

Dräger Vapor® 2000 and D-Vapor® Vaporisers for Anaesthetic Agents

Dräger vaporisers have been the benchmark for quality for over 50 years. Quality trusted by doctors and nurses around the world: to date, over 400,000 Vapor units have been sold to hospitals around the world.



Benefits

Simply more volume: 300 ML

The filling volume of the Vapor 2000 and the electronic D-Vapor amounts at least 300 ml. This means you can completely empty the entire contents of a standard anaesthetic agent bottle containing 250 ml into the vaporiser. Even if the vaporiser still contains remnants of your anaesthetic agent, you can top it off with an entire, new bottle. This not only speeds up your workflow. Since you can refill the anaesthetic agents in one step, you also do not have to worry about keeping any leftovers safe and secure.

Suitable for all plug-in systems

The vaporisers are designed with flexibility in mind – just like your Dräger anaesthesia workstation. In addition to the Dräger connector system Auto Exclusion, you may also select the connector system S-2000. The former is also compatible with the Interlock 2 systems for multi-vaporiser operation. The latter is compatible with the Selectatec system. Both Vapor 2000 and D-Vapor are suitable for anaesthesia workstations that are equipped with a conical 23 mm ISO connector.

Mix-ups are impossible

All filling systems are designed for specific anaesthetic agents. That means: the risk of confusing anaesthetic agents is excluded. In addition, the colour of the caps of the Vapor 2000 and the D-Vapor are labelled according to the colour coding of each anaesthetic agent.

D-Vapor: battery operation during power failure

The electronic D-Vapor also has a battery installed. If power suddenly fails, it is possible to bridge short power outages.

Unique hand-wheel position for safe transport

Even if the vaporiser is turned upside down or tilted during intra-hospital transport: the unique transport position of the Vapor family (T-Position) prevents the anaesthetic agent from leaking into the metering elements or escaping into ambient air. After the transport, the vaporisers immediately continue working as per their specifications.

Vapor 2000: Extended temperature range from 10 °C to 40 °C

The Vapor 2000 is designed for use with a temperature range of 10 °C to 40 °C. Precise dosing is therefore ensured even with special surgical procedures where heating or cooling plays an important role such as in paediatric surgery, cardiac surgery, burns, or orthopaedics.

Benefits

No recalibration

The new family of vaporisers helps you save time: they do not need to be recalibrated at any time during their period of use.

The next generation

The Dräger Auto Exclusion vaporiser comfort mounting system is a new generation of vaporiser plug-in system that will help simplify your routine, increase your efficiency and flexibility, and avoid user error. The Auto Exclusion comfort mounting system is now standard for Perseus and an option for Fabius and Primus anaesthesia workstations.

Improved Ergonomics

With the Auto Exclusion comfort mounting system, it's no longer necessary to manually slide the Interlock 2 latch on the anaesthesia workstation. Just plug it in, swing the locking lever into position, and the vaporiser is automatically locked in place. With fewer steps needed to connect the vaporiser, your workstation is quickly ready to go, faster than ever before.

Easy to identify

The Auto Exclusion comfort mounting connector on the anaesthesia workstation, as well as all Auto Exclusion vaporisers are clearly labeled in order to ensure proper use.

Downward compatibility and functionality

You can continue to use Dräger Auto Exclusion vaporisers with the standard Dräger connector and Interlock 2 of the anaesthesia workstation. Standard vaporisers which use the Dräger plug-in adapter, however, are not compatible with the new Auto Exclusion connector on the anaesthesia workstation. Of course, you still get all the advantages of our previous system, such as the T-position for safe transport and a filling gauge that clearly displays anaesthetic agent levels. Now, when the level is below the second mark, the vaporiser has enough filling capacity for an entire bottle of anaesthetic agent.

System components

D-412-2014



Primus Infinity® Empowered

Take performance, reliability, workflow and information management to the next level with one of the most advanced integrated anaesthesia solutions on the market today.

D-9285-2009



Dräger Fabius® GS premium

The Dräger Fabius® GS premium is an anaesthesia workstation that is simple to use, highly efficient and ready for the future. It features a solid design with modular architecture plus a wide range of ventilation capabilities. Your Fabius® GS premium can be customised to suit your exact needs.

D-6838-2014



Dräger Fabius® Tiro

Get the most out of even the smallest spaces with a compact yet fully featured anaesthesia solution designed for use in a variety of specialised environments.

D-12287-2011



Dräger Fabius® MRI

Increase the diagnostic capability of your MRI unit with the help of state-of-the-art ventilation in the Dräger Fabius® MRI anaesthesia system specially designed for use in MRI environments.

Related Products



D-7420-2011

Dräger Vapor® 3000 / D-Vapor® 3000

So much more than just a container for volatile agents, the new Vapor® 3000 series is now even better in combination with the Perseus® A500 anaesthesia workstation especially in dark environments. It can even help you monitor and plan your anaesthesia for improved efficiency.

