

# Dräger

**DEUTSCHER TEXT:  
BITTE UMDREHEN**

OPERATING MANUAL

## Minute Volumeter 3000

# From Dräger: Minute Volumeter 3000

## OPERATING INSTRUCTIONS

### Important Notice

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

- 1 Any use of the appliance requires precise knowledge and observation of these operating instructions.
- 2 The appliance is intended only for the purposes specified in the Operating Manual or for purposes confirmed in writing by Drägerwerk AG.
- 3 The appliance 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 appliance passes to the owner or operator in all cases where the appliance 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 minute Volumeter 3000 shows the patient's **respiratory minute volume** and **tidal volume** independent of the gas composition, and it thereby appreciably simplifies the determination of respiratory values needed for the record.

### Application of Volumeter 3000

- In assisted or controlled ventilation;
- During anaesthesia;



Fig. 1 Minute Volumeter 3000

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- In the determination of vital capacity;
- To check spontaneous respiration (e. g. during postoperative recovery).

No heating is required for the Volumeter 3000.

It is resistant to corrosion in respect to the usual inhalation anaesthetics (e. g. Halothane, Enflurane, or Methoxyflurane).

## Technical Data

Measurement range	
1 turn of large hand	1000 cm <sup>3</sup>
1 turn of small hand	15 l
Necessary initial flow	3.5 l/min
Max. permissible peak flow	120 l/min
Flow resistance	1 mbar at 80 l/min
Heat stability	up to 120°C
Connections	
Air inlet (above)	Male thread M 33x 1
Air outlet (below)	Union nut M 33x 1
Weight (without heating)	0.9 kg
Dimensions	
Diameter/Length	80 Ø/90 mm

## Approvals

The Volumeter 3000 is exclusively mechanical in operation and it is therefore explosion proof.

## Initial Preparation

The Volumeter is connected to the **expiratory side** of a ventilator or to a circle system of an anaesthetic machine. The expiratory air flows from top to bottom.

The Volumeter can be directly screwed onto the Dräger ventilators and anaesthetic machines (Fig. 2).

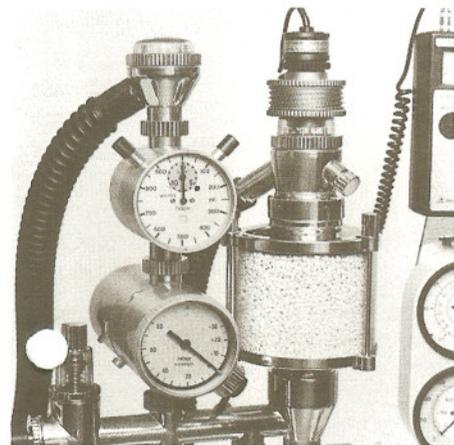


Fig. 2 Minute Volumeter 3000 in circle system of anaesthetic machine

## Operational Use

### Measurement of Minute Volume

When the left button is depressed (Fig. 3), a timer begins to run, which after one minute will stop the hand of the volumeter. In this manner, the minute volume is determined. When the left button is pushed, a black spot will also simultaneously appear in the left aperture, and after one minute, a black disc will fill the rectangular space, located below the hand of the indicator.

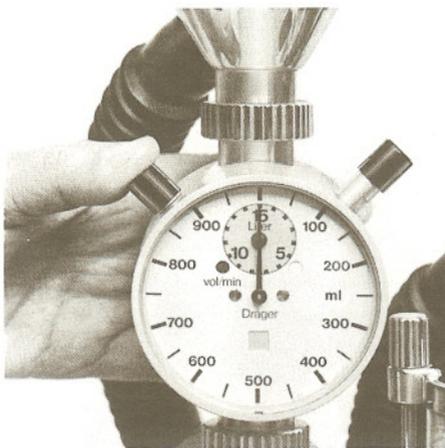


Fig. 3 Release of indicator hand for minute volume

### Measurement of Tidal Volume

When the right button is depressed (Fig. 4) a black spot will appear in the right aperture and the tidal volume will be measured.

