

Dräger



DEUTSCHER TEXT:
BITTE UMDREHEN

OPERATING MANUAL

Spirolog 1/1N

From Dräger: Spirolog 1/1N

OPERATING INSTRUCTIONS

Important Notice

For correct and effective use of the device, and to avoid hazards, we would point out the following:

- 1 Any use of the device requires precise knowledge and observation of these operating instructions.
- 2 The device is intended only for the purposes specified in the Operating Manual or for purposes confirmed in writing by Drägerwerk AG.
- 3 The device should be inspected by experts at regular time intervals. An official report of the inspections should be drawn up.
- 4 Only original Dräger spare parts should be used for maintenance and repairs. Repairs and maintenance, and the replacement of spare parts should only be carried out by experts.
- 5 We recommend having inspections and repair work carried out by the

Technical Customer Service of your Dräger Branch or Agent.

Regular inspection is best ensured by entering into an Inspection Service Contract with the Technical Customer Service of your Dräger Branch or Agent.

- 6 Responsibility for the reliable function of the device passes to the owner or operator in all cases where the device has been inexpertly maintained or repaired by persons not employed by the Dräger Organisation or where it has been used in a manner which does not conform to the normal conditions of use.

We would also point out that the national recommendations, regulations and laws governing the use of technical equipment should be observed.

DRÄGERWERK AG LÜBECK

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Intended Use

The Dräger Spirolog 1 is used to determine and display the following ventilation parameters:

Minute volume
Tidal volume
Respiratory rate

Tidal volume and respiratory rate can be optionally displayed.

The minute volume is monitored by way of adjustable upper and lower limit values.

Indication of the alveolar ventilation is made possible by taking account of the anatomical dead space with the dead-space volume setting.

The Dräger Spirolog 1 is designed for use with ventilators as well as for use during spontaneous breathing. If use is made of a conversion kit (Dräger Spirolog 1N), the device can also be used during anaesthesia ventilation with O₂-N₂O mixtures.

Notes on Usage

For flow measurement the Dräger Spirolog 1 employs a sensor with an electrically heated platinum wire.

The Spirolog 1 sensor must not be used in an explosive atmosphere e. g. cyclopropane (C₃H₆) or ether mixtures!

The Dräger Spirolog 1 is designed for use in oxygen – air mixtures.

The range of application can be extended to include any concentration of O₂-N₂O mixtures (Dräger Spirolog 1N) if use is made of an additional printed circuit board (conversion kit N₂O 8301828). This version features automatic gas recognition and switching to the gas mixture to be measured.

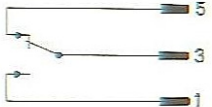
Caution!

If the Spirolog is to be combined with other electromedical equipment, it must be ensured that patient, personnel and environment are not endangered.

VDE Regulation (Verein Deutscher Elektroingenieure = German Association of Electrical Engineers) 0750 must be observed:

»If the technical data of the device do not clearly specify that there are no risks involved in combining the device concerned with other equipment, the user must establish on a case to case basis, for example by consulting the manufacturers concerned or a qualified expert, that the envisaged combination in no way endangers patient, personnel or environment.«

Technical Data

Operating temperature	10 – 40°C
Storage temperature	–40 to +55°C
Minute volume display	0 – 25 l/min
Respiratory rate display	0 – 60 min ⁻¹
Tidal volume display	0 – 2 l
Minimum tidal volume requirement (for tidal volume display)	0.15 l
Accuracy of flow measurement in range 1 – 150 l/min	± 8% of measured value
Variable dead-space volume	0 – 0.4 l
Monitoring of minute volume	adjustable lower and upper limit in range 0 – 25 l/min
Alarm feature	visual and audible (upper alarm segment flashes, combined with intermittent alarm tone); the intermittent alarm tone can be suppressed for 2 minutes.
Suppression of monitoring function	if the upper limit adjuster is set to the right stop (setting »off«), the upper alarm limit is disconnected. If the lower limit adjuster is set to the left stop, the lower alarm limit is disconnected.
Monitoring of mains voltage	storage-battery buffered, intermittent alarm tone for roughly 1 hour
Output for central alarm (socket 17, Fig. 3)	floating changeover contact 
Dimensions W x H x D	212 x 114 x 300 mm (see also Fig. 1).
Weight	approx. 4.2 kg
N ₂ O compensation (Spirolog 1N)	0 – 100 vol. % N ₂ O in O ₂
Operating voltage	100/110/127/220/240 V 50/60 Hz (see rating plate for voltage set at factory)
Power consumption at 220 V	0.14 A
Recorder output	Connection of Trend Recorder TS2 with recorder cable (83 03 013) Flow 0 – 15 l/min ± 0 to + 1 V Internal resistance = 22 kΩ short-circuit-proof Volume 0 – 2 l ± 0 to + 1 V Internal resistance = 2 kΩ short-circuit-proof

