the integral thermal printer or to an external HP printer using the USB cable supplied.

**Customise - System**

Region  
United Kingdom  
United Kingdom  
France  
Deutschland  
Nederland  
Espana  
USA

ddmm/yyyy

Date Separator  
00/00/00

Colour Printing  
Yes

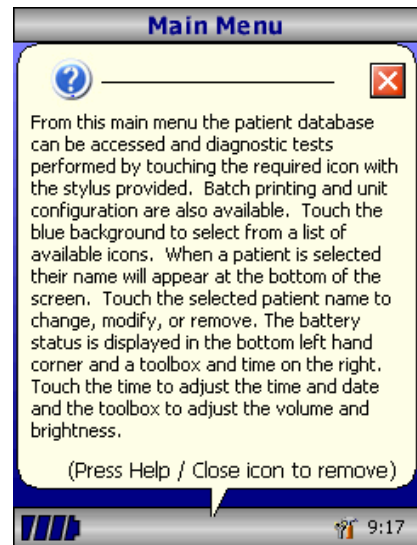
Cancel Next Finish

Page 1 of 2 15:30

When the unit is turned on for the first time the system customise menu is displayed. Touch the name of the required region with the stylus stored on the left hand side of the unit and then touch 'Finish'. This will set the regional defaults including language, if available.

If this screen is not displayed then touch the 'Customise' icon on the main menu followed by the 'System' icon.

## Overview



The MicroLab uses a touch screen with icons representing each function available. A stylus, housed in the left hand side of the unit, is provided for icon screen activation and an optional mouse is available.

Touch the displayed time to adjust time and date.

Unused icons may be disabled by touching the blue background and selecting from the list displayed.

Touch the toolbox icon to adjust volume and brightness.

Four levels of battery charge are indicated by the segmented battery icon.

When this icon turns red the battery is nearly exhausted and the batteries must be charged – see Charging Procedure. The complete functionality is described on the help screen.

This is obtained by pressing the help button (?).

Help text exists for every screen viewed during the operation of the MicroLab.

You are recommended to make full use of the extensive Help screens provided.

# Getting Started



When performing a spirometry test the recommended workflow is to enter the patient's details, or retrieve them from memory, perform the required test and then print and save the results.



Please ensure that the turbine transducer is plugged in to either of the first two sockets on the right hand side of the instrument.

**Patient Select**

Search		Database Usage
ID:		1%
Name:		

ID	Name
123	Smith,Adam
234HI889	Lawson,Christopher
54tjn666889	Denton,James

Cancel Add Today

10:51

Touch the 'Patients' icon to enter the patient database. The required patient may be selected from the stored patient list. If the patient details have not been previously stored then touch Add to enter the new patient's details. The patient details may also be downloaded from the optional Spida 5 or SpidaXpert PC software.

Once selected, the patient's name will appear at the bottom of the screen.

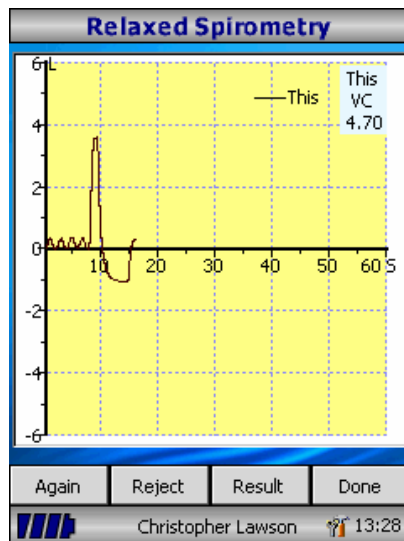
Use the help button to obtain further information.

**Main Menu**

		
Relaxed Spirometry	Forced Spirometry	Patients
		
Print	Calibration Check	Database Management
		
Customise		

Christopher Lawson 7:49

From the main menu select the required test, by touching the icon with the stylus.



If Relaxed Spirometry is selected then a volume/time graph will be displayed. Note that the unit may be customised to perform a relaxed Vital Capacity with tidal breathing or from a single expiration or single inspiration. When a manoeuvre has been obtained touch 'Results' to view the indices, 'Again' to repeat the manoeuvre, 'Reject' to delete the manoeuvre or 'Done' to end the test.

