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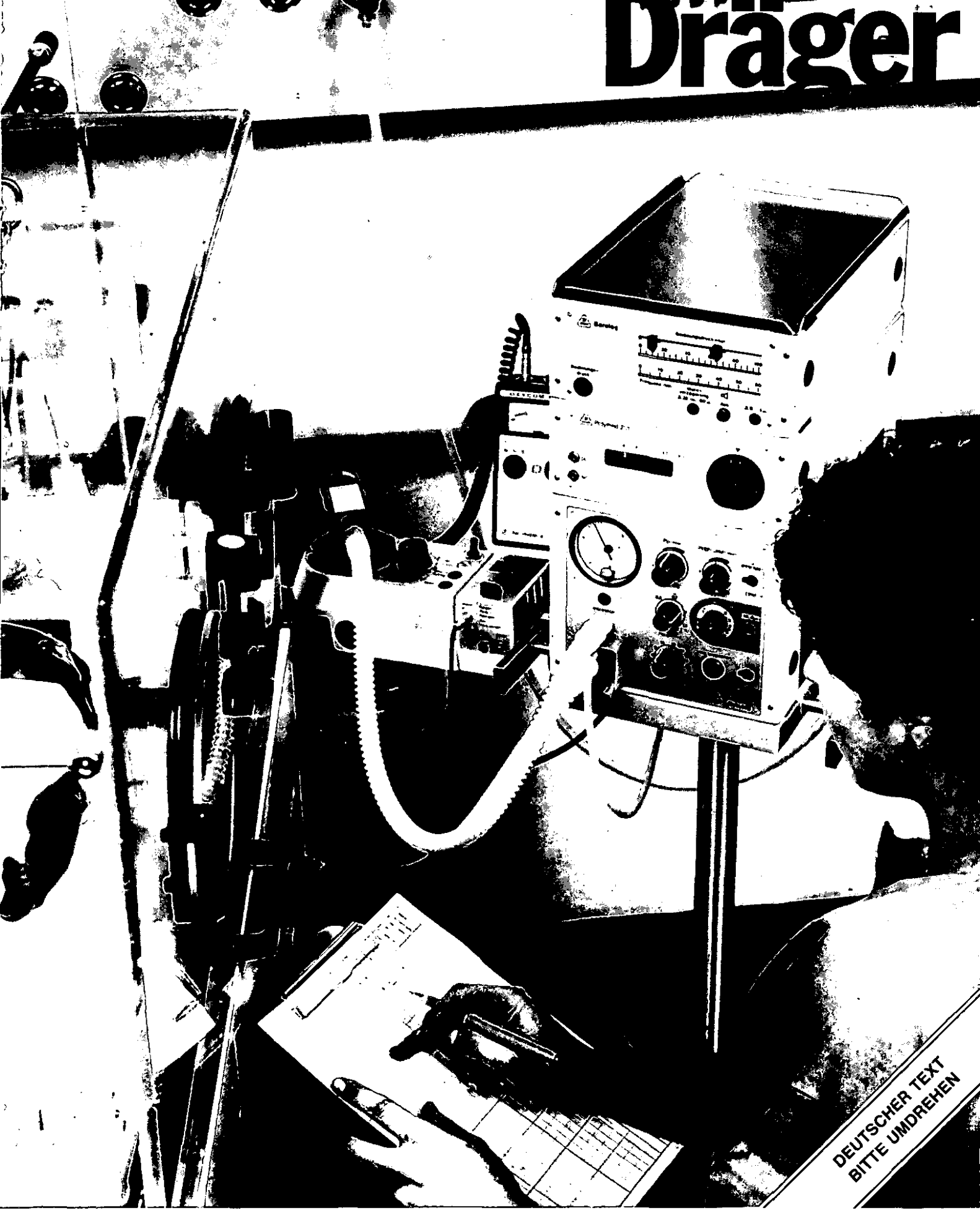

DEUTSCHER TEXT
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41501

OPERATING MANUAL

Babylog 1 Ventilator

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BA 6173.1e

From Dräger: Babylog 1 Ventilator

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 Organization or where it has been used in a manner which does not conform to the normal conditions of use.
7 For reasons of safety, pressure reducers should be overhauled at least every 6 years.
8 The oxygen blender is to be overhauled every 4 years for safety reasons.
9 This device is intended only for use in areas without danger of explosion.

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

DRÄGERWERK AG LÜBECK

We would like to point out the recommendations of DGAI (Deutsche Gesellschaft für Anaesthesie und Intensivmedizin, or German Association for Anaesthesia and Intensive Care Medicine) which urge that a manual ventilator should be available which is independent of the automatic ventilator and ensures ventilation of the patient with ambient air. If the vital function is no longer ensured in case of a recognizable fault of the ventilator, ventilation of the patient with the separate manual ventilator must be started without delay, if necessary with PEEP and/or a higher inspiratory O_2 concentration (cf. operating instructions for the manual ventilator).

Contents

A3

Intended Use

Clinical ventilator for premature babies and neonates for IPPV, CPAP or IMV, with integrated PEEP valve.

Key to abbreviations used

MV = Minute volume (L/min)

CPAP = Continuous Positive Airway Pressure

IPPV = Intermittent Positive Pressure Ventilation

IMV = Intermittent Mandatory Ventilation

PEEP = Positive Endexpiratory *Pressure*

Technical Data

Control principle	continuous flow
Inspiration start	time-controlled or manual start
Expiration start	time-controlled
Inspiratory pressure characteristics	linear pressure increase with possibility of continuous plateau adjustment
Expiratory pressure *PEEP/CPAP*	*endexpiratory pressure* from 0 to 10 mbar
Airway pressure adjustment during inspiration P_{in}	continuous from 10 to 60 mbar plateau pressure; pressure indication by *pressure gauge, pick-up in expiration* section
Inspiratory flow and expiratory flow for IPPV, IMV or CPAP	continuous from 2 to 20 L/min
Inspiratory time t_{in}	continuous from 0.3 to 2 seconds
Expiratory time t_{ex}	continuous from 0.5 to 6 seconds or continuous from 5 to 60 seconds *(depending on the position of the range selector switch t_{ex})*
Oxygen concentration	via O_2 blender
Drive gas, operating pressure	dry compressed air, free of oil and dust, *or O_2 (2 to 6 bar) from a central supply* system
Connecting an O_2 blender	
a) Using Dräger Polymed (Fig. 11): An intake pressure of between 2 and 6 bar must be ensured at the left connection **15**. The O_2 blender must be capable of supplying at least 20 L/min on a continuous basis	O_2 switch **16** to left
b) Using the blending device with flowmeter unit (Fig. 12): Connect the outlet of the flowmeter unit to the right connection **17** (intake pressure < 100 mbar) **In order to ensure the control function of the device, it is necessary to feed O_2 (2 to 6 bar) to the *device through the left-hand* screw connection 15 (see rear of unit)**	O_2 switch **16** to right
Compressed-gas consumption	Since the unit operates on the continuous flow principle, gas consumption does not depend on the MV, but matches the set flow directly (flow knob)
IPPV-IMV/CPAP switch	for IPPV-IMV or continuous flow (CPAP)
"*Manual inspiration*" button	for starting manual inspiration and "inflation hold"
The settings to the green dot correspond to the following values:	
Inspiratory pressure limit P_{in}	approx. 20 mbar
Expiratory pressure PEEP/CPAP	0 mbar
Inspiratory time t_{in}	approx. 0.7 s
Expiratory time t_{ex} with range selector switch in position "0.5 to 6 s"	approx. 1.1 s
Weight	approx. 5 kg

What's What?

(Figs. 1 and 2)

1 Expiratory valve (removable)
2 Expiration nozzle
3 Inspiration nozzle
4 Knob for inspiratory time t_{in}
5 Airway pressure gauge
6 Inspiratory pressure limit P_{in}
7 Expiratory pressure PEEP/CPAP
8 Switch IPPV-IMV/CPAP
9 Knob for expiratory time t_{ex}
10 Range selector switch t_{ex}
11 Switch (On/Off)
12 Key for manual inspiration
13 Carriage
14 Flow knob
15 Connection M 15 × 1 for
a) *mixed gas: compressed air/O_2*, 2 to 6 bar (from Polymed blender)
b) O_2 (or compressed air), 2 to 6 bar as drive gas (if mixed gas is fed from the flowmeter blender via connection 17)
16 Selector switch for O_2 blender
17 Connection M 16 × 1.5 for mixed gas: compressed air/O_2 (< 100 mbar)
18 Retaining screws

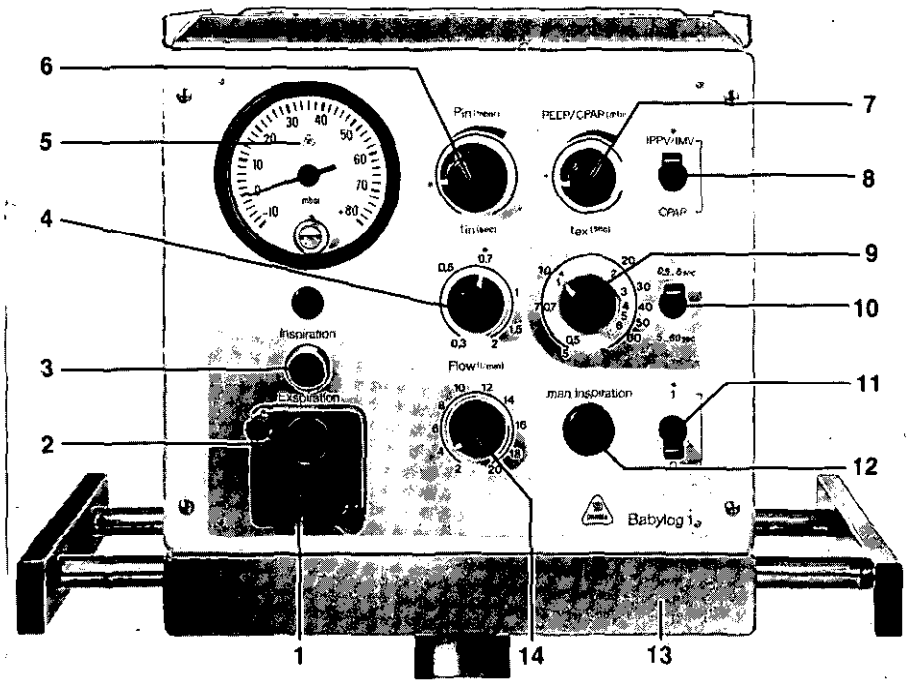

Fig. 1 Front view of Babylog 1

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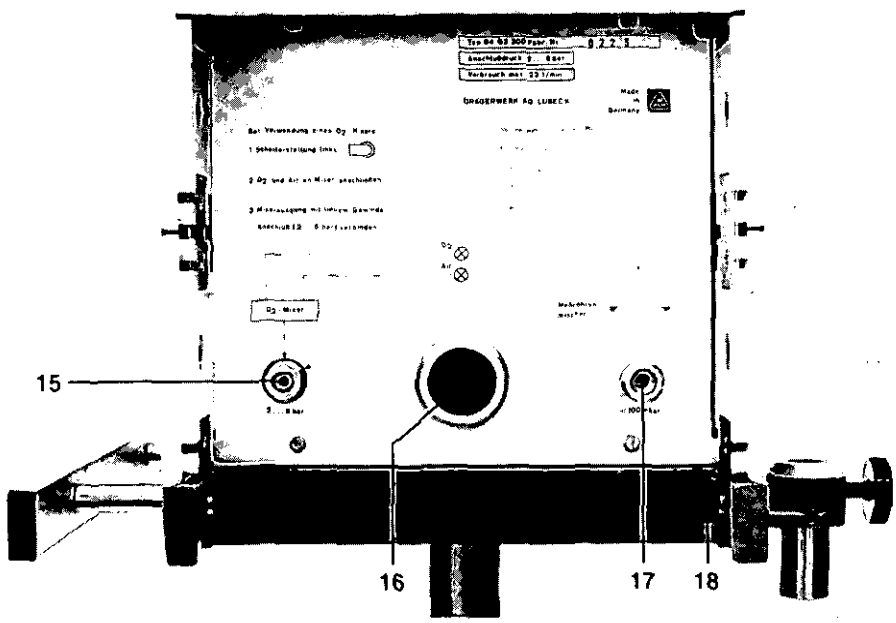

Fig. 2 Rear view of Babylog 1

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Functioning Principle of Babylog 1

The Babylog 1 is a continuous-flow unit, *i.e., respiratory gas flows* ***continuously*** from the inspiratory nozzle of the Babylog 1 into the hose system (in contrast to the "intermittent operation" in a flow chopper, such as the Babylog 2), through the Y piece to the patient, and back to the expiratory valve. The inspiratory and expiratory phases are generated when the expiratory valve closes and opens.

During inspiration, the expiratory valve is actuated by a pneumatic signal of **low** pressure level. Thus auscultation is not disturbed by a sound wave caused by the pneumatic signal.

The PEEP function is also implemented by activating the expiratory valve by means of a pneumatic signal of very low pressure level (in the range of the PEEP) during the expiratory phase.

The pressure limiting valve (P_{in}) is installed in the unit in the inspiration section so that the patient is protected from unduly high pressure, e.g., when a hose is kinked.

Controlled ventilation – IPPV

The ventilation rate and I:E phase time ratio are provided by presetting the inspiration (t_{in}) and expiration (t_{ex}) times which can be set separately.

The frequency table shown in Fig. 13 to determine the ventilation rate and I:E ratio is located on the right side of the Babylog 1. *Example: For a setting corresponding* to the green dots, with t_{in} = 0.7 s and t_{ex} = 1.1 s, the ventilation rate is f = 33/min, and the breathing time ratio has the value 1:1.6. The inspiration pressure limitation P_{in} can be varied continuously between 10 and 60 mbar, thus making it possible to set a plateau in the ventilation pressure curve or to set a safety pressure.

Flow

The flow can be set between 2 and 20 L/min. The gas flows continuously: to the patient during inspiration, through the *expiratory valve to the outside during* expiration. Measurement of the patient's volumetric parameters, *e.g.*, by means of a Spirolog or volumeter, is not possible due to the continuous-flow principle.
However, the method described below allows for easy presetting of the Babylog 1.

Assumption:

Patient	neonate
Body weight (BW)	3 kg
Specific respiratory volume (V)	10 m L / kg BW
Ventilation rate (f)	35/min
I:E phase time ratio	1:1

A5

Flow setting

- Tidal volume V_T = BW × V = 30 mL
- Minute volume MV = V_T × f = 1.05 L/min
- Flow = MV × (I + E) = 1.05 × 2 = 2.1 L/min.

For a selected I:E ratio = 1:1.5, the flow is calculated as follows:
flow = 1.05 × 2.5 = 2.6 L/min.