The connections 1, 3, and 5 of the central alarm outlet form a floating changeover contact. In neutral position, contact 3/1 is open while contact 3/5 is closed. In the case of alarm (audible warning triggered) contact 3/1 is closed and contact 3/5 is open. For connection of a remote alarm system, the outlet features an operating voltage up to 24 V (max. current 250 mA, max. output 3 W).

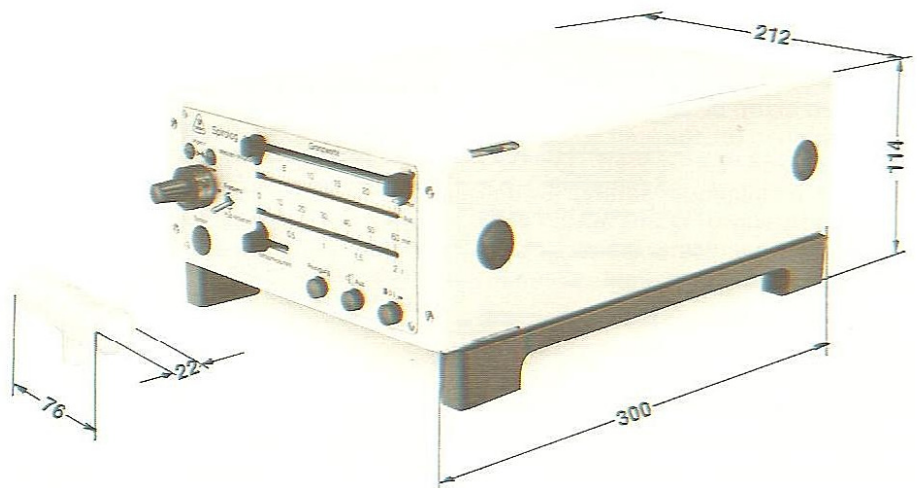


Fig. 1 Spirolog 1 (dimensions)

What's What? (Figs. 2 and 3)

- 1 Potentiometer for zero adjustment
- 2 Adjustment indicator lamps (LEDs)
- 3 Lower limit adjuster for minute volume
- 4 Scale for displaying minute volume
- 5 Upper limit adjuster for minute volume
- 6 Mains switch
- 7 Button for suppressing intermittent alarm tone for roughly 2 minutes
- 8 Button for cleaning sensor wires by causing them to glow
- 9 Scale for optional display of respiratory rate or tidal volume
- 10 Regulator for dead-space volume for taking account of anatomical dead space
- 11 Changeover switch for optional display of respiratory rate or tidal volume on scale 9
- 12 Sensor connection, front (with unit 8301700) (connection sealed with dummy plug)
- 13 Spirolog sensor
- 14 Sensor cable
- 15 Rating plate
- 16 Mains connection
- 17 Central alarm output
- 18 Signal output for connection of recorder cable 8303013
- 19 Sensor connection, rear (with unit 8302040)
- 20 Connector for potential equalization
- 21 Fuse holder