To stop the indicator hand after a certain number of respiratory cycles, the right button is depressed **half way**. To restart the Volumeter, the same button is **completely** depressed.



Fig. 4 Release of indicator hand for tidal volume

## Measurement of Vital Capacity

(Special equipment 2M 18476 for the minute Volumeter 3000 in a kit with accessories).

The accessory kit (Fig. 5) enables measurement of **vital capacity** using a face mask (Fig. 6) or a mouth piece (Fig. 7).

During postoperative recovery, the **minute volume** of a patient with an indwelling endotracheal tube can be determined using the same special equipment without further expenditure.

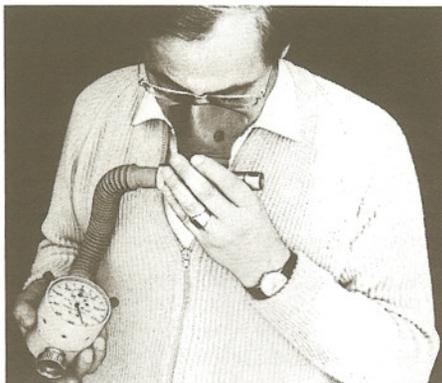


Fig. 6 Measuring the vital capacity using a face piece



Fig. 7 Measuring the vital capacity using a mouth piece

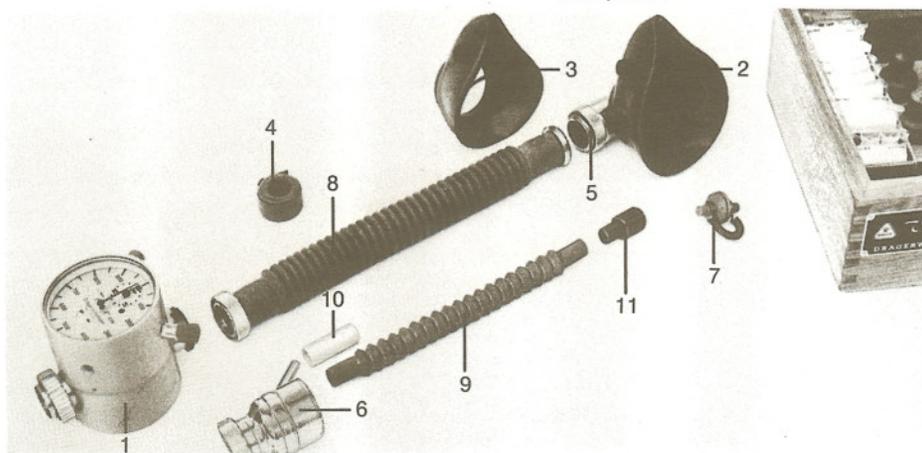


Fig. 5 Dräger Minute Volumeter 3000 with special equipment kit

1 Minute Volumeter 3000	2 M 18250
2 Face mask size 1 (large)	M 8983
3 Face mask size 2 (small)	M 9126
4 Head strap	M 8135
5 Valve	2 M 2103
6 Mouth piece	2 M 2353
7 Nose clamp	R 5868
8 Corrugated hose with connecting nozzle consisting of:	2 M 2346
Gasket	M 9257
Threaded connector	2 M 2328
Corrugated hose	M 12558
Union collar	M 9226
Connecting nozzle	2 M 2091
9 Hose for endotracheal tubes	M 10071
10 Bag with 5 cardboard mouth pieces	2 M 2355
11 Cone shaped adapter	8400851

# Cleaning and Disinfection

## Cleaning

The Volumeter is to be cleaned after **each day's use**. Run hot water from the tap through the Volumeter measurement chamber, the water flowing from top to bottom, so that none of the water can enter the bleed vents of the control mechanism (Fig. 8). **Do not immerse the Volumeter in water.**

Shake out the Volumeter manually (Fig. 9) and then dry it using the Dräger Volumeter Dryer 2M 14850 (Fig. 10) or

the Dräger Dryer 2M 8220. The connecting nozzle 2M 13921 is to be used to attach the Volumeter to the 2M 8220 Dryer.