Technical Data

Manufacturer	Dräger	Dräger
Model	Vapor® 2000	D-Vapor®
Principle	Standard vaporiser	Electronic vaporiser
Anaesthetic agent	Sevoflurane Isoflurane Halothane	Desflurane
Dosage range	0.2 to 8 vol% (Sevoflurane) 0.2 to 6 vol% (Isoflurane) 0.2 to 6 vol% (Halothane)	2 to 18 vol%
Plug-in System	Dräger Auto Exclusion Selectatec compatible Conical Connector (23 mm) Fixmount	Dräger Auto Exclusion Selectatec compatible Conical Connector (23 mm) Fixmount
Filling volume total [mL]	360	300
Filling volume refill [mL]	260	240
Weight empty [kg]	8	< 7
Operating temp min [°C]	10	18
Operating temp max [°C]	40	30
Flow range [L/min]	0.15 to 15	0.2 to 15
Power Consumption [W]		30, typical
Battery backup [min]		5
backup power time in the event of a mains failure		
Transport capabilities	Transport function	Transport function
MRI compatible	yes	no
Warranty	1 year	1 year
Service / calibration / maintenance	Inspection every 12 months No recalibration	Inspection every 12 months No recalibration

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As of August 2015

Dräger Medical GmbH changes
to Drägerwerk AG & Co. KGaA

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Dräger Vapor[®] 2000



Anaesthetic Vaporiser Instructions for Use

In order to make it very clear which Instructions for Use is to be used with each Vapor, the serial number of the Vapor assigned is specified on the back of these Instructions for Use.

Instructions for Use without such a number are issued purely for information purposes and not for actual use with a Vapor. The serial number is specified on the nameplate of the Vapor.

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For Your Safety and that of Your Patients

Strictly follow the Instructions for Use

Any use of the apparatus requires full understanding and strict observation of these instructions. The apparatus is only to be used for purposes specified here.

Maintenance

The apparatus must be inspected and serviced regularly by trained service personnel at yearly intervals (and a record kept).

Repair and general overhaul of the apparatus may only be carried out by trained service personnel.

We recommend that a service contract be obtained with DrägerService and that all repairs also be carried out by them. Only authentic Dräger spare parts may be used for maintenance.

Observe chapter "Maintenance Intervals".

Accessories

Do not use accessories other than those in the order list. Reusable accessories (e.g. after they have been prepared) have a limited life span. A number of factors during preparation and operation (e.g. disinfectant residues can damage the material during autoclaving) can increase the wear and decrease the life span considerably. Materials with external signs of wear such as cracks, deformation, discolouration, disbonding or similar must be replaced.

Liability for proper function or damage

The liability for the proper function of the apparatus is irrevocably transferred to the owner or operator to the extent that the apparatus is serviced or repaired by personnel not employed or authorized by DrägerService or if the apparatus is used in a manner not conforming to its intended use.

Dräger cannot be held responsible for damage caused by non-compliance with the recommendations given above. The warranty and liability provisions of the terms of sale and delivery of Dräger are likewise not modified by the recommendations given above.

Dräger Medical AG & Co. KGaA

Intended Use

Dräger Vapor® 2000 is an unheated, calibrated anaesthetic vaporiser for the enrichment of dry, fresh medical gas in anaesthesia delivery systems with accurately-controlled concentrations of vapour from liquid anaesthetic agents. The concentration delivered is, for the most part, not influenced by operating and ambient conditions, such as temperature, gas flow and ventilation pressure.

The Vapor 2000 is suitable for use in strong magnetic fields (MRI equipment) when used in accordance with the operating instructions on page 24.

Each Vapor is calibrated for a specified anaesthetic agent and is only suitable for that anaesthetic agent. Different models of Vapor are specified for different anaesthetic agents and are marked accordingly.

The Vapor is inserted in the fresh-gas line of the anaesthesia delivery system which typically delivers a continuous fresh-gas flow. The Vapor is connected between the fresh-gas flow-control unit and the fresh-gas outlet. The Vapor is not suitable for use with a breathing system due to high pneumatic resistance.

Proper functioning of the Vapor is dependent on the direction of flow. It must be connected and operated in accordance with the direction of flow specified on the machine. The use of the Vapor with different anaesthesia delivery systems is, therefore, only permissible and safe when it is used with the appropriate special adapters. Simultaneous operation of several Vapors switched in series is not permissible, particularly for different anaesthetic agents.

Dräger recommend that the output concentration is monitored to detect any hazardous output values, using a monitor which has continuous measurement and upper and lower alarm limits.

Installation and/or operation with anaesthesia delivery systems in mobile vehicles, aeroplanes, helicopters and ships is only permissible after consultation with Dräger and their agreement.