The settings of the ventilation patterns in the Babylog 1 can be classified as follows:

1. Ventilation without assumed leakage and without pressure limitation. The calculated and set flow leads to an end inspiratory pressure at the end of the set inspiratory time, if there is no leakage. The end inspiratory pressure depends on the compliance and resistance of the patient's lungs (Fig. 3).

2. Ventilation with leakage (a ventilation gas loss of up to 50% may occur due to leakage at the tube). Any leakage results in a lower volume per breath; the end inspiratory airway pressure is reduced at the same time (Fig. 4).

3. Ventilation with higher flow setting to compensate the leakage, with inspiratory pressure limitation P_{in}. A greater flow is selected to compensate the ventilation gas losses at, for instance, the tube. In order to avoid an unwanted pressure increase at decreasing leakage, the airway pressure must thus be limited by an appropriate setting at the knob P_{in} (e.g., 20 mbar, Fig. 5).
   An end inspiratory pressure plateau is formed in the airway pressure curve (Fig. 5). Even with relatively heavy leakage, ventilation is sufficient as long as a plateau exists.

4. Ventilation in case of changes in compliance of the lungs.
   If compliance changes in the lungs have to be expected during ventilation, a different basic setting of the Babylog must be chosen. Proceed as follows:
   With deteriorating compliance, a higher airway pressure is required so that the same volume per breath can be applied.

   An attempt is thus made to obtain an airway pressure curve of the type shown in Fig. 3. In order to limit the airway pressure upwards, the pressure limit P_{in} is set about 5 to 10 mbar above the end inspiratory airway pressure.

   The setting can be checked by pressing the key **12** "Manual inspiration" (Fig. 6).

   If the airway pressure drops, this may be due to an improvement in compliance, but possibly also to leakage at the tube. In this case, proceed in the manner described in Fig. 5.

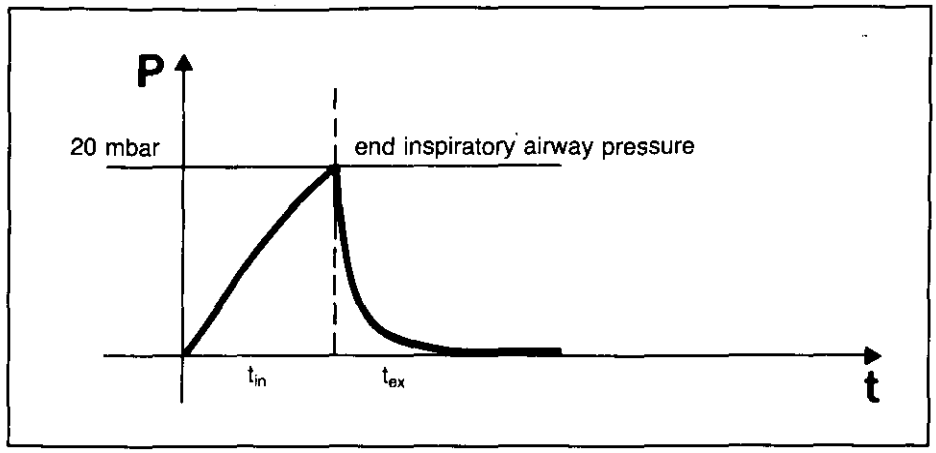

Fig. 3 Airway pressure curve for assumed setting without leakage (pressure limitation P_{in} to "max")

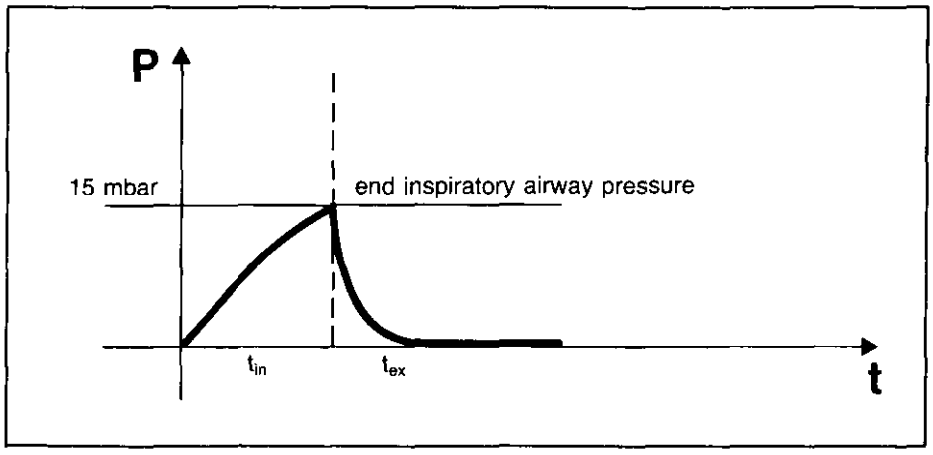

Fig. 4 Airway pressure curve with leakage (cf. Fig. 3)

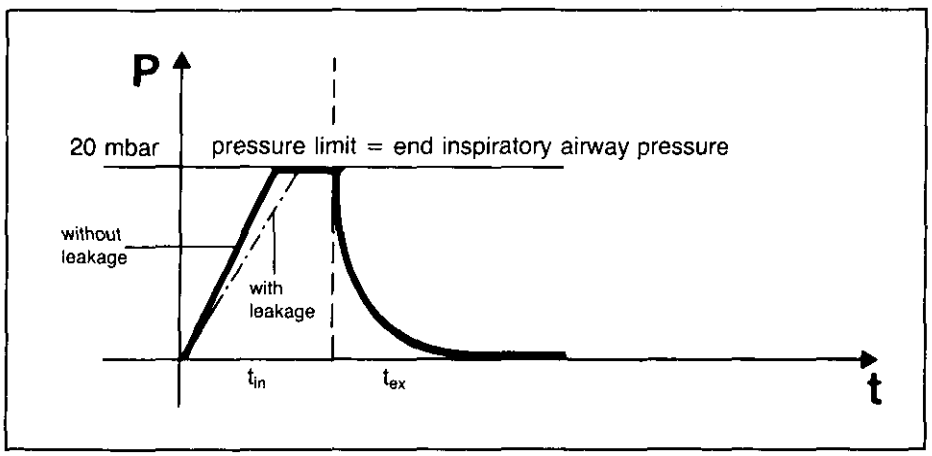

Fig. 5 Airway pressure curve with plateau (cf. Figs. 3 and 4)

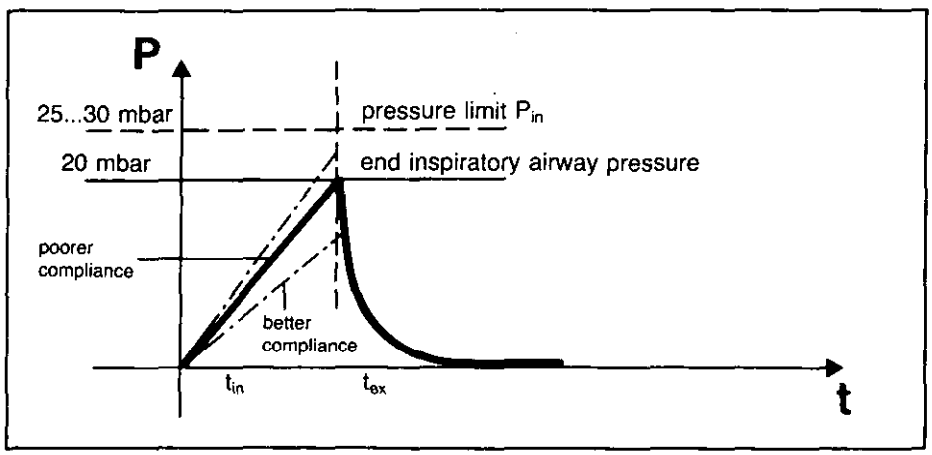

Fig. 6 Setting of the pressure limit P_{in} if changes in compliance of the lungs occur

Respirator Weaning Method IMV

The IMV method consists of the combined application of spontaneous respiration and controlled ventilation. With progressive weaning, the phases of spontaneous respiration are gradually extended, until straight spontaneous breathing (CPAP method) is possible.

Owing to the continuous-flow principle, the Babylog 1 supplies breathing gas even during the expiratory time t_{ex}. If the expiratory time t_{ex} is extended by means of the knob **9**, the patient is given progressively more time for spontaneous respiration.

At the end of the time t_{ex} for the spontaneous breathing, there is **one** controlled ventilation each time.

The parameters for the controlled ventilation are the inspiratory time t_{in} (knob **4**) and the flow (knob **14**). Since both setting variables are not changed, there is a constant mandatory tidal volume throughout the IMV weaning. This volume is applied at gradually increasing intervals (Fig. 7). The IMV rate can also be determined from Fig. 13. There is a small table at the top right, in which the assignment of the IMV rate and the set t_{ex} times is listed. A t_{in} value of 0.7 s for the mandatory tidal volume is included in the calculated IMV rate.

Spontaneous breathing with CPAP

Breathing gas flows continuously to the patient connection during spontaneous breathing (switch **8** in position CPAP), without actuating the expiratory valve.

A reference pressure acts continuously on the expiratory valve to generate a positive airway pressure (CPAP) up to about 10 mbar max. In case of spontaneous breathing with CPAP, the flow setting should be selected in such a manner that the pressure difference shown in Fig. 8 is about $\Delta P = 5$ mbar.

Adjusting aids:

ΔP too small – flow set too high

ΔP too large – flow set too low

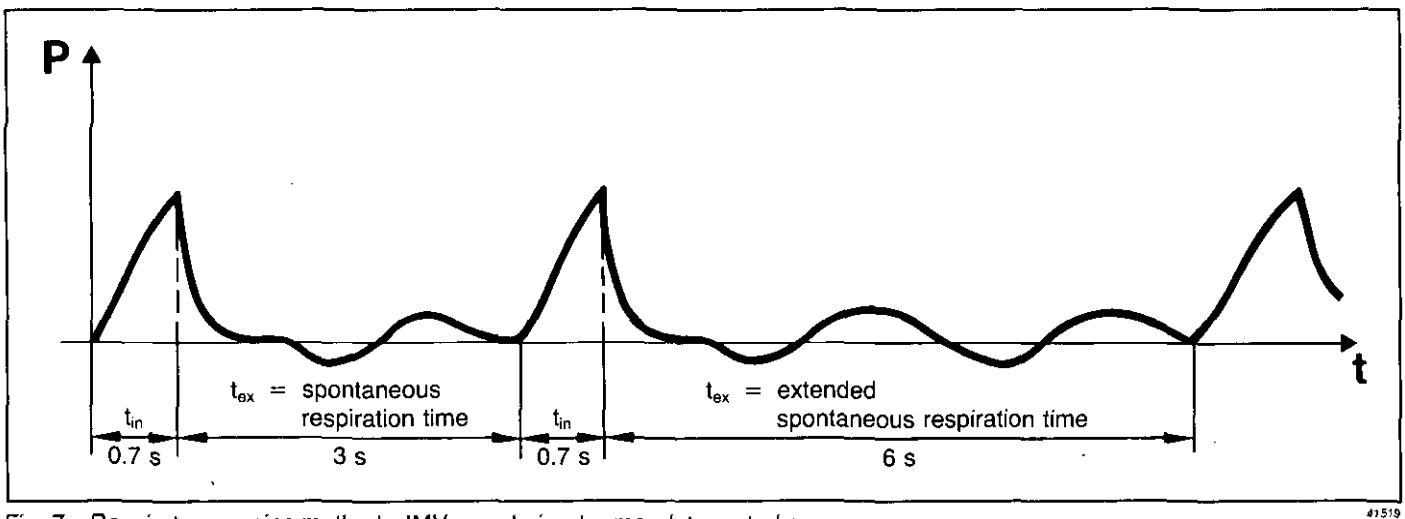

Fig. 7 Respirator weaning method – IMV

during t_{in}: mandatory stroke
during t_{ex}: spontaneous breathing

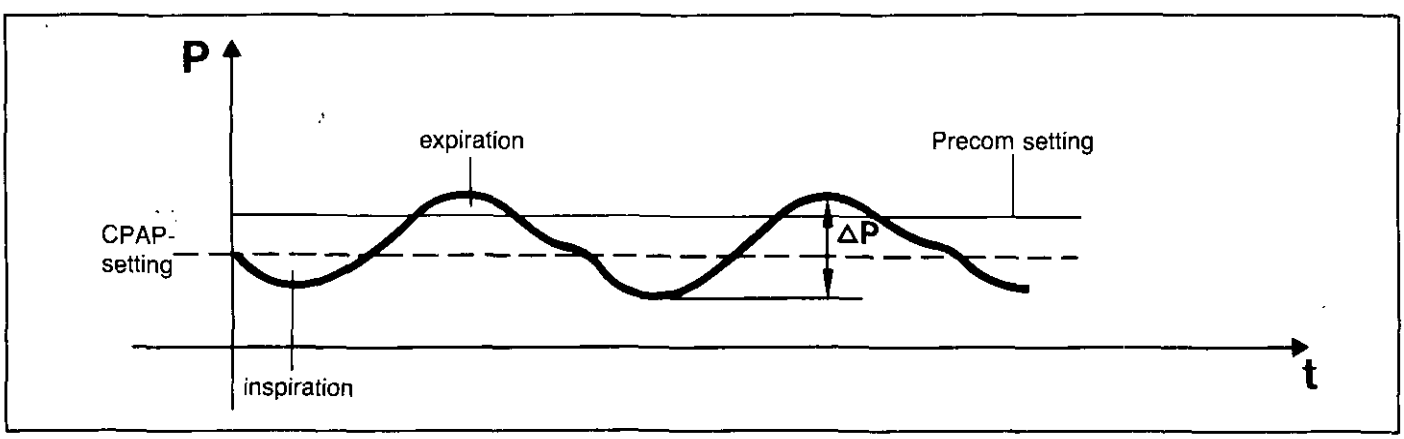

Fig. 8 Precom setting in CPAP

Initial Preparation

Gas supply

(connection of an O_2 blender):

When using the Polymed (Fig. 11)

- O_2 switch **16** to left position.
- Connect the blender outlet to the left screw connection **15** (2 to 6 bar).

When using the flowmeter blender (Fig. 12)

- O_2 switch **16** to right position.
- Connect blender outlet to the right screw connection **17** (< 100 mbar).
- Feed O_2 or compressed air to the left screw connection **15** (2 to 6 bar).

Note!

When a flowmeter blender is used (O_2 switch position **16** to the right), the flow is set **only** at the flowmeter blender. The flow knob **14** on the front of the Babylog 1 is inoperative. The O_2 concentration can be determined by means of the table attached to the blender.

A7

Preparations at the Babylog

Install the expiratory valve **1** in the manner shown in Figs. 9 and 10.

The following humidifiers can be used:
- Aquapor humidifier (included in the accessory set 3) or
- humidifier 19 (included in the accessory set 1, cf. order list).