## Disinfection in the Dräger Aseptor

Clean and dry the Volumeter as described before. Then attach it to the holding screw in the Aseptor and it will be disinfected with formaldehyde.

## Autoclave Sterilization

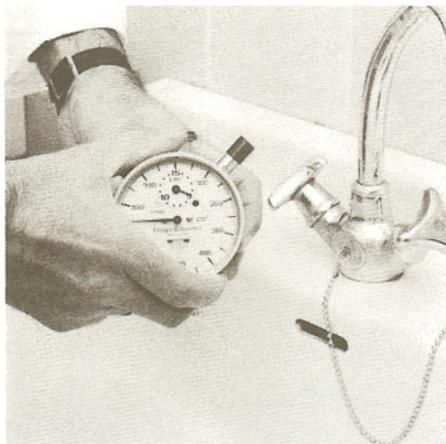
Clean the Volumeter as described be-

fore. It does not need to be dried. Sterilize in an autoclave set to a glove programme at 120°C.



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Fig. 8 Flushing out Volumeter



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Fig. 9 Shaking out remaining water



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Fig. 10 Dräger Volumeter-Dryer 2 M 14850

## Maintenance and Care

The bearings of the Volumeter's rotating elements become accessible through 4 lateral bores; these bores are marked by printed arrows. This makes it possible to lubricate the bearings with a specially suited lubricant »Oxigenoex S 4« (approved for fittings carrying oxygen).

A lubricating set 2M 18180 is supplied with each Volumeter.

**Lubrication must be carried out after about 30 steam sterilisations or at least every 2 months (Fig. 11).**

### Note!

Only use pipette supplied with the kit to avoid damage to the bearings.

**Each bearing must be lubricated as follows:**

- Remove protective cover from pipette and open lubricant bottle.
- Dip tip of pipette into lubricant and suck one drop of »Oxigenoex S 4« into pipette by pulling the pin upwards.
- Insert pipette into one of the four bores as far as it will go (bores indicated by arrows on the side of the Volumeter). Push the pin forward to the stop whereby lubricant is pressed into the hole.



Fig. 11 Lubrication of the bearings

## Trouble Shooting

If the timer mechanism of the Volumeter 3000 does not start following sterilization using superheated steam, this is due to the small shafts sticking in their bearings. This can be corrected by giving the Volumeter a sharp turn around its longitudinal axis.

When a new piece of tempered plate glass hast to be put in, remove the retaining ring over the glass using a pointed instrument (such as forceps) by levering it out to the front. When the Volumeter is tipped, the glass will fall out.

When putting in a new glass:

- Clean the dial face;
- Clean the new glass before putting it in;
- Snap in the retaining ring.

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## Order List

Description	Designation	Order-No.
<b>Minute Volumeter 3000</b>	<b>Volumeter 3000</b>	<b>2 M 18250</b>
<b>Minute Volumeter 3000 in carrying case</b> for measurement of vital capacity; complete with 2 face masks, valve, mouth piece and connecting hoses	<b>Volumeter 3000 in carrying case</b>	<b>2 M 18476</b>
Spare and wearing parts		
<b>Tempered plate glass</b>	<b>Glass</b>	<b>E 9285</b>
<b>Retaining ring</b>	<b>Retaining ring</b>	<b>E 9284</b>
<b>Gasket</b> (on upper connecting piece)	<b>Gaskets</b> (pack of 10)	<b>M 22154</b>
<b>Bag with cardboard mouth pieces;</b> bag contains five pieces (belongs to Volumeter in carrying case)	<b>Bag mouthpiece</b>	<b>2 M 2355</b>
<b>Lubrication-Set</b> for Volumeter 3000	<b>Lubrication-Set</b>	<b>2 M 18180</b>

Subject to alterations!