**Relaxed Result**

Base

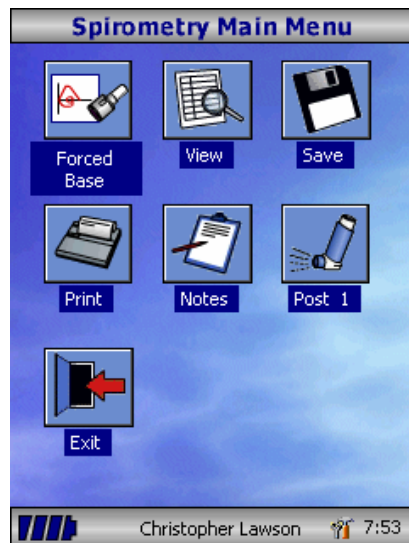
1\*

Indice	Value	%Pred	[Min	Pred	↑
EVC	4.70				
IC	3.61				
TV	0.36				
ERV	1.09				
IRV	3.25				
FR	27.0				
Ti	1.16				
Te	0.97				
Ti/Ttot	54				

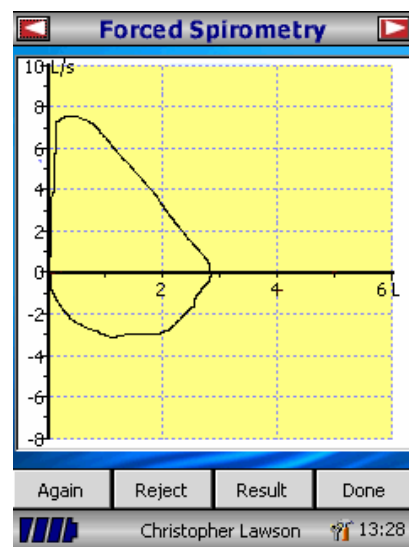
Graph Done

Christopher Lawson 13:28

All the active indices are displayed for any of the manoeuvres selected together with an option to review the volume/ time curves. The active indices listed can be changed by using the customisation option. Select 'Done' to proceed to the Spirometry Main Menu.



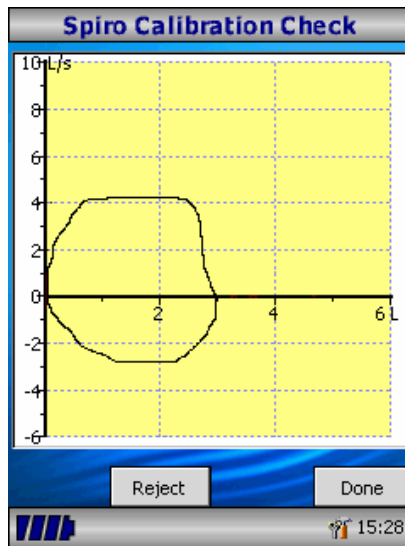
From this menu the results of the test may be viewed, saved, or printed and notes may be added. It is also possible to proceed to a forced baseline spirometry test, or a post medication relaxed spirometry test. Select 'Exit' when all the required functions have been used.



If forced spirometry is selected the default graph will be displayed. This may be changed by touching the arrows at the top of the screen. Flow/Volume, Volume/time or child incentive default displays may be selected using the customise option from the main menu. When the spirometry manoeuvre has been completed options to repeat the test, reject the test, and view results will be available. At the end of the test options to view results, save results, print results, and to add notes will be available from the spirometry main menu.



# Calibration Check

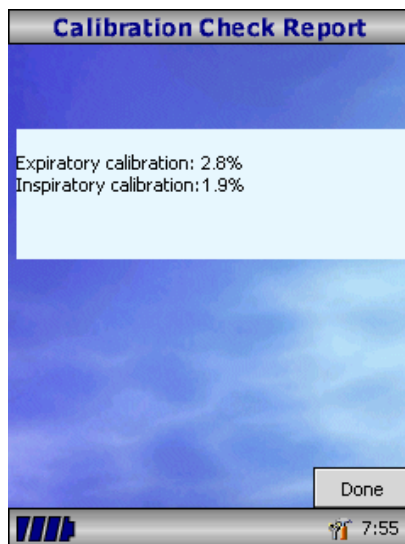


Select 'Calibration Check' from the main menu and then select 'check Calibration'.

Connect a 3 litre syringe to the transducer with the adapter supplied and empty by pushing the handle fully in.

Fill the syringe by pulling the handle at a constant rate until the end stop is reached and then immediately empty the syringe completely.

Press 'Done' to view the calibration check results.



The calibration error for expiration and inspiration are displayed. The calibration error should be less than 3% in each direction. If a greater error is shown, repeat the procedure ensuring that the syringe is emptied and filled in a smooth manner without jerking the handle. If an error greater than 3% is still shown, inspect the turbine transducer and clean if necessary.