The Vapor must only be used by qualified medical personnel to ensure that any malfunction can be remedied without delay.

According to US and Canadian law these machines must only be used by or on the instructions of a fully qualified medical practitioner.

Registered trademarks

- Dräger Vapor
 - Dräger Fill
- are Dräger registered trademarks.
- Quik Fil
- is a registered trademark of Abbott Laboratories.
- Selectatec
- is a registered trademark of Datex-Ohmeda.

Method of Operation

Handle Vapor with care.

Be careful not to tilt or drop.

Do not carry by the control dial, control dial caps or locking lever for the plug-in adapter.

Risk of injury.

Do not use Vapor if it has been dropped.

Damage may result in incorrect output concentration.

Control dial

For switching on and off and adjusting the concentration of anaesthetic agent. In the »O« setting and in the »T« transport setting, the control dial is locked but it can be freed by pressing »O« button.

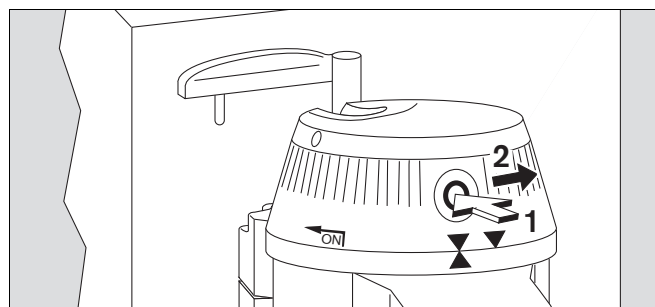
All illustrations of a Vapor on an anaesthesia delivery system show a stylised anaesthesia delivery system in the background. All illustrations of the transport setting show only the disconnected Vapor by itself.

»ON« – Switching on and adjusting concentration:

Only adjust concentration when the Vapor is connected to an anaesthesia delivery system.

- 1 Press »O« button and
- 2 turn control dial anti-clockwise to required concentration of anaesthetic agent.

Concentration values greater than 5 vol.% are shown in inverted form in order to draw attention to the danger of a high output concentration and restricted flow range.



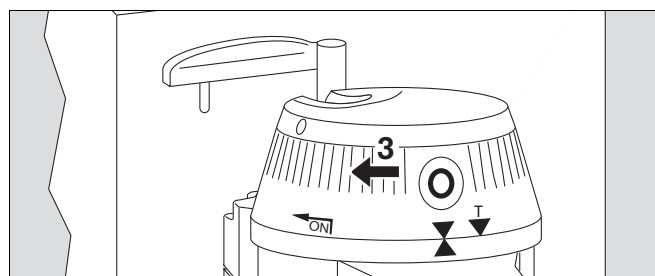
»O« – switching off:

When Vapor is connected to an anaesthesia delivery system only set to »O« when anaesthetic agent is not being administered.

- 3 Turn control dial clockwise to »O« – »O« button engages.

When control dial is set at »O« or above »O«, do not use Vapor at an angle of more than 30°.

Risk of incorrect output concentration or anaesthetic agent escaping otherwise.

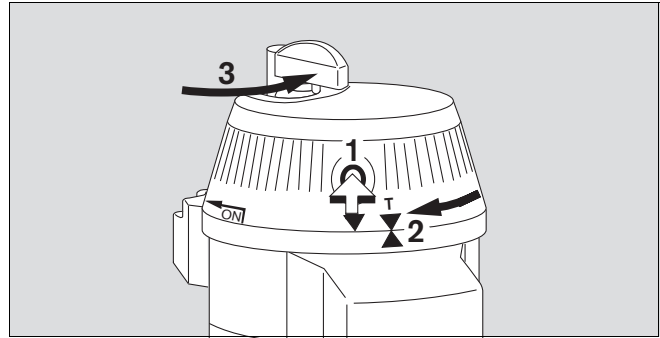


»T« – Transport:

Only set to »T« when Vapor is being disconnected from the anaesthesia delivery system or is connected to the parking holder.

- 1 Press »O« button and
- 2 turn control dial clockwise to »T« transport setting – »O« button engages.
- 3 For plug-in adapter: engage locking lever in control dial.

**At »T« setting Vapor may be moved in any position.
If not at »T« setting, risk of incorrect output concentration,
or of anaesthetic agent escaping otherwise.**



Connecting and Interlock systems

When the Vapor is used with different anaesthesia delivery systems, different connecting systems have to be used. When anaesthesia delivery systems have several Vapor connectors, the different Interlock systems¹ ensure that only one Vapor can be used at any one time, while the others are switched off and blocked.

The interlock system on the vaporiser and anaesthesia delivery system must be functional. Especially with **Interlock 2, the nibs must be engaged and undamaged in both openings of the interlock disc.** See also "Checking Readiness for Operation" Page 36.