A plastic sheet is supplied with the respective accessory set. The connection of the humidifier to the Babylog 1 as well as assembly of the entire system of hoses is presented schematically on this sheet; the frequency table is provided on the back of the sheet (cf. Fig. 13).

When the units are mounted on the carriage, the following points must be observed:
- For safety reasons, maintain the sequence Babylog 1, Polymed and finally (from bottom to top) an electrically operated unit (e.g., Barolog A) (cf. Fig. 11).
- Attach the units to one another and to the carriage by means of the securing screws **18** (Fig. 2).

When assembling the system of hoses, note
- that the "Inspiration" outlet of the Babylog 1 is connected to the humidifier inlet (in the Aquapor: nozzle at the top, cf. Fig. 14; in the Humidifier 19: nozzle with the small diameter, cf. Fig. 15),
- that the large water trap is inserted in the expiratory hose,
- that the connection for the hose link to the airway pressure gauge (Barolog A or Precom) is inserted into the cone marked "expiration" of the Babylog expiratory valve,
- that the breathing gas temperature is measured in the inspiratory hose (using the AWT 01 measuring instrument at the Aquapor, cf. Fig. 11).

The airway pressure gauge **5** should be set to 0 mbar.

O_2 switch

Make sure to place the O_2 switch **16** to the correct position as per the illustration on the rear of the unit (depending on the blender connected).

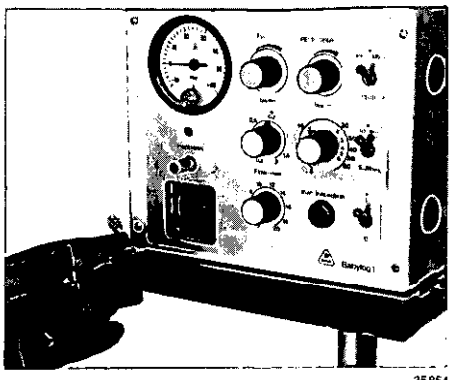

Fig. 9 Expiratory valve **1** with diaphragm

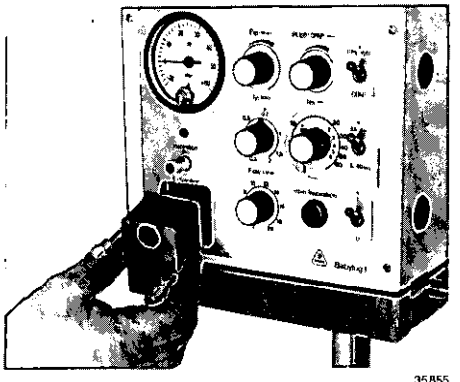

Fig. 10 Expiratory valve 1 being inserted in unit

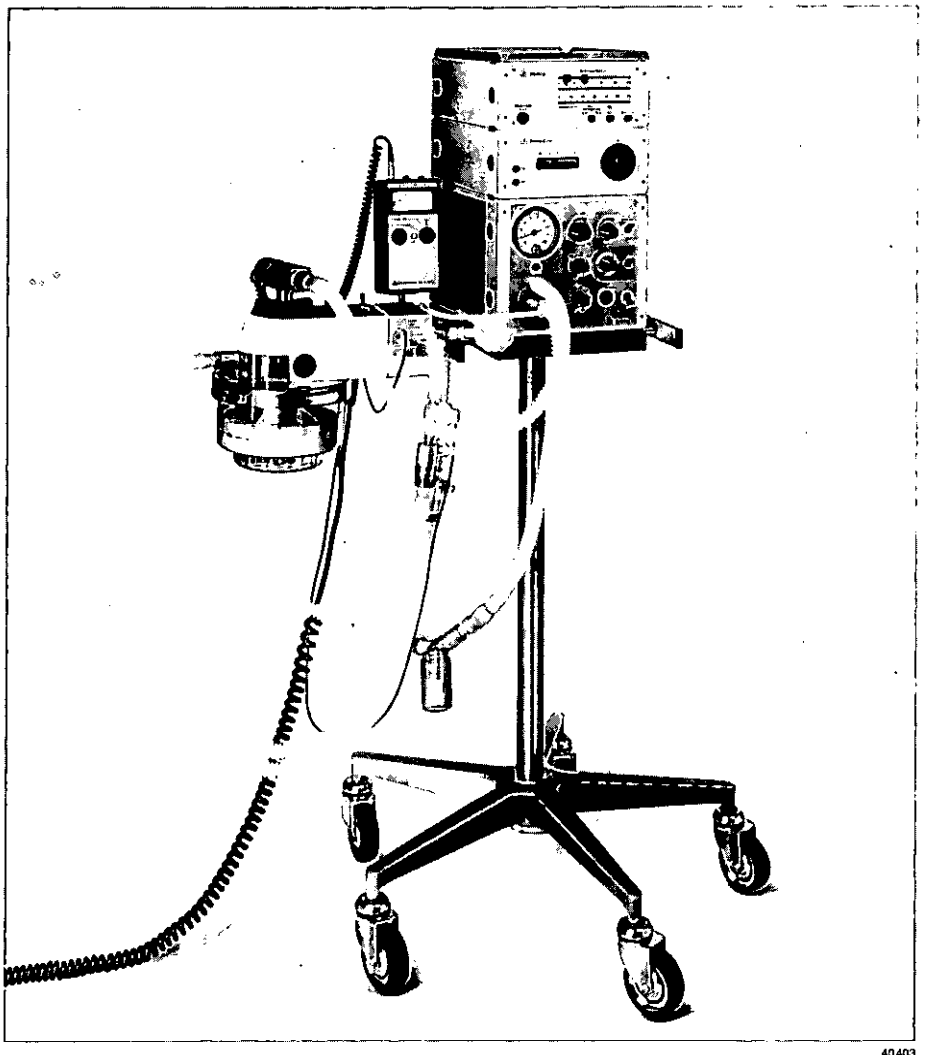

Fig. 11 Babylog 1 on carriage with O_2 blender Polymed, Barolog A, Oxycom 100 D and humidifier Aquapor with AWT 01

Functional check

- Check system for completeness and correct assembly (cf. initial preparation),
- set all knobs and switches to the settings marked by a green dot,
- connect the bellows 84 03 208 to the patient Y piece.
- Leak test:
  knob P_{in} to maximum,
  set flow knob to minimum,
  press manual inspiration **12**,
  the airway pressure display **5** must rise to about 60 mbar; if it does not, there is some leakage in the hose system or humidifier,
- reset all knobs to the green dot,
- the indicated inspiratory pressure should be approx. 20 mbar; the unit should switch from inspiration to expiration at the rate of the ventilation time set. The indicated airway pressure should be <1 mbar during the expiratory phase,
- set the PEEP/CPAP knob **7** to maximum; the PEEP pressure should be approx. 10 mbar,
- set the switch **8** to CPAP; the CPAP value should be about 10 mbar,
- actuate the manual inspiration **12**: the unit should switch to inspiration; the inspiratory pressure should be approx. 20 mbar.

Operation

Operate the unit according to the doctor's instructions. For operating the humidifier, gas blender, airway pressure gauge and O_2 meter, follow the respective operating instructions. Check the breathing gas temperature at the thermometer.

Instrument settings

Controlled ventilation – IPPV

Switch on

Babylog – switch **11** to "1"

Select IPPV – switch **8** to "IPPV" and range selector switch t_{ex} **10** to "0.5 to 6 sec"

The five knobs should be set to values suited for the patient.

Spontaneous breathing with intermittent ventilation – "IMV"

Settings as in "IPPV". If a spontaneous breathing time over 6 seconds is required, the range selector switch t_{ex} **10** must be set to the range "5 to 60 sec", and the knob **9** for the time t_{ex} is set to a desired value on the outer scale of knob **9**.

Spontaneous breathing – "CPAP"

Settings as in "IPPV", but CPAP switch **8** to "CPAP".

Caution! For safety reasons, the knob P_{in} must be set to the green dot during CPAP operation, so that the patient is not given an excessive airway pressure by mistake when a switch to IPPV is made.

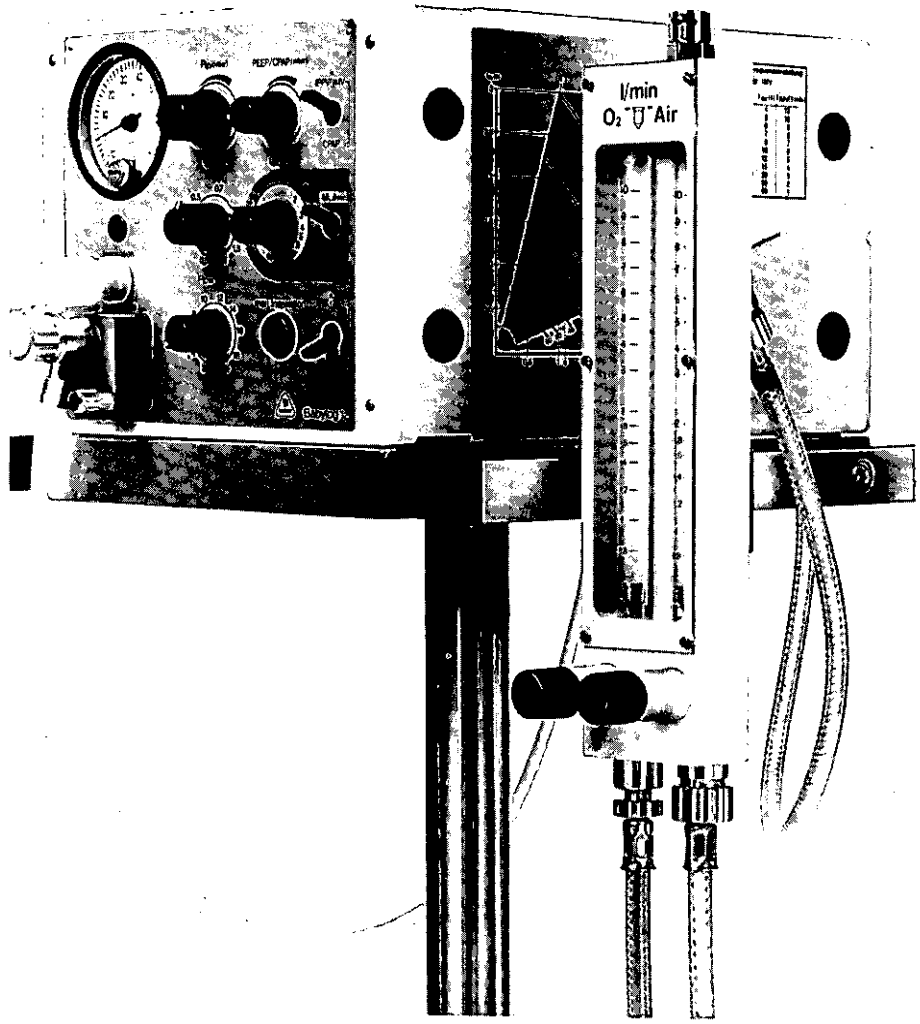

Fig. 12 Babylog 1 with O_2 flowmeter blender

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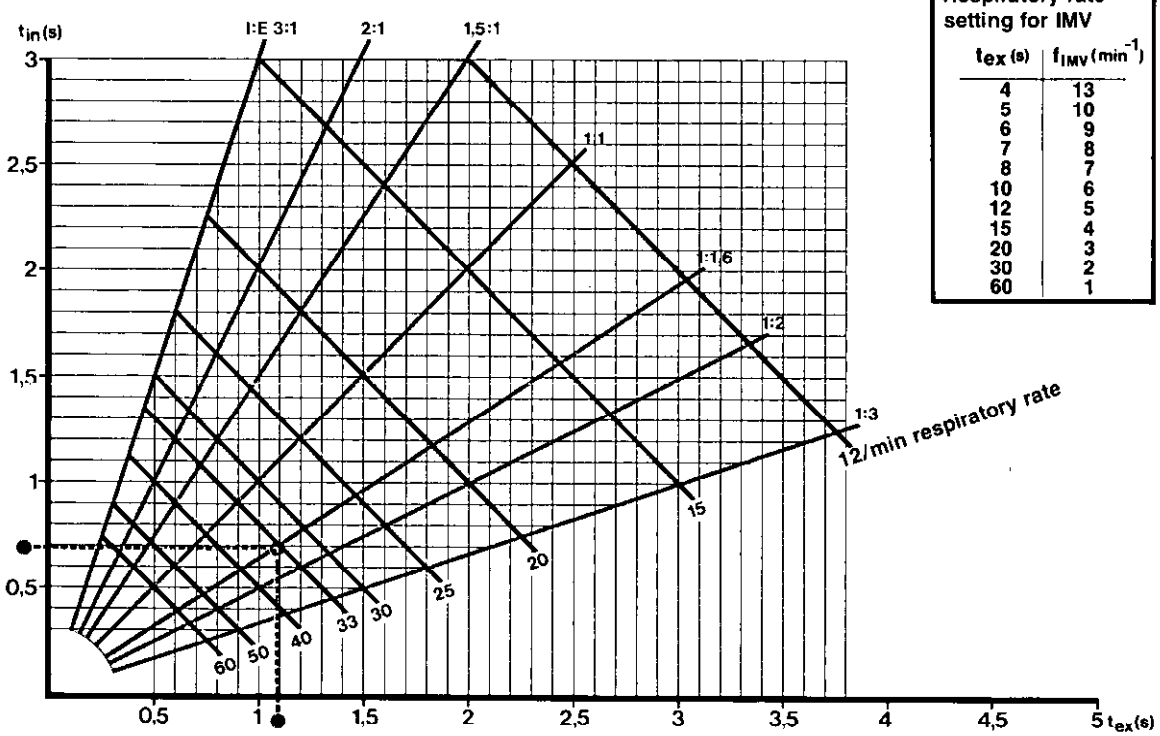

Respiratory rate setting for IMV

t_{ex} (s)	f_{IMV} (min^{-1})
4	13
5	10
6	9
7	8
8	7
10	6
12	5
15	4
20	3
30	2
60	1

Fig. 13 Frequency table

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A9

Manual inspiration
Since the manual inspiration can be triggered in IPPV as well as in IMV and CPAP, the knobs P_{in} and t_{in} in particular should remain set to values suited to the patient even during CPAP.

Setting of the airway pressure gauge with alarm device – Precom in IPPV/IMV
The Precom has a large knurled setting ring. When this ring is turned, a red pointer marker (lower limit) moves along above the scale. This red pointer should be set to a value which is approx. 3 mbar below the peak inspiratory airway pressure. If this pressure drops to a value below the set limit value because of a disconnection, an acoustic alarm is sounded after about 15 seconds. The alarm goes off as soon as an airway pressure has been built up which is higher than the limit value (red mark).
Note: In case of IMV, the Precom sounds an alarm *in case of expiratory times* t_{ex} *in* excess of 15 seconds, even if there is no disconnection.