# Customisation

The 'Customise' option from the main menu may be used to configure many of the features of your MicroLab and are divided into system and spirometry options.

System options allow you to configure the following:

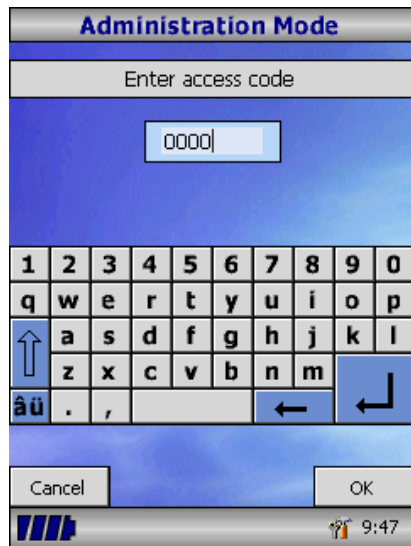
- Language.
- Height and weight units.
- Date format.
- Date separator.
- Colour or monochrome printing (on external printer).
- Personalised printout heading.

Spirometry options allow you to configure the following:

- Relaxed spirometry mode (with or without tidal breathing).
- Predicted value sets.
- Predicted area or line display.
- Display default.
- Incentive display type.
- Printed graphs.
- Best test criteria
- Interpretation and Lung Age indication.
- Dyspnoea score and smoking status.
- Calibration reminder and manual temperature adjustment.
- Indices selection.

Note that when the language is selected, the height and weight units, date format, and date separator will be automatically changed. However this automatic selection may be overridden manually.

## Administration Mode



Administration mode allows the administrator to restrict the availability of functions to the user by disabling icons on the main menu. For example, after the unit has been configured to the administrator's requirements, disabling of the 'Customise' icon will prevent any further adjustment by the user. Similarly, disabling of the 'Database Management' icon will prevent the user from deleting any patient details or test results.



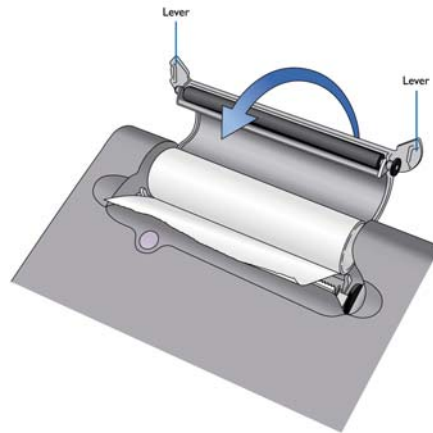
To enter administration mode turn the unit on whilst holding down the help key. The default access code is 0000. Type this number in using the on-screen keyboard. A number of functions are now available.

Touch the 'Change Access Code' icon in order to enter your personal access code and thereby restrict the use of administration to authorised personnel.

Press the help button to obtain a full description of the functions.

## Paper Loading

To load a new roll of thermal paper lift the paper cover using the side levers, place the paper into the compartment as shown and close the cover firmly. It is recommended that only Micro Medical thermal printer paper (Cat No. PSA1600) is used with the MicroLab to avoid damage to the thermal printer head.



To tear off the paper pull the paper towards you and to the right as shown below:



## External Printing

When printing the MicroLab will default to an external USB printer, if connected.

Using the USB cable provided connect the mini A/B socket on the right hand side of the MicroLab to the input socket on the printer. The MicroLab is compatible with Hewlet Packard PCL3 and PCL3 enhanced compatible USB printers. For a list of compatible printers refer to the web site [www.micromedical.co.uk](http://www.micromedical.co.uk) or contact your local dealer

It is recommended that during printing the batteries are on charge with the unit connected to the mains adapter.

NOTE: Keep the printer out of reach of the patient at all times.

## Charging Procedure

The MicroLab's internal batteries are discharged when shipped from the factory and should be fully charged on first use. Plug the AC adapter into the mains supply and plug the adapter output plug into the power input socket on the right hand side of the instrument. The orange charging light next to the power input socket will flash to indicate charging and will turn on constantly to indicate full charge.

The batteries will take approximately 4 hours to become fully charged.

**Note:** Use only the AC adapter supplied. Use of any other type may cause permanent damage to the MicroLab and cause a fire or electrical hazard. Do not plug in and remove the power lead from the AC adapter repeatedly.

## PC connection using Spida 5

Spida 5 is an easy to use PC based windows application that interfaces to the MicroLab via a USB or serial port. It incorporates a database into which patient details can be entered and downloaded to the MicroLab or test results may be uploaded from the MicroLab to the PC.