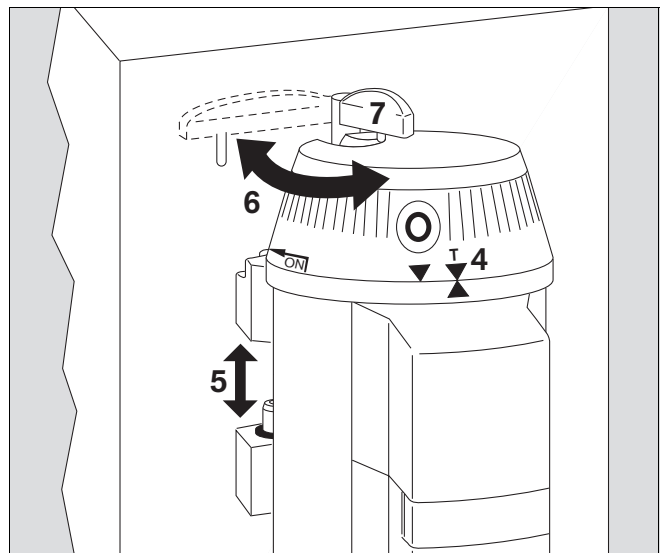
A malfunctioning Interlock may endanger the patient by causing overdosing or a mixture of anaesthetic agents.

Plug-in adapter/plug-in connector

to connect Vapor safely and change over quickly. Most plug-in connectors have valves to allow fresh gas to flow through, whether the Vapor is, or is not, connected. These plug-in connectors can be identified by the moveable valve inserts in the inner holes on the connector pins.

Many Vapors with plug-in adapters carry an anaesthetic agent code on the back, which can be read and displayed by anaesthesia delivery systems designed for the purpose.

- 4 To connect/disconnect, control dial must be at the »T« setting and the locking lever must be engaged in the control dial.
- 5 The holes in the plug-in adapter on the Vapor fit onto the pins on the plug-in connector on the anaesthesia delivery system.
- 6 To secure/release, swing locking lever into position and engage/disengage the pin in the cover plate on the Vapor.
- 7 The locking lever and pin help to ensure that the Vapor is handled correctly and that it can only be fitted and disconnected when the control dial is at the »T« setting.

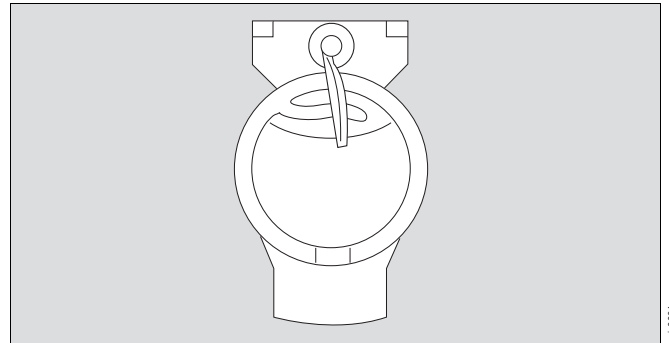


¹ The different Interlock systems are not compatible with each other. However, the Vapor can be modified from one system to another.

Plug-in DW-2000 adapter with Interlock 2

For connecting to Dräger plug-in connectors.

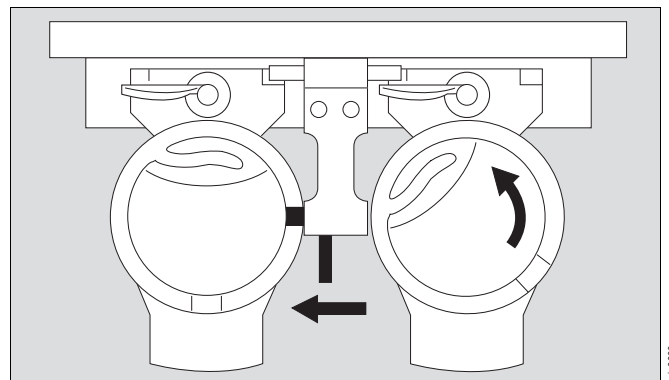
DW-2000 is not compatible with the Dräger Auto Exclusion System.



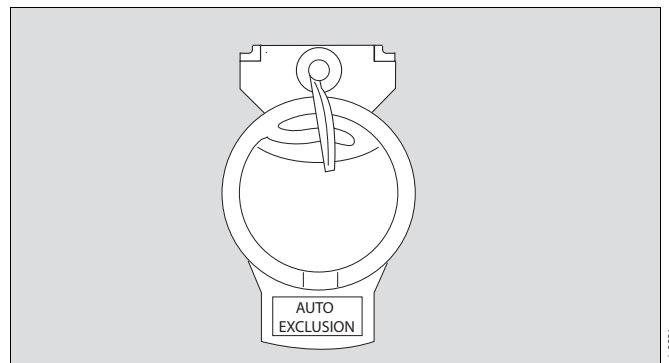
For anaesthesia delivery systems with two plug-in connectors combined with **Interlock 2**.