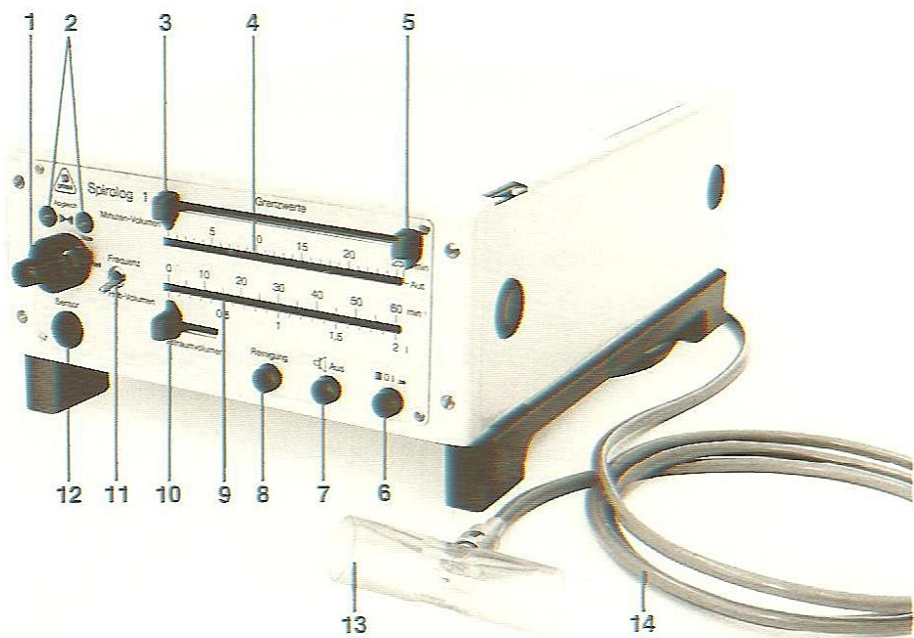


Fig. 2 Front view (with sensor)

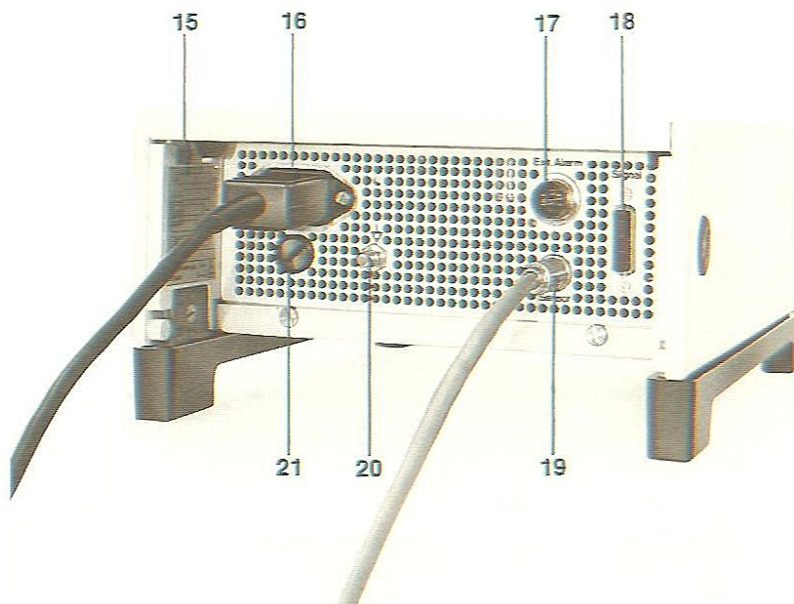


Fig. 3 Back view

Initial Preparation

Connect sensor 13 to the sensor cable 14 provided and insert cable into sensor connection 12 on front (in the case of unit 8301700) or into the connection 19 on the back (in the case of unit 8302040).

Compare operating voltage on rating plate 15 for conformity with local voltage. Insert power cord on back of device and connect to mains. To prevent an alarm being given when the unit is switched on, the limit adjusters 3 and 5 should be moved to their maximum or minimum setting. Switch on device by way of mains switch 6. At least one of the indicator lamps 2 above potentiometer 1 should light.

In order to eliminate any dirt on the platinum wires in the sensor, button 8 should be pressed for roughly 2 seconds. The two wires in the sensor must glow slightly; at the same time the displays for the minute volume and tidal volume appear.

Adjustment

Zero adjustment is always to be performed prior to use and following sensor replacement:

Seal off the sensor at both ends (Fig. 4). In the respective operating position, set the indicator lamps 2 such that they are equally bright by using the potentiometer 1. Lock potentiometer. When performing adjustment, there may only be air in the sensor housing.