Precom setting in CPAP
An airway pressure curve in case of spontaneous breathing with CPAP is shown in Fig. 8.
The red pointer of the Precom should be set approx. 1 mbar below the maximum airway pressure value (pointer indication) of expiration.
In order to check the correct Precom setting, the patient's hose system can be disconnected at any desired point. An alarm must be sounded after 15 seconds.
Setting aid: If the airway pressure curve does not display in spontaneous breathing the pressure differences between inspiration and expiration shown in Fig. 8 (ΔP should be approx. 5 mbar), the flow setting **14** may have been set too high and should be somewhat reduced.

Care

Dismantling
After ventilation the equipment should be taken apart as follows:
- Disconnect all hose connections,
- Dismantle the expiratory valve **1** by unscrewing the two knurled screws,
- Remove the diaphragm.

Care and maintenance of the humidifier are described separately in the enclosed operating manual.

Note!
The thermometer in the patient hose system is to be checked for proper function after each cleaning operation: Compared with room temperature, the indicator must not deviate by more than 1°C below or 2°C above room temperature. Use a calibrated thermometer!

Cleaning
All dismantled parts are to be subjected to a thorough cleaning in running water. Afterwards, all parts are to be dried (Dräger 2 M 8220 Drying Unit). By drying, bacterial growth and corrosion are minimized. Dirt on the unit can be removed with a damp cloth impregnated with a normal detergent (wetting agent).

Disinfection in the Aseptor
The unit is to be prepared for disinfection as described under "Cleaning". The unit and small component parts have to be dry, because unpleasant odours may otherwise result after disinfection. Electrically operated units, like the humidifier, must have been out of operation at least 1½ hours before disinfection and must have cooled off, otherwise the condensation effect will not be perfect and disinfection will be questionable. The cleaned parts are then placed on the drainer of the Aseptor.
The cleaned and dried connection hoses are pushed over the suction nozzles in the Aseptor.
Place the Babylog 1, humidifier and carriage in the Aseptor. Before being reused on a patient, correct functioning of the unit must be ascertained in the manner described in the chapter "Functional Check".

Steam sterilization
The ventilation unit itself and the thermometer are **not** sterilizable in an autoclave. All other parts (patient system including expiratory valve **1**) can be sterilized in superheated steam up to 134°C. These parts must be prepared for *steam sterilization as described under* "dismantling" and "cleaning".

Note!
Any superheated steam sterilization subjects enamelled surfaces to severe stress and affects their appearance. The natural aging process of rubber parts is accelerated, and their working life shortened.

Maintenance, Inspection

The rubber diaphragm of the expiratory valve should be inspected regularly for cracks if it is frequently steam sterilized in an autoclave and should be replaced every six months. No other maintenance work is necessary on the part of the clinic staff, apart from normal care and cleaning. The unit should be inspected and serviced twice a year by trained personnel.

Trouble Shooting

Before a possible breakdown of the unit can be analyzed, check to see if the supply gases are available at the prescribed pressure (2 to 6 bar). Especially if operated with an O_2 blender, correct functioning of this blender should be checked; in case of operation with a flowmeter blender, make sure connection **15** at the Babylog 1 is supplied with compressed gas (drive gas oxygen: 2 to 6 bar).

Fault	Cause	Remedy
Airway pressure build up unsatisfactory	Leakage in system	Check all hose and plug connections. Check humidifier system. Check expiratory valve diaphragm for correct fit and satisfactory condition.
In the case of control defects, the Drägerwerk AG Technical Customer Service should be contacted		

Order List

Name and description	**Order No.**
Basic unit **Babylog 1**	**84 03 300**
Accessories required for operation	
A. Humidification	
1. ***Accessory set 3 Aquapor*** comprising complete hose system, 5 cannulas and bellows K, Aquapor	***84 05 820***
2. **Accessory set 1 Humidifier 19** comprising complete hose system, 6-stage supply unit, 5 cannulas and bellows K, *Humidifer 19*	**84 05 130**
Replacement parts for sterilization:	
Replacement set Aquapor	**84 06 110**
Replacement set Humidifer 19	**84 05 033**
B. O_2/compressed air blending	
1. **Polymed 201 gas blender**	**D 21000**
Connecting hose (Polymed to Babylog 1) (dispensed with if the medicaments nebulizer 84 05 804 or 84 05 806 is ordered)	**84 03 343**
2. Flowmeter blender	**M 24664**
T hose	**84 03 555**
Connecting hose (blender to Babylog 1)	**84 03 591**
O_2 and compressed air connecting hoses:	
O_2 connecting hose, 3 m	**M 22344**
O_2 connecting hose, 5 m	**M 22345**
Compressed air connecting hose, 3 m	**M 23193**
Compressed air connecting hose, 5 m	**M 23235**
C. Placement of the Babylog 1	
1. Babylog 1 with Aquapor	
Carriage	***84 05 759***
Hinged arm (required only for ventilation outside the incubator)	**84 01 860**
or	
Wall-mounted rail console with drawer	**2 M 18285**
2. Babylog 1 with Humidifer 19	
Carriage	**84 05 759**
Holder (for Humidifer 19)	**84 06 299**
or	
Wall-mounted rail console with drawer	**2 M 18285**
Holder (for Humidifier 19)	***84 06 299***
Accessories recommended for monitoring	
A. For continuous measurement and monitoring of O_2 in gas inhaled:	
Oxycom 100 D with cable, sensor housing and sensor cable	**68 03 255**
Accessories required for connection:	
O_2 meter holder	
O_2 measurement set	**2 M 17770**
– for **Aquapor**	**84 05 754**
– for **Humidifier 19**	**84 03 370**
B. For continuous measurement and monitoring of the airway pressure:	
1. **Barolog A** Device for measuring and monitoring the ventilation pressure in respiratory systems and for determining the ventilation frequency. With optical and audible *alarm in case of disconnection or obstruction*	**83 02 930**
Adapter Barolog A – Babylog 1	**84 05 260**
2. **Airway pressure gauge with alarm 'Precom'** Audible alarm if a set pressure is not reached within 15 seconds	**E 9711**
Precom holder	***84 05 220***

Name and description	**Order No.**
C. For continuous measurement and monitoring of the inspiratory breathing gas temperature	
AWT 01 with adjustable upper limit and audible alarm	**84 05 370**
Temperature sensor	**84 05 371**
Battery	**13 35 817**
Also *required:*	
Accessory set for Babylog 1 (Aquapor)	**84 05 876**
or	
Accessory set for Babylog 1 (Humidifier 19)	**84 05 874**
Special accessories	
Medicaments nebulizer (for Aquapor)	**84 05 804**
Medicaments nebulizer (for Humidifier 19)	**84 05 806**
Depositing tray 0.5 B can be attached to *Polymed 201, Barolog A or other* Dräger monitors	**2 M 17680**

Subject to modifications!

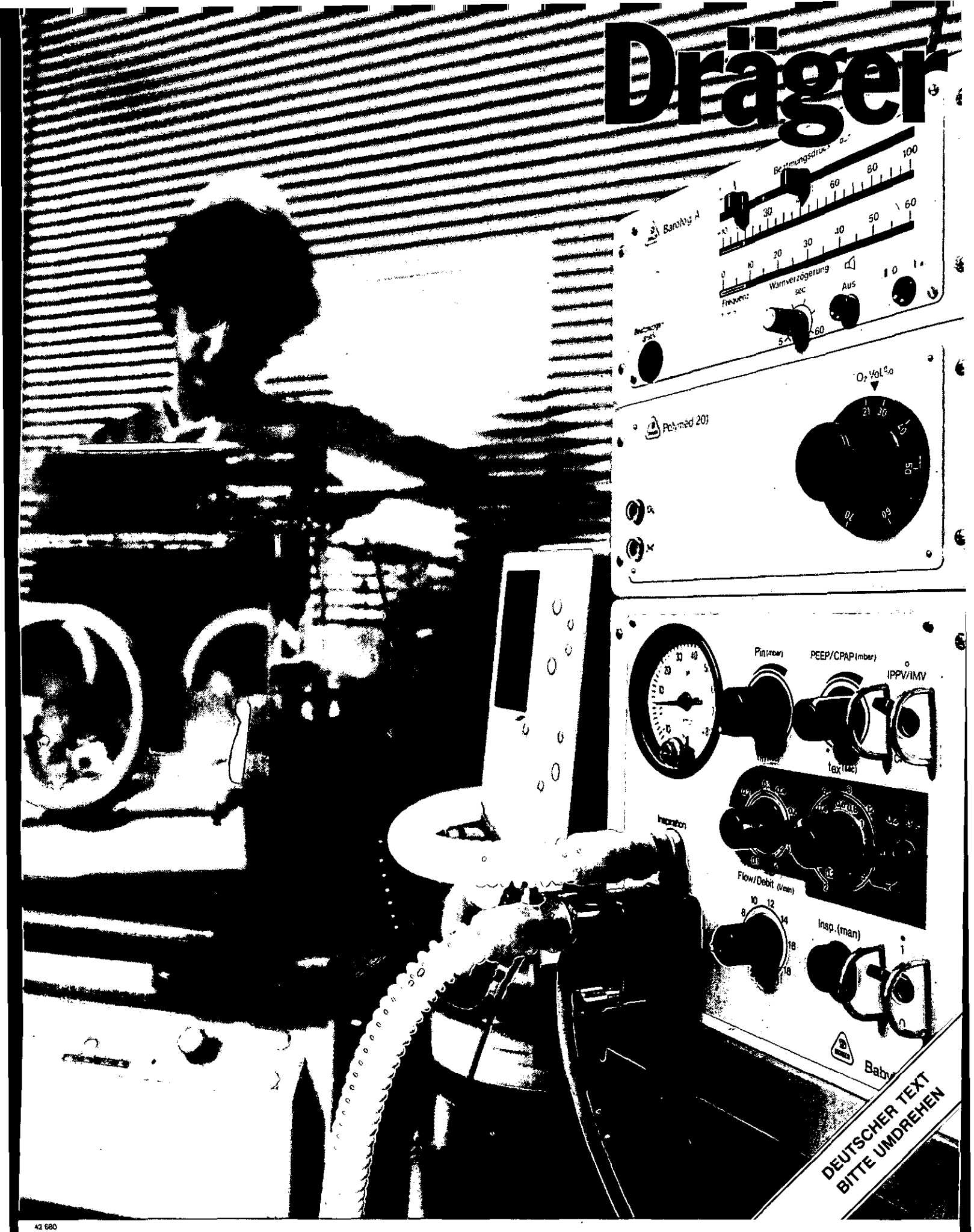
Parts list

(cf. Fig. 14)

No. in Fig. 14	***Name***	***Order No.***
1	**Babylog 1 complete**	**84 03 300**
2–24	**Accessory set 3** (Aquapor)	**84 05 820**
2	**Clamp set**	**84 03 345**
3	**Filling kit**	**84 05 031**
4	**Bellows K**	**84 03 208**
5	**Aquapor**	**84 05 020**
6–24	**Babylog 1 hose system**	**84 05 805**
6	**Diaphragm** (set of 5)	**84 03 945**
7	***Cover, expiratory valve***	***84 03 943***
8	**Bolt, washer** (set of 2)	**84 03 944**
9	**Instructions** for assembling the Babylog 1 and Aquapor	**84 05 822**
10	**Silicone hose K, 60 cm**	**84 03 073**
11	**Cone 22a**	**84 05 752**
12	**Catheter sleeve size 9**	**M 19347**
13	**Catheter sleeve size 11**	**M 19351**
13–24	**Patient connection K**	**84 05 808**
14	**Silicone hose K, 35 cm**	**84 03 070**
15	**Water trap**	**84 04 985**
16	**Silicone hose K, 1 m**	**84 03 080**
17	**Condensate trap**	**84 04 760**
18	**Corrugated hose**	**84 03 333**
19	**Adapter K 90°**	**84 03 075**
20	**Set of caps** (set of 5)	**84 02 953**
21	**Thermometer**	**2 M 13259**
22	**Adapter T**	**84 03 056**
23	**Hose clamp**	**84 05 768**
24	**Set of catheter sleeves** (set of 9)	**84 03 684**
25	**O_2 connection**	**84 05 754**
26	**Adapter**	**84 05 023**

Subject to modifications!

Dräger



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OPERATING MANUAL

Babylog 1 Ventilator

A 12

From Dräger: Babylog 1 Ventilator

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 Organization or where it has been used in a manner which does not conform to the normal conditions of use.
7 For reasons of safety, pressure reducers should be overhauled at least every 6 years.
8 The oxygen blender is to be overhauled every 4 years for safety reasons.
9 This device is intended only for use in areas without danger of explosion.

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

DRÄGERWERK AG LÜBECK

We would like to point out the recommendations of DGAI (Deutsche Gesellschaft für Anaesthesie und Intensivmedizin, or German Association for Anaesthesia and Intensive Care Medicine) which urge that a manual ventilator should be available which is independent of the automatic ventilator and ensures ventilation of the patient with ambient air. If the vital function is no longer ensured in case of a recognizable fault of the ventilator, ventilation of the patient with the separate manual ventilator must be started without delay, if necessary with PEEP and/or a higher inspiratory O_2 concentration (cf. operating instructions for the manual ventilator).

Contents

A 13

Intended Use

Clinical ventilator for premature and newborn babies and infants up to 2 years, corresponding to 15 kg body weight, to carry out IPPV, CPAP or IMV, with integrated PEEP valve.

Key to abbreviations used

MV = Minute volume (L/min)

CPAP = Continuous Positive Airway Pressure

IPPV = Intermittent Positive Pressure Ventilation

IMV = Intermittent Mandatory Ventilation

PEEP = Positive Endexpiratory Pressure

Technical Data

Control principle	continuous flow
Inspiration start	time-controlled or manual start
Expiration start	time-controlled
Inspiratory pressure characteristics	linear pressure increase with possibility of continuous plateau adjustment
Expiratory pressure PEEP/CPAP	endexpiratory pressure from 0 to 10 mbar
Airway pressure adjustment during inspiration P_{in}	continuous from 10 to 60 mbar plateau pressure; pressure indication by pressure gauge, pick-up in expiration section
Inspiratory flow and expiratory flow for IPPV, IMV or CPAP	continuous from 2 to 20 L/min
Inspiratory time t_{in}	continuous from 0.3 to 2 seconds
Expiratory time t_{ex}	continuous from 0.5 to 6 seconds or continuous from 5 to 60 seconds (depending on the position of the range selector switch t_{ex})
Oxygen concentration	via O_2 blender
Drive gas, operating pressure	dry compressed air, free of oil and dust, or O_2 (2 to 6 bar) from a central supply system
Connecting an O_2 blender a) Using Dräger Polymed (Fig. 11): An intake pressure of between 2 and 6 bar must be ensured at the left connection **15**. The O_2 blender must be capable of supplying at least 20 L/min on a continuous basis	O_2 switch **16** to left
b) Using the blending device with flowmeter unit (Fig. 12): Connect the outlet of the flowmeter unit to the right connection **17** (intake pressure < 100 mbar) **In order to ensure the control function of the device, it is necessary to feed O_2 (2 to 6 bar) to the device through the left-hand screw connection 15 (see rear of unit)**	O_2 switch **16** to right
Compressed-gas consumption	Since the unit operates on the continuous flow principle, gas consumption does not depend on the MV, but matches the set flow directly (flow knob)
IPPV-IMV/CPAP switch	for IPPV-IMV or continuous flow (CPAP)
"Manual inspiration" button	for starting manual inspiration and "inflation hold"
The settings to the green dot correspond to the following values:	
Inspiratory pressure limit P_{in}	approx. 20 mbar
Expiratory pressure PEEP/CPAP	0 mbar
Inspiratory time t_{in}	approx. 0.7 s
Expiratory time t_{ex} with range selector switch in position "0.5 to 6 s"	approx. 1.1 s
Weight	approx. 5 kg

What's What?