The locking bar, which can only be engaged in the control dial when at »0« setting, allows only one Vapor to be in use at any one time.

Illustration: left Vapor blocked, right Vapor operational.

**Dräger Auto Exclusion plug-in adapter**

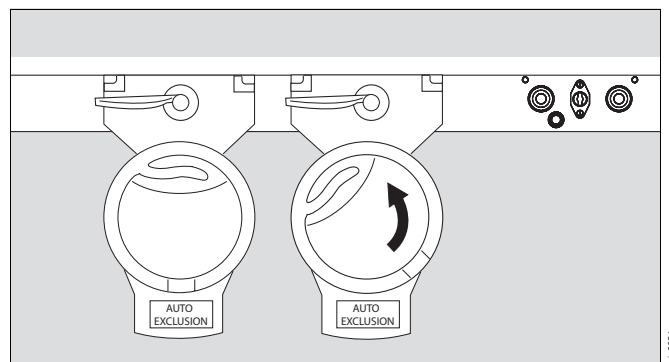
for connecting to Dräger Auto Exclusion plug-in connectors and Dräger plug-in connectors.



For anaesthesia delivery systems with Auto Exclusion plug-in connectors.

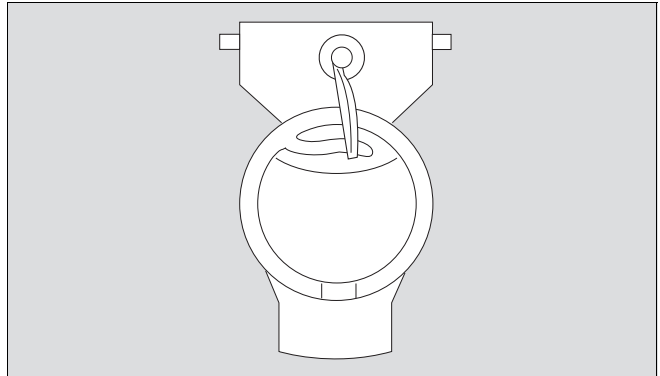
When a Vapor is switched on, a pin on the underside of the plug-in adapter is pushed out. This prevents other Vapors on adjacent plug-in connectors being switched on via an internal mechanism.

Illustration: left Vapor blocked, right Vapor operational.



Plug-in S-2000 adapter with Interlock S

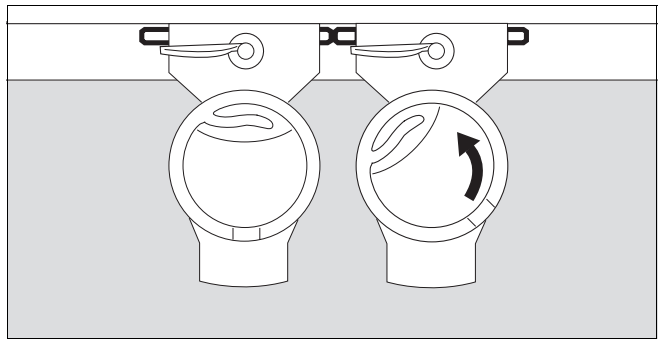
For connecting to Selectatec®-compatible plug-in connectors.



For anaesthesia delivery systems with several plug-in connectors combined with **Interlock S**.

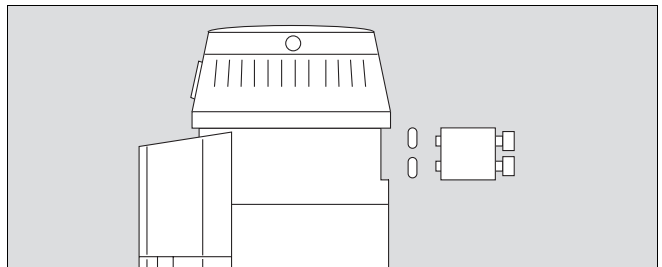
When a vaporiser is switched on, two pins on the side of the relevant plug-in adapter are pushed out. These prevent other vaporisers on adjacent plug-in connectors being switched on.

Illustration: left vaporiser blocked, right Vapor operational.



Permanent connection

a permanent installation in fresh-gas line for anaesthesia delivery systems, with the appropriate connector options.