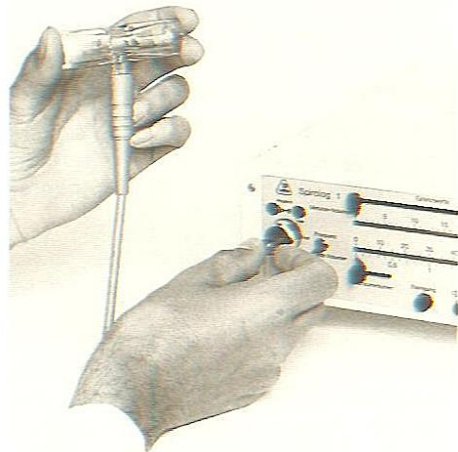


Fig. 4 Calibrating the device

Functional check

Set lower limit adjuster **3** for minute volume to roughly 5 l/min and upper limit adjuster **5** for minute volume to approximately 9 l/min; switch changeover switch **11** to »tidal volume«:

- With its ends open, continuously move the sensor back and forth in the ambient air such that an alternating flow of air passes through the sensor. The tidal volume display **9** must appear intermittently and the value indicated must increase.

Until the lower limit value **3** of the minute volume display **4** is exceeded, a visual and audible alarm is given (flashing of minute volume display combined with intermittent alarm tone).

Switch changeover switch **11** to »respiratory rate«, and continue to move the sensor back and forth:

- The respiratory rate display **9** should indicate a constant value.
- The minute volume display **4** should slowly increase; after passing the upper limit value **5** a visual and audible alarm should be given (flashing of minute volume display combined with intermittent alarm tone).

Press button **7** for suppressing intermittent alarm tone:

- Alarm tone should cease to sound, display continues to flash.

After 2 minutes:

- Intermittent alarm tone sounds again.

Stop moving the sensor back and forth:

- When the lower limit value **3** of the minute volume display **4** is passed, a visual and audible alarm is given. (»Flashing of minute volume display combined with an intermittent alarm tone«.)

Set lower limit value adjuster **3** to left stop:

- Visual and audible alarm should be suppressed.

Pull mains connector:

- Intermittent alarm tone should sound.

Set mains switch **6** to zero:

- Intermittent alarm tone should cease to sound.

Plug in mains connector again, switch on mains switch **6** again, the device is now ready for use.

Operational Use

Insert sensor of calibrated Dräger Spirolog 1 into tubing system. The flow direction is irrelevant. It must however be ensured that the flow through the sensor is in one direction only and that it is inserted in the tubing system at a point at which there is no gas flow at least for a brief period of roughly 100 ms during the breathing cycle.

With ventilators, we recommend locating the sensor at the gas outlet socket; with anaesthetic apparatus the sensor should be inserted in the expiration tract.

Specific accessory sets are available for use with Dräger equipment (see Order List).

The Spirolog 1 is to be set as follows:

- Set dead-space volume adjuster to left stop
- Set lower and upper limit value of minute volume to $\pm 20\%$ of momentary value
- Select display of tidal volume or respiratory rate with switch **11**
- If the dead-space ventilation of the patient is to be considered, the estimated value of the anatomical dead space is to be set on the dead-space volume adjuster (same scale as for tidal volume). The set value is multiplied by the respiratory rate and automatically subtracted from the minute volume.

Example:

If, with an effective minute volume of 9.4 l/min and a respiratory rate of 8 min^{-1} , a dead-space volume of 0.15 l is set, the Dräger Spirolog 1 indicates the following minute volume:

$$\begin{aligned} \text{Display} &= \text{Effective minute volume} \\ &\quad - (\text{dead-space volume} \\ &\quad \quad \times \text{respiratory rate}) \\ &= 9.4 - (0.15 \times 8) \\ &= 8.2 \text{ l/min} \end{aligned}$$

Alarm

If the lower limit value for the minute volume has been dropped below or the upper limit has been exceeded and a visual or audible alarm has been given, the intermittent alarm tone can be suppressed for approximately 2 minutes. When the fault has been corrected (minute volume value between limit values), the upper luminous segment stops flashing. The visual and audible alarm is immediately ready for operation again.

Medicament nebulisation

Medicament nebulisation may cause formation of deposits on the sensor wires.

To avoid the possibility of erroneous displays, the sensor should always be cleaned after nebulisation and calibrated again (see »Initial Preparation«, Page 4).

Shut-Down Actions

Switch off device with mains switch.

If the device is shut down merely by pulling the mains connector, the mains failure alarm will come into effect, its Ni-Cd storage batteries will under certain circumstances be drained and thus the mains failure alarm will not function when the device is subsequently re-used.

Remove connector from sensor, remove sensor from tubing system.

Care

Cleaning and disinfection

Wipe Spirolog 1 and the cables with a damp cloth soaked in water and detergent (reducing the surface tension).

Do not use solvents such as benzene, alcohol or ether for cleaning purposes.