Using Spida 5 and the MicroLab, live blows can be performed with the PC directly controlling the operation of the MicroLab.

The results and graphs produced are displayed directly on the PC screen.

The spirometer is connected from the serial or USB port on the PC, to the port on the right hand side of the instrument using the USB or serial cable provided with Spida 5.

Note: the MicroLab should only be connected to a computer that is manufactured in accordance with EN60950 1992/1993 – 'Safety of Information Technology Equipment including Electrical Business Equipment'.

Keep the PC out of reach of the patient at all times.

It is recommended that whilst the unit is connected to a computer the mains adapter is used.

## Looking after your Spirometer

Please observe the following precautions:

- Do not touch the screen with fingers. Use only the stylus provided.
- Use only a damp, lint free, cloth to clean the screen.
- Do not keep the spirometer in a damp place or expose it to extremes of temperature.
- Do not direct the transducer holder towards a strong light source whilst operating the spirometer.
- Check the AC charger for compatibility with local power rating.

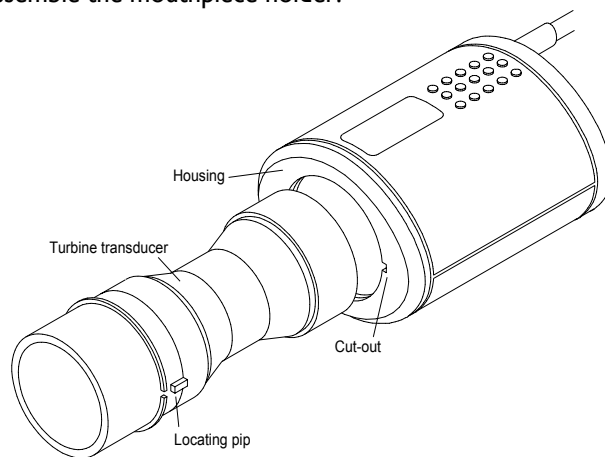
## Cleaning the Transducer

The transducer requires no routine maintenance or servicing. However, if you wish to sterilise or clean the transducer it may be removed by means of the following procedure:

- 1 Rotating the turbine transducer anti-clockwise until the locating pip lines up with the small rectangular cut-out in the housing as shown below.
- 2 Gently pull the transducer away from the housing.
- 3 The transducer may now be immersed in warm soapy water for routine cleaning or immersed in cold sterilising solutions e.g. Perasafe for a maximum of 10 minutes (Alcohol and chloride solutions should be avoided). After cleaning/sterilising, the transducer should be rinsed briefly in distilled water and dried.

Perasafe is available from Micro Medical in convenient 81g containers, Cat No. SSC5000.

- 4 Re-assemble the mouthpiece holder.



## Servicing

There is no routine maintenance required for the MicroLab and there are no user serviceable parts in this instrument. Please return the unit to Micro Medical or an authorised agent if servicing is required.

## Symbols



Type B device



In accordance with  
Directive 93/42/EEC

0120

## Environment

This instrument complies with directive EN60601-1-2 electromagnetic compatibility but can be affected by cellular phones and by electromagnetic interference exceeding levels specified in EN 50082-1:1992

This instrument is not for use with flammable anaesthetic gases or in an oxygen enriched atmosphere

## Electrical classification

Class I equipment.



## Consumables / Supporting Products

Cat. No.	Description
PSA1600	Thermal Printer Paper (pack of 5 rolls)
PSA1900	Archive Printer Paper ~ 25 Year Anti-Fade (pack of 5 rolls)
PSA1000	Adult Disposable Mouthpieces (500 per box)
SST1000	One-way Safety Mouthpieces (500 per box)
SST1250	One-way Safety Mouthpieces (250 per box)
PSA1200	Paediatric Disposable Mouthpieces (250 per box)
PSA1100	Paediatric Adaptor
SPF6050	SpiroSafe Pulmonary Filters (50 per box)
SPF6550	SpiroSafe Pulmonary Filters (250 per box)
SPF6250	SpiroSafe Pulmonary Filters (10 filter casings and 250 replacement pads)
SSC5000	PeraSafe Sterilising Powder 81g (to make up 5 litres of solution)
VOL2104	Nose Clips (pack of 5)
SMI2125	3 Litre Calibration Syringe
SD5000	Spida Software
MM3500	MicroMouse

## Training

Micro Medical run spirometry training courses throughout the UK, sessions include:

- \* Anatomy and Physiology of Respiratory System
- \* Lung Volume Terminology
- \* Objectives of Spirometry
- \* Setting up the test & performing a good manoeuvre
- \* Errors of technique
- \* Interpretation of results
- \* Using Spirometry as an aid to diagnosing airways disease
- \* Choosing a Spirometer
- \* Case Studies

To place an order for consumables / supporting products, for details of training course dates and locations, or for general enquiries please contact Micro Medical on:

Tel:            ++44 (0)1634 893500  
Fax:            ++44 (0)1634 893600  
Email:        [sales@micromedical.co.uk](mailto:sales@micromedical.co.uk)  
                  [product.support@micromedical.co.uk](mailto:product.support@micromedical.co.uk)  
Website:      [www.micromedical.co.uk](http://www.micromedical.co.uk)

Or contact your local Micro Medical dealer.

## Specification of the MicroLab

### General

<b>Storage :</b>	>2000 tests including Flow/Volume loops and Volume/Time curves
<b>Printer Output:</b>	PLC3 compatible Hewlett Packard USB printers.
<b>Display:</b>	Colour 1/4VGA LCD.
<b>Power supply:</b>	Input 100 to 240V, 50 to 60Hz. Output 12V 2.5A (Class I)
<b>Battery Pack:</b>	Rechargeable NiMH 8.4V 1A-hours.
<b>Dimensions:</b>	350x255x120 mm. Transducer 50x60x90mm.
<b>Weight:</b>	630g.
<b>Operating Temperature:</b>	0 to +40° C
<b>Operating Humidity:</b>	30% to 90% RH
<b>Transport and Storage Temperature:</b>	-20 to + 70° C
<b>Transport and Storage Humidity:</b>	10% to 90% RH

### Spirometry

#### Measurements:

Relaxed Expiratory Vital Capacity (VC)  
Forced Expired Volume in 0.75 seconds (FEV.75)  
Forced Expired Volume in 1 second (FEV1)  
Forced Expired Volume in 3 second (FEV3)  
Forced Expired Volume in 6 seconds (FEV6)  
Forced Vital Capacity (FVC)  
Peak Expiratory Flow Rate (PEF)  
FEV<sub>0.75</sub> as a percentage of VC (FEV.75/VC)  
FEV<sub>0.75</sub> as a percentage of FVC (FEV.75/FVC)  
FEV<sub>1</sub> as a percentage of VC (FEV1/VC)  
FEV<sub>1</sub> as a percentage of FVC (FEV1/FVC)  
FEV<sub>3</sub> as a percentage of VC (FEV3/VC)  
FEV<sub>3</sub> as a percentage of FVC (FEV3/FVC)  
FEV<sub>0.75</sub> as a percentage of FEV6 (FEV.75/FEV6)  
FEV1 as a percentage of FEV6 (FEV1/FEV6)  
Maximum Expired Flow at 75% of FVC remaining (MEF75)  
Maximum Expired Flow at 50% of FVC remaining (MEF50)  
Maximum Expired Flow at 25% of FVC remaining (MEF25)  
Mean Mid-Expiratory Flow Rate (MMEF)

Forced expiratory flow at 50% of volume as a percentage of VC (FEF50/VC)  
 Forced expiratory flow at 50% of volume as a percentage of FVC (FEF50/FVC)  
 Maximal voluntary ventilation indicated ( $MVV_{(ind)}$ )  
 Forced inspired volume in 1 second (FIV1)  
 Forced inspiratory Vital Capacity (FIVC)  
 Peak Inspiratory Flow Rate (PIF)  
 FIV<sub>1</sub> as a percentage of FIVC (FIV1/FIVC)  
 Forced inspiratory flow at 25% of inhaled volume (FIF25)  
 Forced inspiratory flow at 50% of inhaled volume (FIF50)  
 Forced inspiratory flow at 75% of inhaled volume (FIF75)  
 Forced expiratory flow at 50% of volume as a percentage of FIF50 (FEF50/FIF50)  
 The time taken between 25% and 75% of the forced expired volume (MET2575)  
 Forced Expiratory Time (FET)  
 Tidal Volume (TV)  
 Expiratory reserve volume (ERV)  
 Inspiratory reserve volume (IRV)  
 Inspiratory capacity (IC)

<b>Tests per subject:</b>	5 VC manoeuvre 8 FVC manoeuvres
<b>Predicted Values:</b>	Various – depends upon national preference
<b>Transducer:</b>	Micro Medical Bi-Directional Digital Volume.
<b>Resolution:</b>	10ml volume 0.03l/s flow
<b>Accuracy:</b>	+/-3%. To ATS recommendations – Standardisation of spirometry 1994 update for flows and volumes.