(Figs. 1 and 2)

1 Expiratory valve (removable)
2 Expiration nozzle
3 Inspiration nozzle
4 Knob for inspiratory time t_{in}
5 Airway pressure gauge
6 Inspiratory pressure *limit* P_{in}
7 Expiratory pressure PEEP/CPAP
8 Switch IPPV-IMV/CPAP
9 Knob for expiratory time t_{ex}
10 Range selector switch t_{ex}
11 Switch (On/Off)
12 Key for manual inspiration
13 Carriage
14 Flow knob
15 Connection M 15 × 1 for
   a) mixed gas: compressed air/O_2, 2 to 6 bar (from Polymed blender)
   b) O_2 (or compressed air), 2 to 6 bar as drive gas (if mixed gas is fed from the flowmeter blender via connection **17**)
16 Selector switch for O_2 blender
17 Connection M 16 × 1.5 for mixed gas: compressed air/O_2 (< 100 mbar)
18 Retaining screws

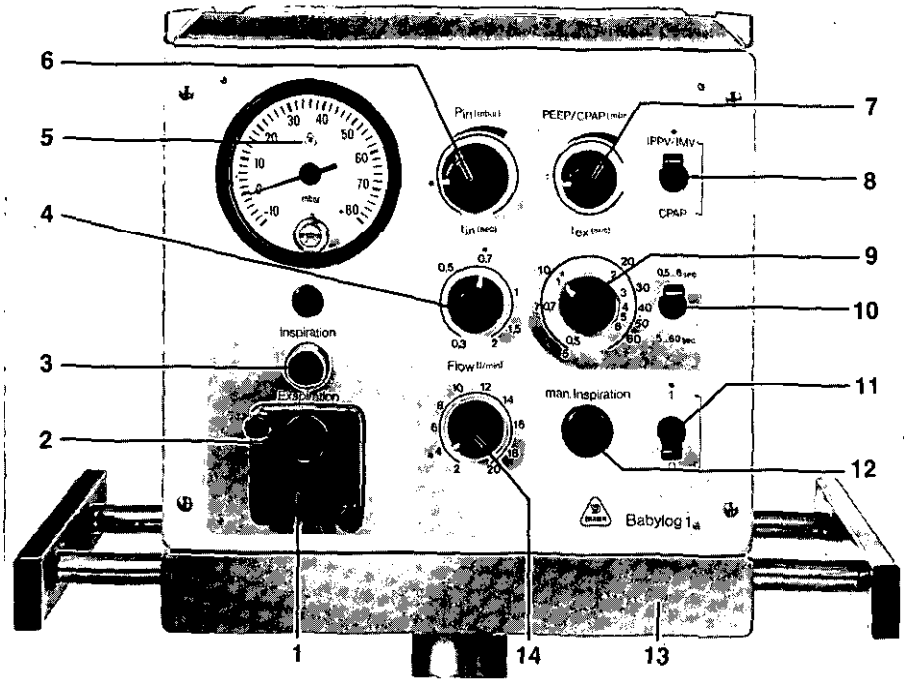

Fig. 1 Front view of Babylog 1

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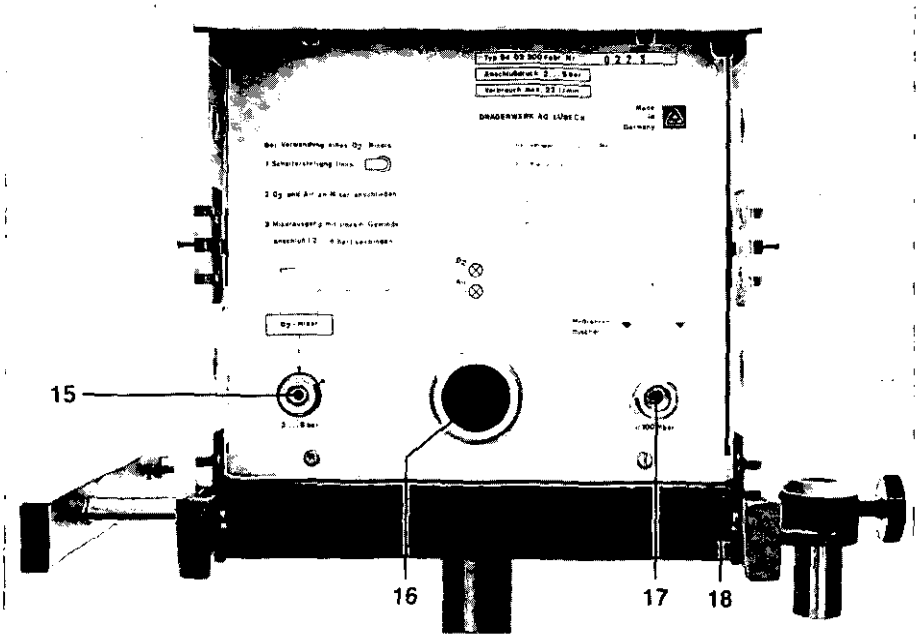

Fig. 2 Rear view of Babylog 1

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Functioning Principle of Babylog 1

The Babylog 1 is a continuous-flow unit, i.e., respiratory gas flows **continuously** from the inspiratory nozzle of the Babylog 1 into the hose system (in contrast to the "intermittent operation" in a flow chopper, such as the Babylog 2), through the Y piece to the patient, and back to the expiratory valve. The inspiratory and expiratory phases are generated when the expiratory valve closes and opens.

During inspiration, the expiratory valve is actuated by a pneumatic signal of **low** pressure level. Thus auscultation is not disturbed by a sound wave caused by the pneumatic signal.

The PEEP function is also implemented by activating the expiratory valve by means of a pneumatic signal of very low pressure level (in the range of the PEEP) during the expiratory phase.

The pressure limiting valve (P_{in}) is installed in the unit in the inspiration section so that the patient is protected from unduly high pressure, e.g., when a hose is kinked.

Controlled ventilation – IPPV

The ventilation rate and I:E phase time ratio are provided by presetting the inspiration (t_{in}) and expiration (t_{ex}) times which can be set separately.

The frequency table shown in Fig. 13 to determine the ventilation rate and *I:E* ratio is located on the right side of the Babylog 1. Example: For a setting corresponding to the green dots, with t_{in} = 0.7 s and t_{ex} = 1.1 s, the ventilation rate is f = 33/min, and the breathing time ratio has the value 1:1.6. The inspiration pressure limitation P_{in} can be varied continuously between 10 and 60 mbar, thus making it possible to set a plateau in the ventilation pressure curve or to set a safety pressure.

Flow

The flow can be set between 2 and 20 L/min. The gas flows continuously: to the patient during inspiration, through the expiratory valve to the outside during expiration. Measurement of the patient's volumetric parameters, e.g., by means of a Spirolog or volumeter, is not possible due to the continuous-flow principle.
However, the method described below allows for easy presetting of the Babylog 1.

Assumption:

Patient	neonate
Body weight (BW)	3 kg
Specific respiratory volume (V)	10 m L / kg BW
Ventilation rate (f)	35/min
I:E phase time ratio	1:1

B 1

Flow setting

- Tidal volume V_T = BW × V = 30 mL
- Minute volume MV = V_T × f = 1.05 L/min
- Flow = MV × (I + E) = 1.05 × 2 = 2.1 L/min.

For a selected I:E ratio = 1:1.5, the flow is calculated as follows:
flow = 1.05 × 2.5 = 2.6 L/min.

The settings of the ventilation patterns in the Babylog 1 can be classified as follows:

1. Ventilation without assumed leakage and without pressure limitation. The calculated and set flow leads to an end inspiratory pressure at the end of the set inspiratory time, if there is no leakage. The end inspiratory pressure depends on the compliance and resistance of the patient's lungs (Fig. 3).

2. Ventilation with leakage (a ventilation gas loss of up to 50% may occur due to leakage at the tube). Any leakage results in a lower volume per breath; the end inspiratory airway pressure is reduced at the same time (Fig. 4).

3. Ventilation with higher flow setting to compensate the leakage, with inspiratory pressure limitation P_{in}. A greater flow is selected to compensate the ventilation gas losses at, for instance, the tube. In order to avoid an unwanted pressure increase at decreasing leakage, the airway pressure must thus be limited by an appropriate setting at the knob P_{in} (e.g., 20 mbar, Fig. 5).
   An end inspiratory pressure plateau is formed in the airway pressure curve (Fig. 5). Even with relatively heavy leakage, ventilation is sufficient as long as a plateau exists.

4. Ventilation in case of changes in compliance of the lungs.
   If compliance changes in the lungs have to be expected during ventilation, a different basic setting of the Babylog must be chosen. Proceed as follows:
   With deteriorating compliance, a higher airway pressure is required so that the same volume per breath can be applied.

   An attempt is thus made to obtain an airway pressure curve of the type shown in Fig. 3. In order to limit the airway pressure upwards, the pressure limit P_{in} is set about 5 to 10 mbar above the end inspiratory airway pressure.

   The setting can be checked by pressing the key **12** "Manual inspiration" (Fig. 6).

   If the airway pressure drops, this may be due to an improvement in compliance, but possibly also to leakage at the tube. In this case, proceed in the manner described in Fig. 5.

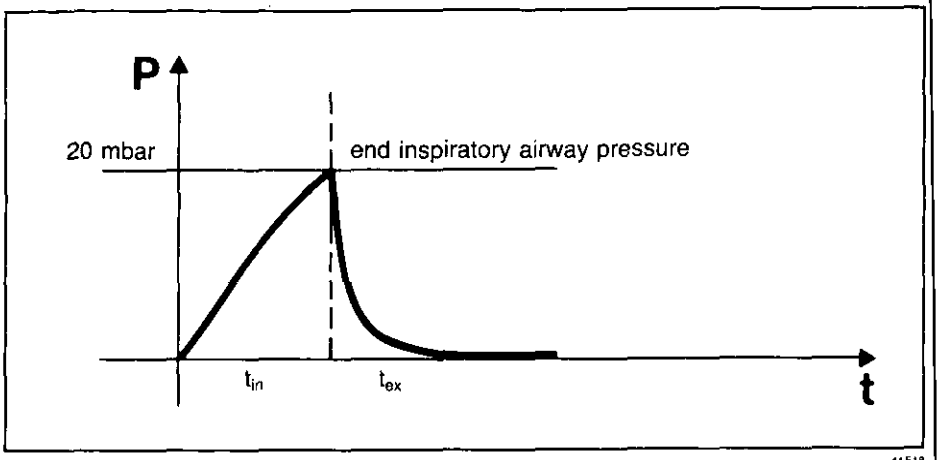

Fig. 3 Airway pressure curve for assumed setting without leakage (pressure limitation P_{in} to "max")

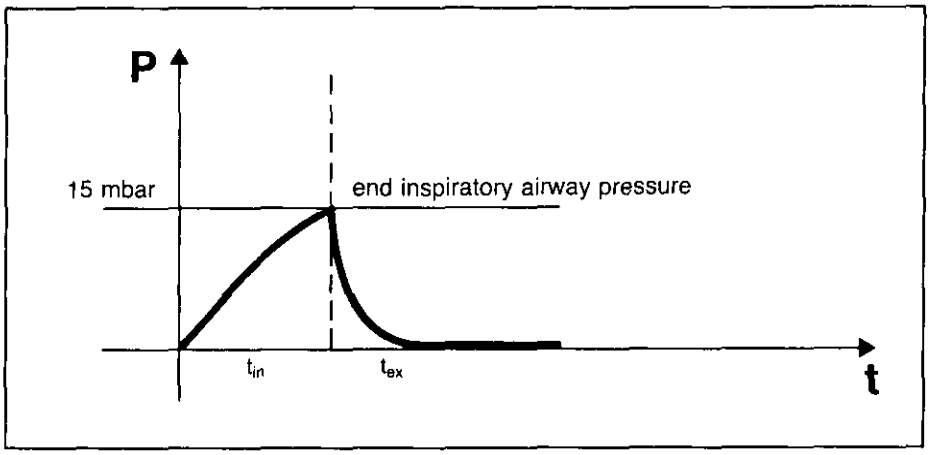

Fig. 4 Airway pressure curve with leakage (cf. Fig. 3)

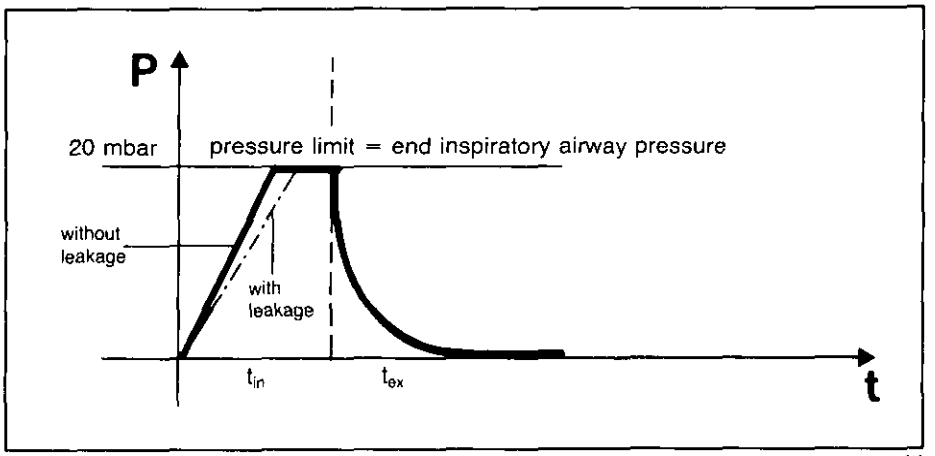

Fig. 5 Airway pressure curve with plateau (cf. Figs. 3 and 4)

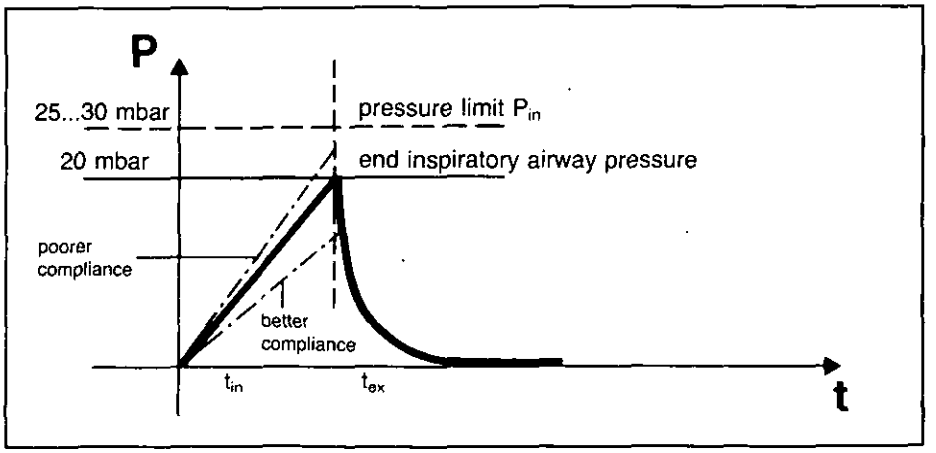

Fig. 6 Setting of the pressure limit P_{in} if changes in compliance of the lungs occur

Respirator Weaning Method IMV

The IMV method consists of the combined application of spontaneous respiration and *controlled ventilation. With progressive* weaning, the phases of spontaneous respiration are gradually extended, until straight spontaneous breathing (CPAP method) is possible.