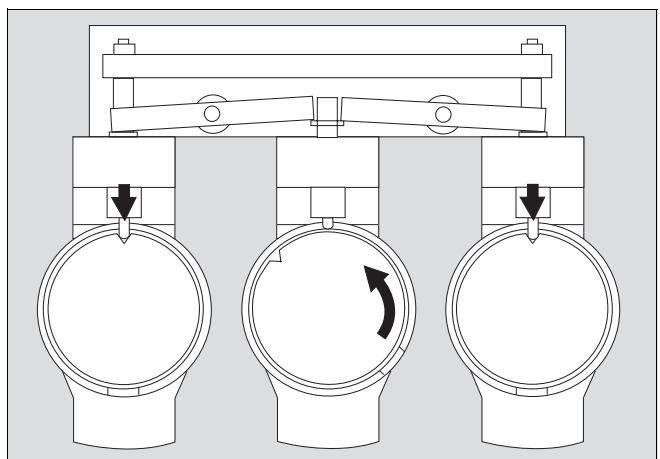


For anaesthesia delivery systems with several plug-in connectors combined with **Interlock NMD**.

When a Vapor is switched on, a lever is activated which prevents other Vapors on adjacent connectors being switched on.

Illustration: central Vapor operational, right and left Vapor blocked.

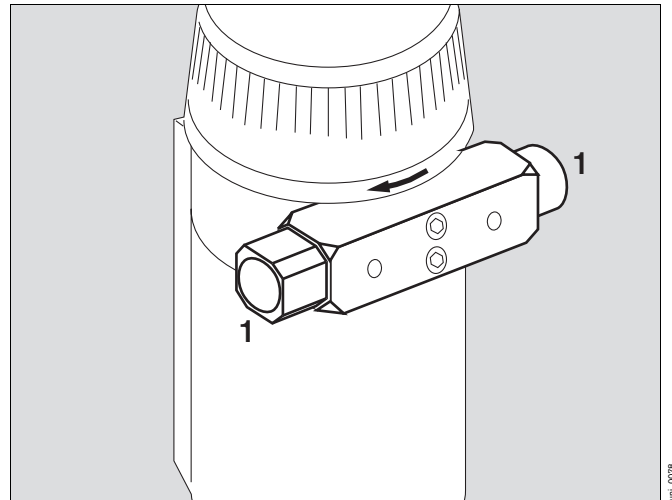
Other Interlock systems are also used, such as Interlock 1, which are very similar to Interlock NMD, but which need not fit a Vapor with Interlock NMD.



Conical connector, 23 mm

for anaesthesia delivery systems with 23 mm conical connectors conforming to ISO 5356-1 on the fresh-gas line.

- 1 Conical connector on Vapor.

**Filling systems**

For filling Vapor with the specified anaesthetic agent and draining.

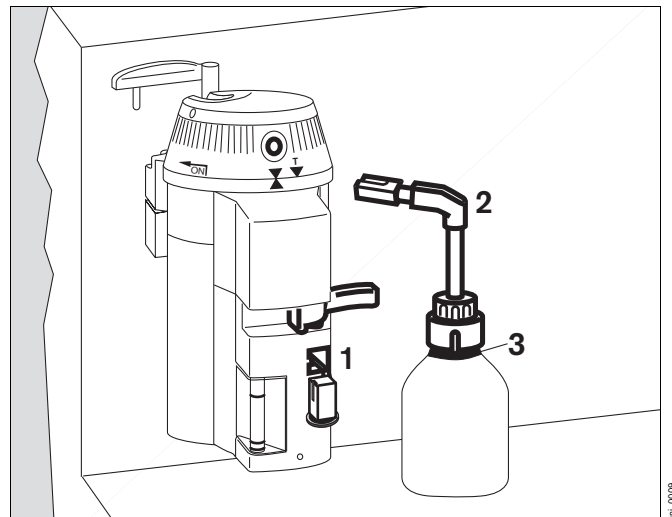
With a display of filling level with minimum and maximum levels marked and a third (middle) mark which shows when a whole bottle (250 mL) can be used.

Dräger recommend the use of anaesthetic-agent-specific filling systems to prevent incorrect filling and to reduce the volume of anaesthetic agent vapour released during the filling process.

Keyed filling system

consisting of

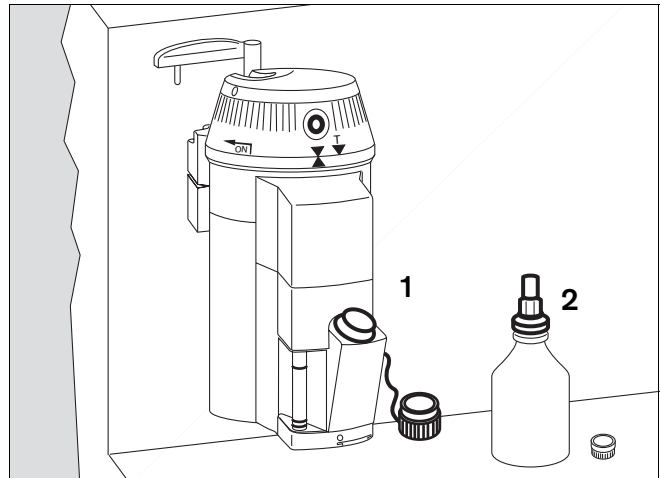
- 1 the anaesthetic-agent-specific filling system on Vapor
- 2 an anaesthetic-agent-specific filling adapter
- 3 the anaesthetic-agent specific collar and threads on the neck of the bottle.