Buraton 10 F for example is recommended for cleaning and disinfection purposes (wiping with disinfectant).

Disinfection in the Aseptor is to be recommended. It is important that the device and cable are dry as otherwise unpleasant odours may be encountered following disinfection. For disinfection in the Aseptor, the device must be switched off.

The device, cable and sensor must not be subjected to sterilization in superheated steam.

The sensor is a disposable article and should be replaced at regular intervals.

Following disinfection the device is to be assembled as indicated in the Section headed »Initial Preparation«. Before re-use with a patient, the device is to be tested for proper functioning as described under »Functional Check« (on this page).

Trouble Shooting

Fault	Cause	Remedy
Device gives auditory alarm without display flashing	No mains voltage available	Check connection of power cord; if applicable, check whether mains voltage is present at socket.
No minute volume display when there is a flow, or minute volume display when there is no flow	Sensor cable not properly connected; sensor may be defective	Properly insert sensor cable at device and on sensor end and allow connector to engage or use new sensor
Adjustment not possible	Sensor may be defective	Use new sensor
Sensor wire glows constantly	Sensor cable not properly connected Connector defective or device defective Sensor defective	Properly insert sensor cable at device and on sensor end and allow connector to engage Call Dräger Inspection Service Use new sensor
Tidal volume display indicates incorrect values	Incorrect adjustment	Re-calibrate sensor
Device gives visual and auditory alarm when switched on (resetting for 2 minutes possible)	Device is still not internally calibrated and requires more time before being ready for operation	This process can be accelerated by briefly pressing (approx. 0.5 s) the cleaning knob
Tidal volume display increases slowly in flow pauses	Flow is not exactly 0 in flow pause or adjustment is not precise	Firstly re-calibrate device (in air and with sensor sealed on both ends). If this does not remedy the fault, the sensor is to be positioned at another point in the tubing system, where it is guaranteed that the flow is 0 in the flow pauses.
When cleaning the sensor wires only one wire glows		Use new sensor; if fault is not eliminated, call Dräger Inspection Service.

Order List

Name and description	Order No.
<p>Basic unit</p> <p>Spirolog 1 Measuring and patient monitoring device for the ventilation parameters: minute volume, tidal volume and frequency</p> <p>Spirolog 1 N as above, yet with N₂O compensation for use during anaesthesia</p>	<p>83 02 040</p> <p>83 02 760</p>
<p>Accessories required for operation</p> <p>Sensor replacement set set of 5 ea</p> <p>Accessory set A for:</p> <ul style="list-style-type: none"> – Spiromat 760, expiratory measurement – Assistor 744, expiratory measurement – Servo-Ventilator 900 and 900B, in conjunction with Humidifier 19, expiratory measurement <p>Tube sleeve, size 1 for:</p> <ul style="list-style-type: none"> – Spiromat 661 and 662, expiratory measurement – Anaesthesia Spiromat 650, inspiratory or expiratory measurement – Anaesthesia Spiromat 656, inspiratory or expiratory measurement – Servo-Ventilator 900 and 900 B in conjunction with Bennet-nebulizer, inspiratory or expiratory measurement – Anaesthesia Assistor or Pulmomat with circle system 7 and 7a, inspiratory and expiratory measurement – Assistor 640, inspiratory measurement – Assistor 641, expiratory measurement – Assistor 642, expiratory measurement – Assistor 644, inspiratory measurement <p style="margin-left: 150px;">} Volume measuring device is dispensed with when Spirolog is used</p> <p>Spirolog connection for: Universal Ventilator UV 1 and UV 2, Pulmolog, SIMV-Pulmolog, CPAP 800</p> <p>Spirolog sensor housing for circle system</p>	<p>84 03 735</p> <p>84 03 760</p> <p>M 02 398</p> <p>84 05 165</p> <p>M 26 844</p>
<p>Special accessories</p> <p>N₂O conversion kit (for converting Spirolog 1 into Spirolog 1 N)</p> <p>Spontaneous breathing accessory</p> <p>Instrument tray</p> <p>Wall bracket with drawer</p> <p>Recorder cable</p>	<p>83 01 828</p> <p>84 05 166</p> <p>2M 17680</p> <p>2M 18285</p> <p>83 03 013</p>
<p>Spare parts</p> <p>Sensor cable</p> <p>Mains cable</p>	<p>83 01 795</p> <p>18 07 323</p>



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