Owing to the continuous-flow principle, the Babylog 1 supplies breathing gas even during the expiratory time t_{ex}. If the expiratory time t_{ex} is extended by means of the knob **9**, the patient is given progressively more time for spontaneous respiration.

At the end of the time t_{ex} for the spontaneous breathing, there is **one** controlled ventilation each time.

The parameters for the controlled ventilation are the inspiratory time t_{in} (knob **4**) and the flow (knob **14**). Since both setting variables are not changed, there is a constant mandatory tidal volume throughout the IMV weaning. This volume is applied at gradually increasing intervals (Fig. 7). The IMV rate can also be determined from Fig. 13. There is a small table at the top right, in which the assignment of the IMV rate and the set t_{ex} times is listed. A t_{in} value of 0.7 s for the mandatory tidal volume is included in the calculated IMV rate.

Spontaneous breathing with CPAP

Breathing gas flows continuously to the patient connection during spontaneous breathing (switch **8** in position CPAP), without actuating the expiratory valve.

A reference pressure acts continuously on the expiratory valve to generate a positive airway pressure (CPAP) up to about 10 mbar max. In case of spontaneous breathing with CPAP, the flow setting should be selected in such a manner that the pressure difference shown in Fig. 8 is about $\Delta P \approx 5$ mbar.

Adjusting aids:

ΔP too small – flow set too high

ΔP too large – flow set too low

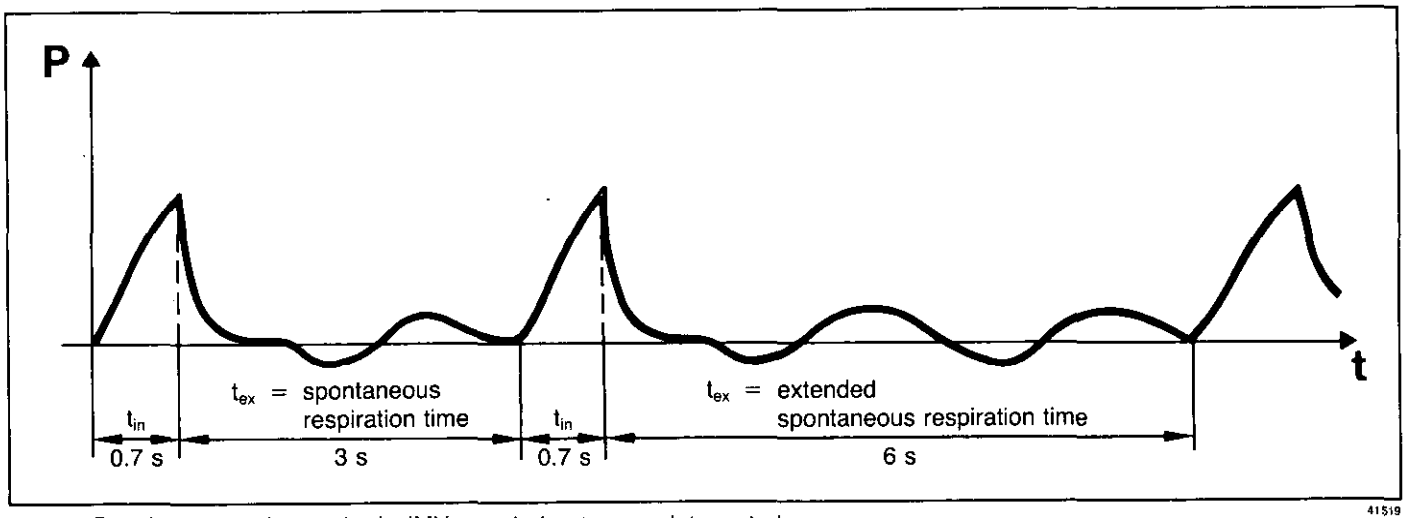

Fig. 7 Respirator weaning method – IMV

during t_{in}: mandatory stroke
during t_{ex}: spontaneous breathing

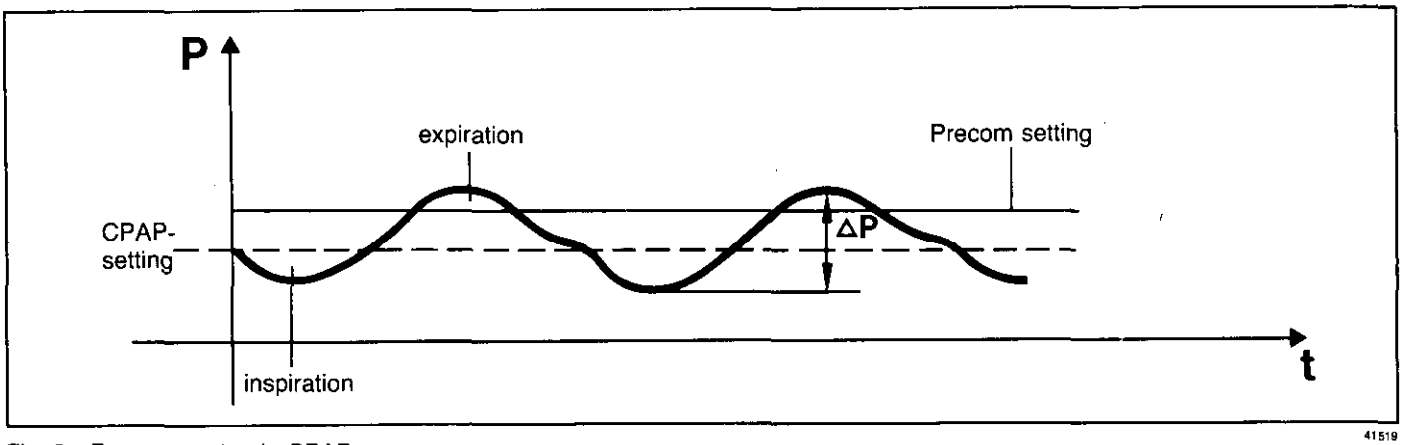

Fig. 8 Precom setting in CPAP

Initial Preparation

Gas supply

(connection of an O_2 blender):

When using the Polymed (Fig. 11)

- O_2 switch **16** to left position.
- Connect the blender outlet to the left screw connection **15** (2 to 6 bar).

When using the flowmeter blender (Fig. 12)

- O_2 switch **16** to right position.
- Connect blender outlet to the right screw connection **17** (< 100 mbar).
- Feed O_2 or compressed air to the left screw connection **15** (2 to 6 bar).

Note!

When a flowmeter blender is used (O_2 switch position **16** to the right), the flow is set **only** at the flowmeter blender. The flow knob **14** on the front of the Babylog 1 is inoperative. The O_2 concentration can be determined by means of the table attached to the blender.

BB

Preparations at the Babylog

Install the expiratory valve **1** in the manner shown in Figs. 9 and 10.

The following humidifiers can be used:
- Aquapor humidifier (included in the *accessory set 3) or*
- humidifier 19 (included in the accessory set 1, cf. order list).

A plastic sheet is supplied with the respective accessory set. The connection of the humidifier to the Babylog 1 as well as assembly of the entire system of hoses is presented schematically on this sheet; the frequency table is provided on the back of the sheet (cf. Fig. 13).

When the units are mounted on the carriage, the following points must be observed:
- For safety reasons, maintain the sequence Babylog 1, Polymed and finally (from bottom to top) an electrically operated unit (e.g., Barolog A) (cf. Fig. 11).
- Attach the units to one another and to the carriage by means of the securing screws ***16*** *(Fig. 2)*.

When assembling the system of hoses, *note*
- that the "Inspiration" outlet of the Babylog 1 is connected to the humidifier inlet *(in the Aquapor: nozzle at the top, cf.* Fig. 14; in the Humidifier 19: nozzle with the small diameter, cf. Fig. 15),
- that the large water trap is inserted in the expiratory hose,
- that the connection for the hose link *to the airway pressure gauge (Barolog A or Precom) is inserted into* the cone marked "expiration" of the Babylog expiratory valve,
- that the breathing gas temperature is measured in the inspiratory hose (using the AWT 01 measuring instrument at the Aquapor, cf. Fig. 11).

The airway pressure gauge **5** should be set to 0 mbar.

O_2 switch

Make sure to place the O_2 switch **16** to the correct position as per the illustration on the rear of the unit (depending on the blender connected).

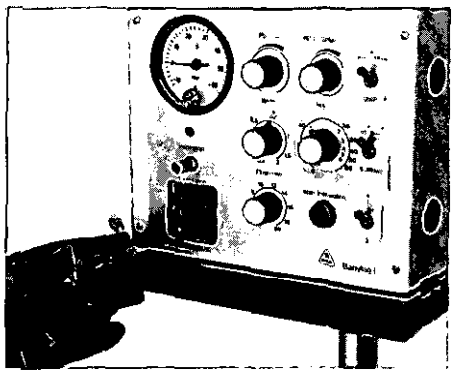

Fig. 9 Expiratory valve **1** *with diaphragm*

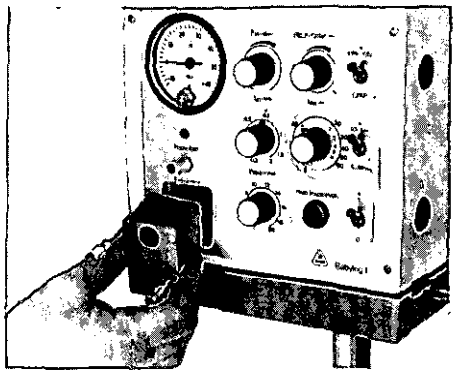

Fig. 10 Expiratory valve **1** being inserted in unit

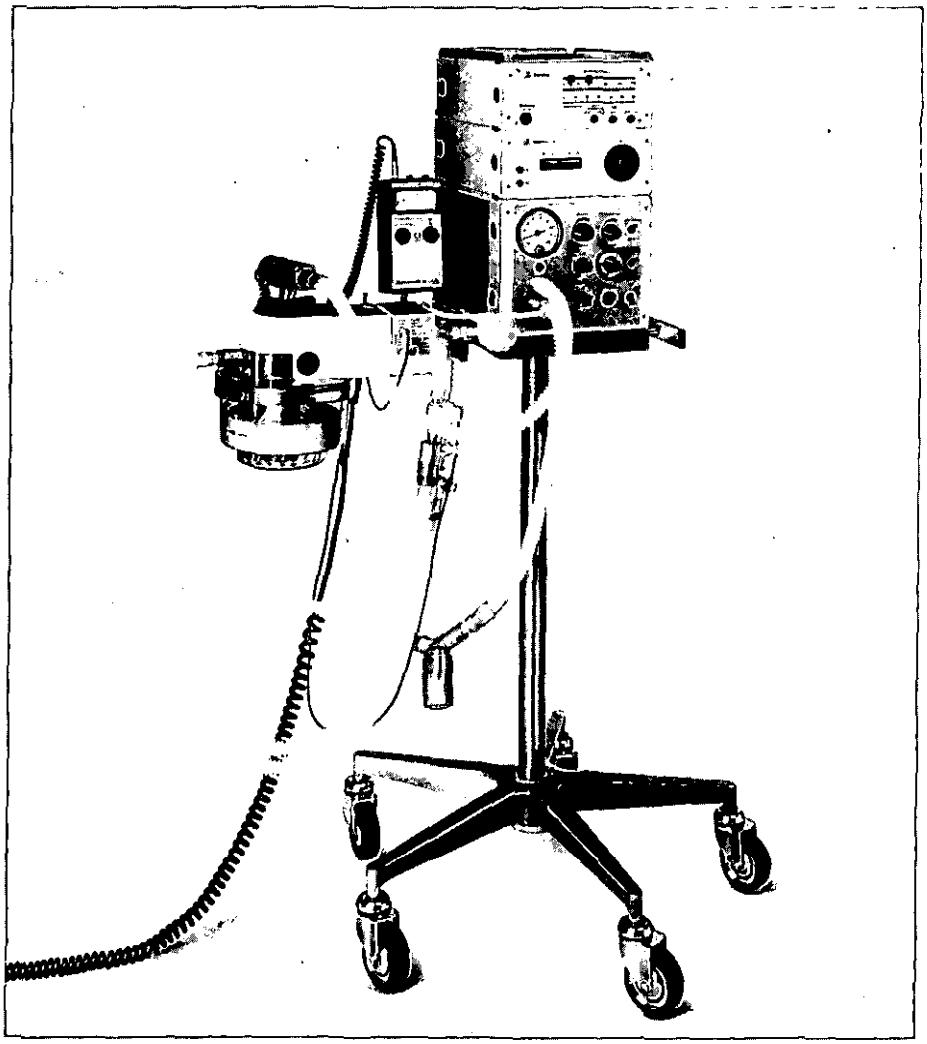

Fig. 11 Babylog 1 on carriage with O_2 blender Polymed, Barolog A, Oxycom 100 D and humidifier Aquapor with AWT 01

Functional check

- Check system for completeness and correct *assembly (cf. initial preparation),*
- set all knobs and switches to the settings marked by a green dot,
- connect the bellows 84 03 208 to the patient Y piece.
- Leak test:
  knob P_{in} to maximum,
  set flow knob to minimum,
  press manual inspiration **12**,
  the airway pressure display **5** must rise to about 60 mbar; if it does not, there is some leakage in the hose system or humidifier,
- reset all knobs to the green dot,
- the indicated inspiratory pressure should be approx. 20 mbar; the unit should switch from inspiration to expiration at the rate of the ventilation time set. The indicated airway pressure should be <1 mbar during the expiratory phase,
- set the PEEP/CPAP knob **7** to maximum; the PEEP pressure should be approx. 10 mbar,
- set the switch **8** to CPAP; the CPAP value should be about 10 mbar,
- actuate the manual inspiration **12**: the unit should switch to inspiration; the *inspiratory pressure should be approx.* 20 mbar.