Dräger Fill filling system

consisting of

- 1 the anaesthetic-agent-specific filling system on the Vapor,
- 2 the anaesthetic-agent-specific Dräger filling adapter on the bottle.



Quik Fil filling system

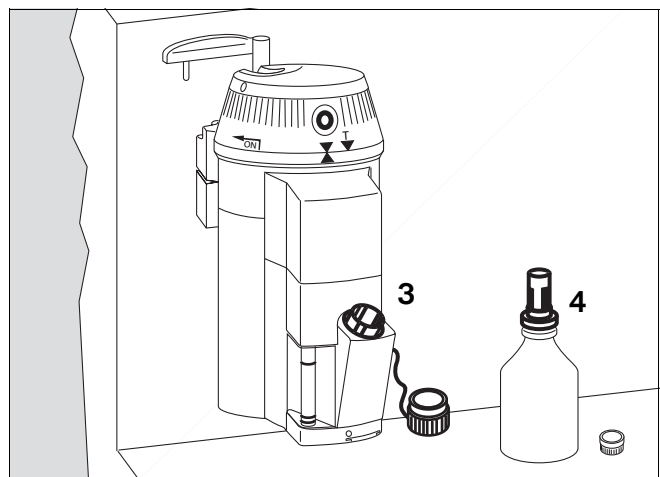
consisting of

- 3 the anaesthetic-agent-specific filling system on the Vapor
- 4 the anaesthetic-agent-specific adapter firmly mounted on the bottle.

Quik Fil filling system with screw-on adapter (not shown)

consisting of

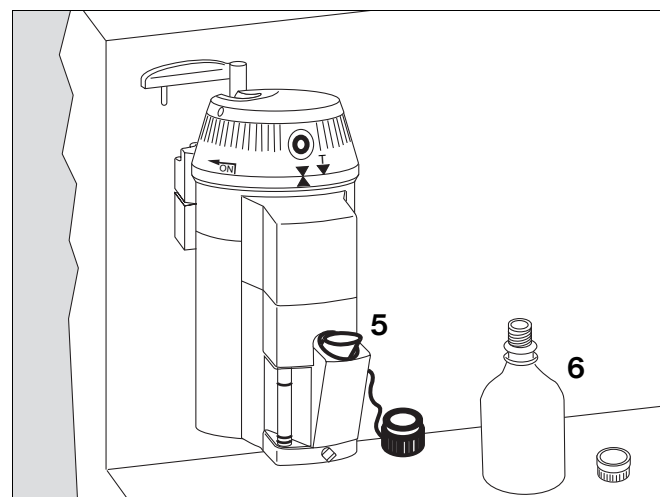
- the anaesthetic-agent-specific filling system on the Vapor,
- the anaesthetic-agent-specific Quik Fil filling adapter on the bottle.



Vapor with filling spout

consisting of

- 5 a **non-specific** filling system on the Vapor
- 6 the anaesthetic agent bottle.



Preparation

Fitting connectors

Use only authentic Dräger parts.

Only selected materials may be used with anaesthetic agents in breathing gas.

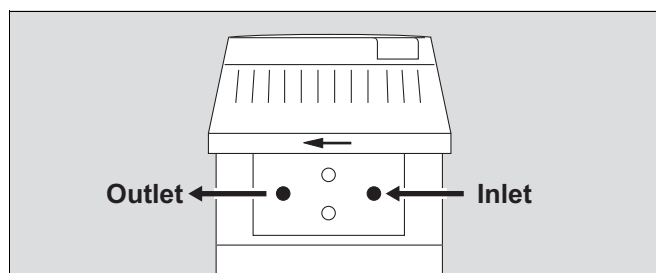
Connectors may only be fitted by trained service personnel, because they must be dismantled and checked.

Risk of incorrect output concentration or escape of anaesthetic agent otherwise.

- Remove protecting cap on gas inlet/gas outlet at the back – when fitted.
- Always connect Vapor in such a way that the gas flow matches the illustration given and the arrow on the back.

If the flow is in the wrong direction an incorrect concentration may be delivered, often an increased concentration.

- Follow Instructions for Use for Anaesthesia Delivery System.
- For conical connectors: the male cone on the connecting piece is the Vapor inlet; the female cone on the connecting piece is the Vapor outlet.