Operation

Operate the unit according to the doctor's instructions. For operating the humidifier, gas blender, airway pressure gauge and O_2 meter, follow the respective operating instructions. Check the breathing gas temperature at the thermometer.

Instrument settings

Controlled ventilation – IPPV

Switch on
Babylog – switch **11** to "1"
Select IPPV – switch **8** to "IPPV" and range selector switch t_{ex} **10** to "0.5 to 6 sec"

The five knobs should be set to values suited for the patient.

Spontaneous breathing with intermittent ventilation – "IMV"

Settings as in "IPPV". If a spontaneous breathing time over 6 seconds is required, the range selector switch t_{ex} **10** must be set to the range "5 to 60 sec", and the knob **9** for the time t_{ex} is set to a desired value on the outer scale of knob **9**.

Spontaneous breathing – "CPAP"

Settings as in "IPPV", but CPAP switch **8** to "CPAP".

Caution! For safety reasons, the knob P_{in} must be set to the green dot during CPAP operation, so that the patient is not given an excessive airway pressure by mistake when a switch to IPPV is made.

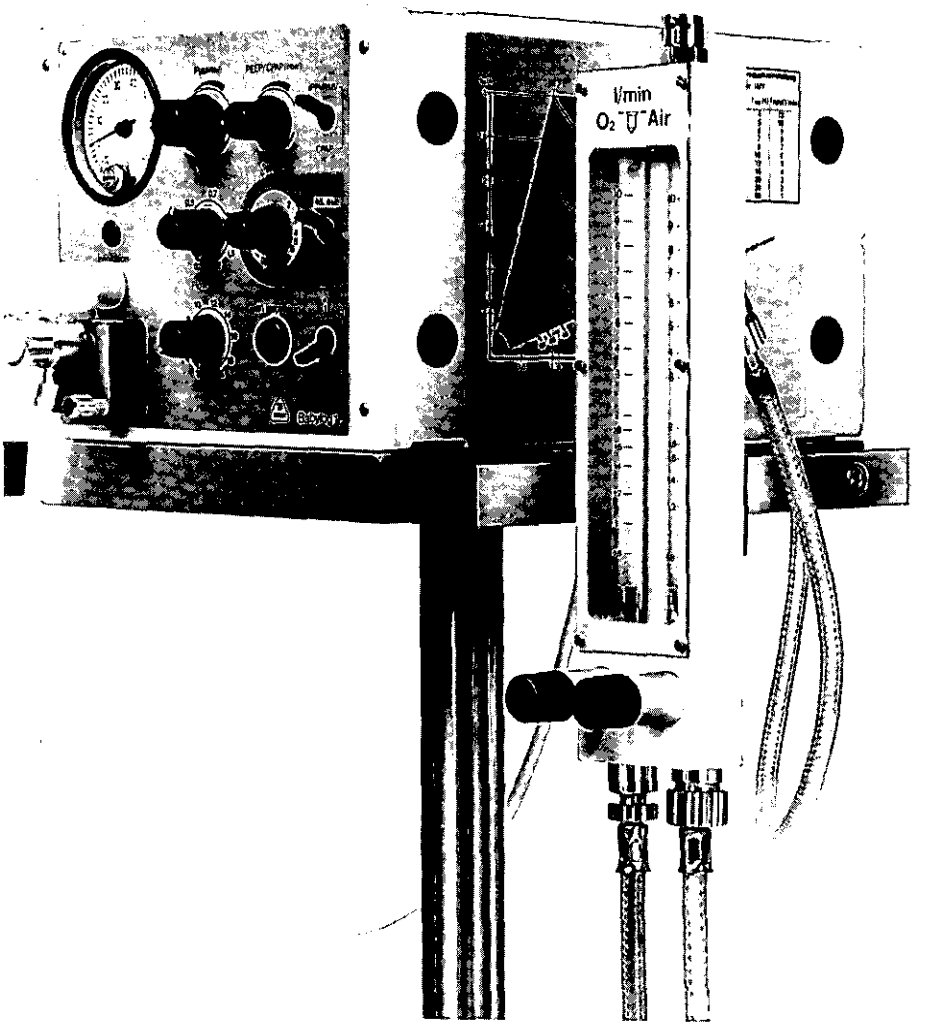

Fig. 12 Babylog 1 with O_2 flowmeter blender

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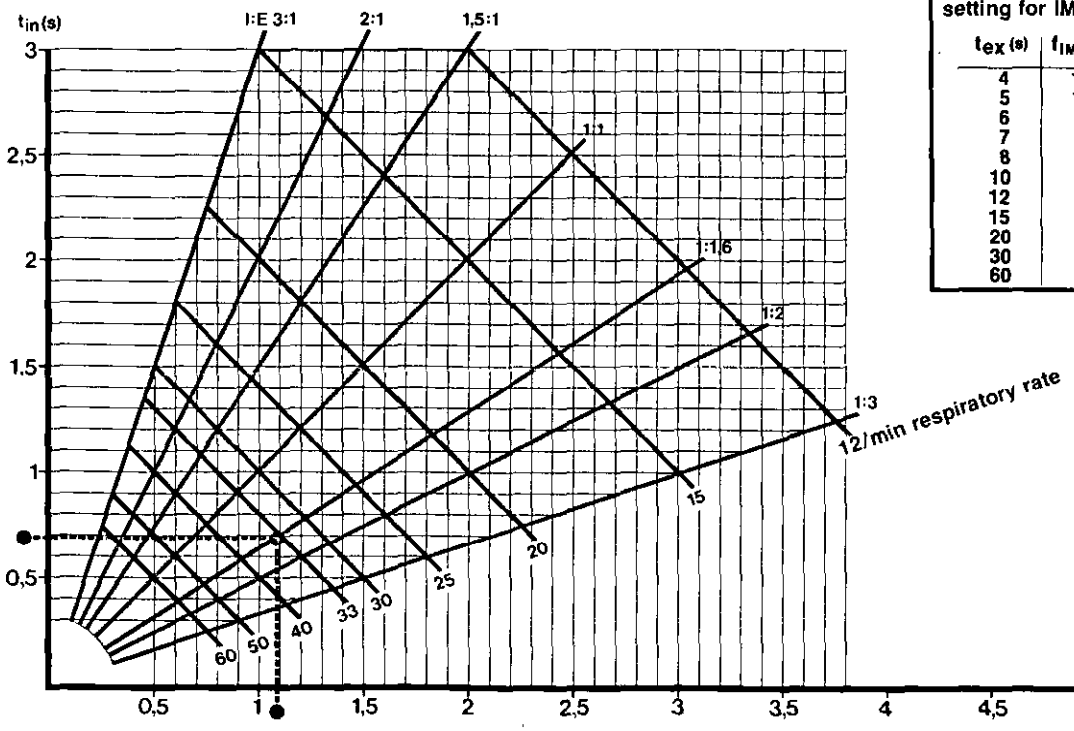

Respiratory rate setting for IMV	
t_{ex} (s)	f_{IMV} (min^{-1})
4	13
5	10
6	9
7	8
8	7
10	6
12	5
15	4
20	3
30	2
60	1

Fig. 13 Frequency table

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B5

Manual inspiration
Since the manual inspiration can be triggered in IPPV as well as in IMV and CPAP, the knobs P_{in} and t_{in} in particular should remain set to values suited to the patient even during CPAP.

Setting of the airway pressure gauge with alarm device – Precom in IPPV/IMV
The Precom has a large knurled setting ring. When this ring is turned, a red pointer marker (lower limit) moves along above the scale. This red pointer should be set to a value which is approx. 3 mbar below the peak inspiratory airway pressure. If this pressure drops to a value below the set limit value because of a disconnection, an acoustic alarm is sounded after about 15 *seconds. The alarm goes off as soon as an* airway pressure has been built up which is higher than the limit value (red mark).
Note: In case of IMV, the Precom sounds an alarm in case of expiratory times t_{ex} in excess of 15 seconds, even if there is no disconnection.

Precom setting in CPAP
An airway pressure curve in case of spontaneous breathing with CPAP is shown in Fig. 8.
The red pointer of the Precom should be set approx. 1 mbar below the maximum airway pressure value (pointer indication) of expiration.
In order to check the correct Precom setting, the patient's hose system can be disconnected at any desired point. An alarm must be sounded after 15 seconds.
Setting aid: If the airway pressure curve does not display in spontaneous breathing the pressure differences between inspiration and expiration shown in Fig. 8 (ΔP should be approx. 5 mbar), the flow setting **14** may have been set too high and should be somewhat reduced.

Care

Dismantling
After ventilation the equipment should be taken apart as follows:
- Disconnect all hose connections,
- Dismantle the expiratory valve **1** by unscrewing the two knurled screws,
- Remove the diaphragm.

Care and maintenance of the humidifier are described separately in the enclosed operating manual.

Note!
The thermometer in the patient hose system is to be checked for proper function after each cleaning operation: Compared with room temperature, the indicator must *not deviate by more than 1°C below or 2°C* above room temperature. Use a calibrated thermometer!

Cleaning
All dismantled parts are to be subjected to a thorough cleaning in running water. Afterwards, all parts are to be dried (Dräger 2 M 8220 Drying Unit). By drying, bacterial growth and corrosion are minimized. Dirt on the unit can be removed with a damp cloth impregnated with a normal detergent (wetting agent).

Disinfection in the Aseptor
The unit is to be prepared for disinfection as described under "Cleaning". The unit and small component parts have to be dry, because unpleasant odours may otherwise result after disinfection. Electrically operated units, like the humidifier, must have been out of operation at least 1½ hours before disinfection and must have cooled off, otherwise the condensation effect will not be perfect and disinfection will be questionable. The cleaned parts are then placed on the drainer of the Aseptor.
The cleaned and dried connection hoses *are pushed over the suction nozzles in the* Aseptor.
Place the Babylog 1, humidifier and carriage in the Aseptor. Before being reused on a patient, correct functioning of the unit must be ascertained in the manner described in the chapter "Functional Check".

Steam sterilization
The ventilation unit itself and the thermometer are **not** sterilizable in an autoclave. All other parts (patient system including expiratory valve **1**) can be sterilized in superheated steam up to 134°C. These parts must be prepared for steam sterilization as described under *"dismantling" and "cleaning".*

Note!
Any superheated steam sterilization subjects enamelled surfaces to severe stress and affects their appearance. The natural aging process of rubber parts is accelerated, and their working life shortened.

Maintenance, Inspection

The rubber diaphragm of the expiratory valve should be inspected regularly for cracks if it is frequently steam sterilized in an autoclave and should be replaced every six months. No other maintenance work is necessary on the part of the clinic staff, apart from normal care and cleaning. The unit should be inspected and serviced twice a year by trained personnel.

Trouble Shooting

Before a possible breakdown of the unit can be analyzed, check to see if the supply gases are available at the prescribed pressure (2 to 6 bar). Especially if operated with an O_2 blender, correct functioning of this blender should be checked; in case of operation with a flowmeter blender, make sure connection **15** at the Babylog 1 is supplied with compressed gas (drive gas oxygen: 2 to 6 bar).

Fault	Cause	Remedy
Airway pressure build up unsatisfactory	Leakage in system	Check all hose and plug connections. Check humidifier system. Check expiratory valve diaphragm for correct fit and satisfactory condition.
In the case of control defects, the Drägerwerk AG Technical Customer Service should be contacted		

Order List

Name and description	Order No.
Basic units	
Babylog 1 Ventilator for premature and newborn babies and infants to carry out intermittent positive pressure ventilation (IPPV), as well as CPAP or IMV with integrated PEEP valve. The device operates pneumatically in the continuous-flow principle, facilitating inspiratory plateau-pressure limitation. Switching from inspiration to expiration is effected by time-cycling featuring the additional possibility of manual inspiration triggering (inflation hold).	84 03 300
Babylog 1 HF Ventilator for premature and newborn babies and infants to carry out intermittent positive pressure ventilation (IPPV) as well as for CPAP or IMV with integrated PEEP valve. The device operates pneumatically in the continuous-flow principle, facilitating inspiratory plateau-pressure limitation. Switching from inspiration to expiration is effected by time-cycling, whereby inspiration can be adjusted from 0.1–2 sec and expiration from 0.2–3 sec and with IMV from 2–30 sec. Additional possibility is rendered for manual triggering of inspiration (inflation hold).	59 85 071
Accessories required for operation	
1. Humification	
option of:	
Accessory 3, Aquapor Comprising complete tubing system, 5 cannulae and bellows K (children), Aquapor	84 05 820
Replacement set B01/Aquapor Contains all parts coming into contact with the air exhaled by the patient	84 06 110
or	
Accessory set 1, Humidifier 19 comprising a complete tubing system, 6-stage supply unit, 5 cannulae and bellows K (children), Humidifier 19	84 05 130
Replacement set Humidifier 19 Contains all parts coming into contact with the air exhaled by the patient	84 05 033
2. O_2-compressed-air blending	
Polymed 201 Gas blender for blending oxygen and compressed air for ventilators with a range of adjustment (infinitely variable) from 21–100 vol.% O_2. The device features an automatic bypass and audible alarm signal as well as gas deficiency indicator in the event of gas failure. Blending accuracy: ± 4 vol.% O_2 (in the range 21–40 vol.% O_2) ± 6 vol.% O_2 (in the range 41–100 vol.% O_2) Output (constant flow): min. 0.5 L/min max. 80 L/min (at 5.0 bar supply pressure) max. 60 L/min (at 2.7 bar supply pressure) Output (bypass operation): max. 50 L/min (at 2.7 bar supply pressure) max. 80 L/min (at 3.5 bar supply pressure) Outlet pressure of mixed gas: 2.0 bar ± 10%	D 21800
Connection hose between ventilator and blender *(not applicable if medicaments nebulizer ordered)*	84 03 343
3. Gas supply CS	
option of:	
O_2 connecting hose, 3 m (angled plug connector)	M 22346
O_2 connecting hose, 5 m (angled plug connector)	M 22347
Compressed-air connecting hose, 3 m (angled plug connector)	M 22496
Compressed-air connecting hose, 5 m (angled plug connector)	M 22497

Name and description	Order No.
4. Mounts	
option of:	
Babylog 1 with Humidifier 19:	
Trolley CS Humidifier 19 comprises stand holder and stand bracket to accommodate Humidifier 19	2 M 17475
or	
Wall-rail bracket with drawer	2 M 18285
Rail bracket, Humidifier 19 For connection of Humidifier 19 to wall rail *(necessary)*	84 06 299
Babylog 1 with Aquapor:	
Trolley CS Aquapor *Height permanently set*	84 05 818
or	
Trolley with latch-on plate and 2 laterally arranged rails, *height-adjustable*	84 05 759
or	
Wall-rail bracket with drawer	2 M 18285
Required for ventilation outside incubator:	
Hinged arm for rail	84 01 860
Accessories recommended for monitoring	
1. For continuous measurement and monitoring of O_2 in gas inhaled:	
Oxydig, complete Oxygen meter and monitor with cable, sensor housing and sensor capsule for continuous monitoring of oxygen content in blended gas inhaled. Measuring range 0–100% O_2. With upper and lower alarm limit which indicate the crossing both visually and audibly (in accordance with DGAI Recommendations) as well as battery recharge alarm and Inop alarm in the case of sensor defects.	83 03 236
Connecting elements required:	
O_2 meter holder	2 M 17770
Set for O_2 measurement Humidifier 19	84 03 370
O_2 connection *Aquapor*	84 05 754
2. For continuous measurement and monitoring of airway pressure:	
For Babylog 1 and Babylog 1 HF:	
Barolog A The Barolog A is designed for measuring and monitoring of airway pressure in breathing systems as well as for determination of ventilation frequency. With visual and audible alarm in the case of disconnection/obstruction (in accordance with DGAI Recommendations). The parameters are indicated on an inertia-free linear analog display. Also equipped with data output jack for recorder connection as well as central-alarm connection facility. The Barolog A conforms to VDE 0750/IEC 601/1 Dimensions: height 80 mm, width 212 mm, depth 300 mm	83 02 930
Babylog 1 – Barolog adaptation set	84 05 260
or	
Only for Babylog 1:	
Precom airway pressure gauge effects audible alarm if set pressure is not atained within 15 sec. The device is battery operated and thus independent of the mains. The front section is easily detached from the alarm facility for sterilization purposes.	E 11431
Precom holder Mount for Precom airway pressure gauge with alarm	84 06 599

B 7

Name and description	**Order No.**
3. For continuous measurement and monitoring of inspiratory breathing-gas temperature	
AWT 01 For continuous measurement and monitoring of breathing-gas temperature. With adjustable upper alarm limit and audible alarm.	**84 05 370**
Temperature sensor	**84 05 371**
Battery	**13 35 812**
Required in conjunction with Aquapor:	
Conversion kit, Babylog 1 (Aquapor) Required for adaptation of AWT 01 with Aquapor	**84 05 876**
Required in conjunction with Humidifier 19:	
Conversion kit, Babylog 1 (Humidifier 19) Required for adaptation of AWT 01 with Humidifier 19	**84 05 874**
Special accessories	
Medicaments nebulizer set, Aquapor Contains medicaments nebulizer and connecting hose between ventilator and blender with plug-in coupling.	**84 05 804**
Medicaments nebulizer set, Humidifier 19 Contains medicaments nebulizer and connecting hose between ventilator and blender with plug-in coupling.	**84 05 806**
Depositing tray, 0.5 B stainless-steel depositing tray 207 mm width, 297 mm depth	**2 M 17680**
CPAP nosepiece, large	**2 M 17238**
Conversion kit, lockable castors	**84 06 311**
For conversion from Humidifier 19 to Aquapor:	
Conversion set B01 10 mm	**84 06 115**
Conversion set Aquapor trolley	**84 06 117**
For conversion of Humidifier 19 7 mm to spiral tubing 10 mm:	
Conversion set B01 10 mm	**84 06 115**
Adapter	**84 05 483**

Parts list (cf. Fig. 14)

No. in Fig. 14	Name	Order No.
1	**Babylog 1 complete**	**84 03 300**
2–24	**Accessory set 3** (Aquapor)	**84 05 820**
2	**Clamp set**	**84 03 345**
3	**Filling kit**	**84 05 031**
4	**Bellows K**	**84 03 208**
5	**Aquapor**	**84 05 020**
6–24	**Babylog 1 hose system**	**84 05 805**
6	**Diaphragm** (set of 5)	**84 03 945**
7	**Cover, expiratory valve**	**84 03 943**
8	**Bolt, washer** (set of 2)	**84 03 944**
9	**Instructions** for assembling the Babylog 1 and Aquapor	**84 05 822**
10	**Silicone hose K, 60 cm**	**84 03 073**
11	**Cone 22a**	**84 05 752**
12	**Catheter sleeve size 9**	**M 19347**
13	**Catheter sleeve size 11**	**M 19351**
13–24	**Patient connection K**	**84 05 808**
14	**Silicone hose K, 35 cm**	**84 03 070**
15	**Water trap**	**84 04 985**
16	**Silicone hose K, 1 m**	**84 03 080**
17	**Condensate trap**	**84 04 760**
18	**Corrugated hose**	**84 03 333**
19	**Adapter K 90°**	**84 03 075**
20	**Set of caps** (set of 5)	**84 02 953**
21	**Thermometer**	**2 M 13259**
22	**Adapter T**	**84 03 056**
23	**Hose clamp**	**84 05 768**
24	**Set of catheter sleeves** (set of 9)	**84 03 684**
25	**O_2 connection**	**84 05 754**
26	**Adapter**	**84 05 023**

Parts list (cf. Fig. 15)

No. in Fig. 15	Name	Order No.
1	**Babylog 1 complete**	**84 03 300**
2–24	**Accessory set 1** (Humidifier 19)	**84 05 130**
2	**Supply unit**	**84 03 712**
3	**Cannula** (set of 50)	**84 02 916**
4	**Humidifier 19**	**84 02 020**
5	**Catheter sleeve size 9**	**M 19347**
6	**Bellows K**	**84 03 208**
7	**Instructions** for assembling the Babylog 1 and humidifier 19	**84 05 766**
8–24	**Babylog 1 replacement set**	**84 05 033**
8	**Catheter sleeve size 11**	**M 19351**
9	**Silicone hose K, 60 cm**	**84 03 073**
10	**Silicone hose K, 35 cm**	**84 03 070**
11	**Water trap**	**84 04 985**
12	**Sleeve**	**84 05 483**
13	**Diaphragm** (set of 5)	**84 03 945**
14	**Cover, expiratory valve**	**84 03 943**
15	**Bolt, washer** (set of 2)	**84 03 944**
16–24	**Patient connection K**	**84 04 800**
16	**Silicone hose K, 1 m**	**84 03 080**
17	**Condensate trap**	**84 04 760**
18	**Cap** (set of 5)	**84 02 953**
19	**Adapter T**	**84 03 056**
20	**Thermometer**	**2 M 13259**
21	**Corrugated hose 14 cm**	**84 03 333**
22	**Adapter K 90°**	**84 03 075**
23	**Catheter sleeve size 1.5–5.5**	**84 03 684**
24	**Catheter sleeve size 11**	**M 19351**
25	**O_2 sensor housing**	**84 03 370**
26	**Adapter**	**84 05 023**

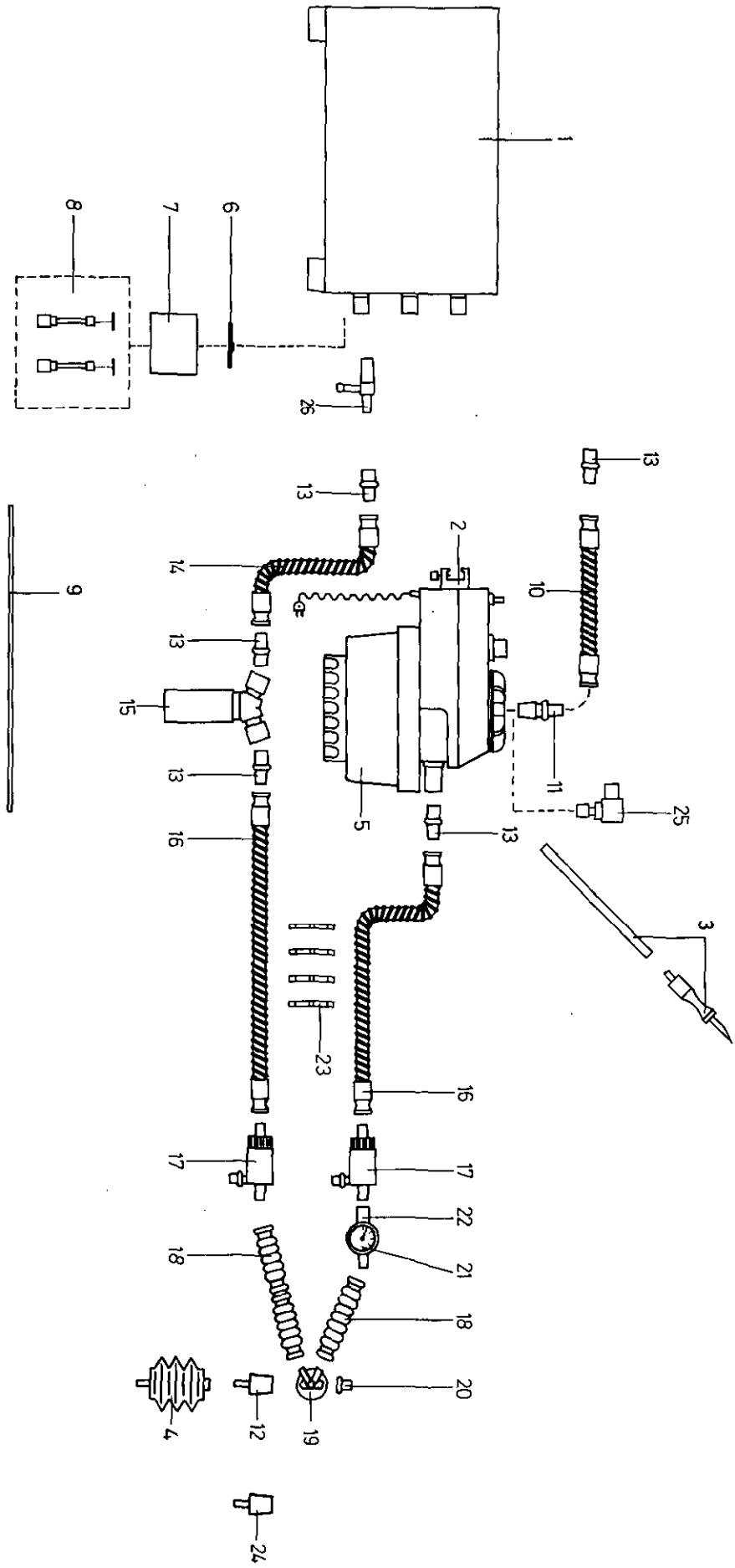

Fig. 14 Spare parts and consumable parts (Babylog 1 with Aquapor)

B-9

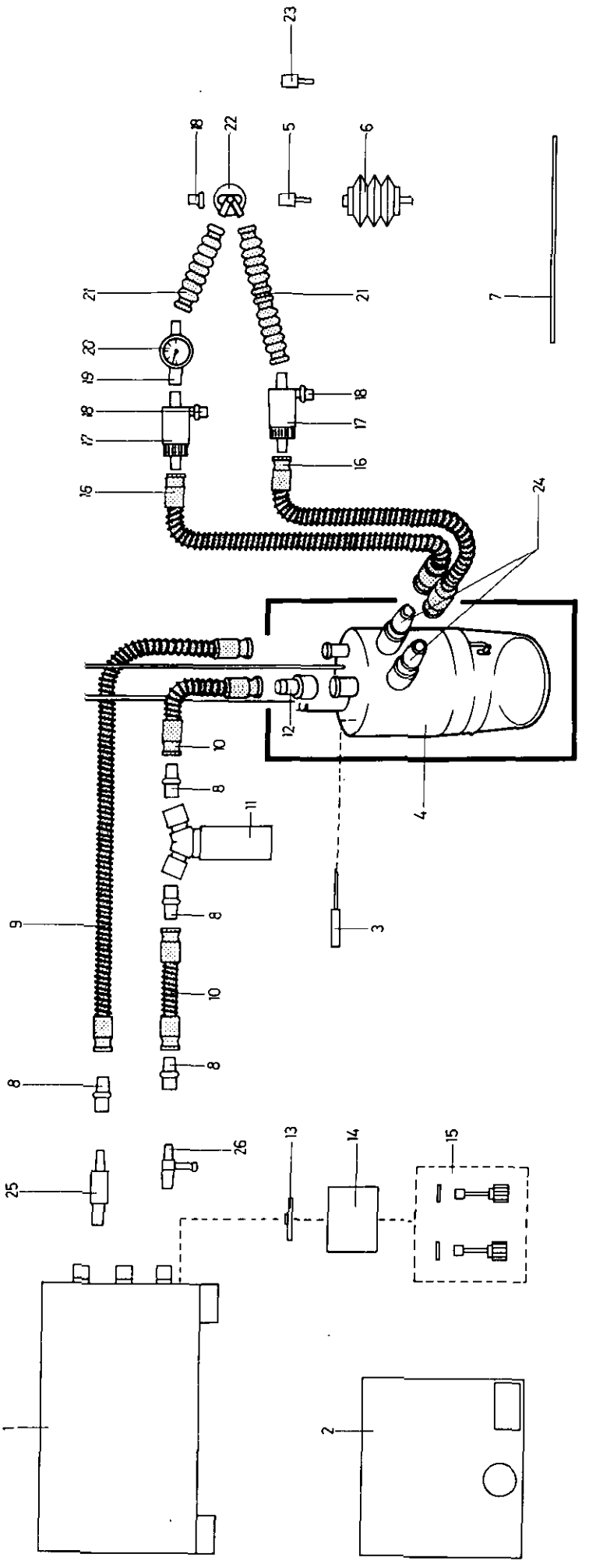

Fig. 15 Spare parts and consumable parts (Babylog 1 with Humidifier 19)

283

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Sheet to be inserted in Operating Manual for
Babylog 1 63 17 30

"Modified Babylog 1 - f 150 min^{-1}"

As opposed to the data given in the original operating manual the values for inspiration time and expiration time are as follows

t_{IN} = 0.1 - 2 s
t_{EX} = 0.2 - 3 s

or following switchover for IMV mode:

Expiration time: t_{EX} = 2 - 30 s

The maximum ventilation ratio can thus be increased to 200 min^{-1}.

Caution: To achieve an unfiltered display with ventilation ratios in excess of 100 min^{-1} and to detect and avoid airtrapping effects, additional use should be made of an electronic pressure gauge with pressure tap at the T-piece.

B1Q