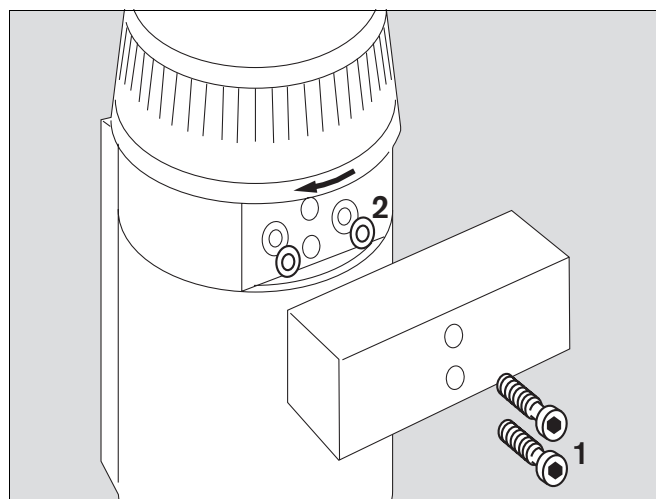
- Two new screws – do not re-use old screws:
 - strength class 10.9, surface A2R conforming to DIN ISO 4042, heat treated.
 - dimensions DIN EN ISO 4762-M4 x length depending on connector.

Screws fitted through the connector must be screwed into place with a thread length of not less than 5 mm and not more than 7 mm.

If screws less than 25 mm long are used, additional centering pins must be fitted.
- Do not use fan locking washers, washers or similar.

If these requirements are not met, the Vapor might fall off. Risk of injury.
Risk of incorrect output concentration.

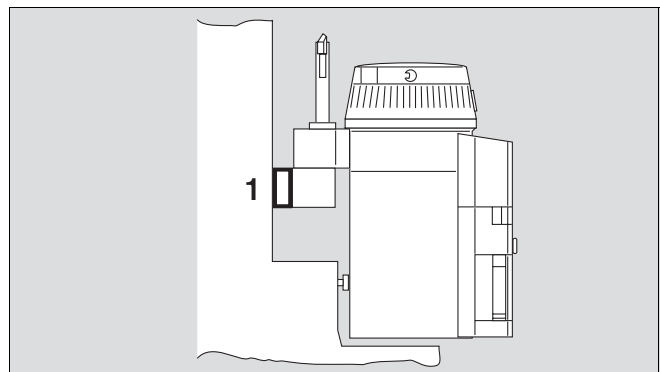
- Before fitting, check that the connecting surfaces, particularly the sealing areas, are clean and undamaged.
- Place 2 sealing rings, item no. M 21929, on the sealing areas around the gas passages.
 - Tighten screws to 270 to 300 Ncm once, do not tighten once more.
 - Check that the connector is secure.



Before using for the first time

- Check that Vapor is undamaged.
- Set control dial to »T«.
- Remove locking device from gas inlet/gas outlet on the back of the Vapor – if fitted.
- "Check readiness for operation", see page 36.
- If Vapor is to be connected to type SA2 or Titus anaesthesia delivery systems:
these machines must be modified for operation with the Vapor 2000 (DrägerService) before the connection is made.

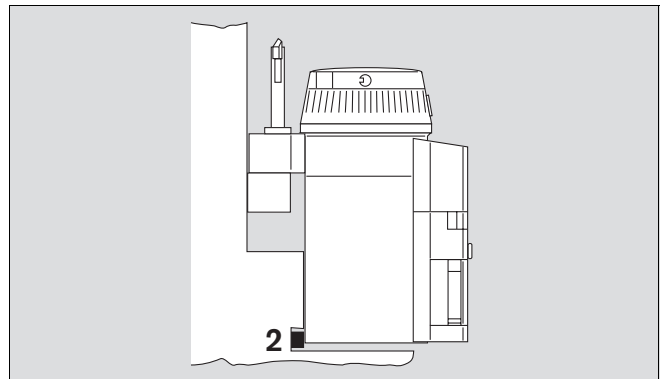
- 1 SA2:
detail of modification:
extra plate, 1 cm thick, between plug-in
connector and housing of anaesthesia delivery
system.



- 2 Titus:
detail of modification:
rubber buffer of O₂ alarm, fitted at the point
where Vapor is hanging, fits flush with surface of
housing.

Check that the Vapor fits flush with the lower installation points
and, when viewed from the side, is suspended from the
machine in a vertical position.

**Risk that fresh gas and anaesthetic agent vapour may
escape otherwise.**



- "Filling Vapor", see page 13.
After filling for the first time wait 15 minutes for the dry
wicks inside to become saturated.
The filling level of the anaesthetic agent may drop; refill if
required.
- "Checking concentration", see page 39.
- Use on anaesthesia delivery systems made by other
manufacturers only after a system function check for
geometry, pressure and flow has been carried out by
trained service personnel (on each type of anaesthesia
delivery system).

**The technical data for Vapor 2000 and the anaesthesia
delivery system must be adhered to. Any deviations might
result in incorrect concentrations being delivered.**

Filling Vapor

**Take care not to spill anaesthetic agent.
Do not inhale anaesthetic agent vapour.
Danger to health.**

Recommendation: ensure adequate ventilation when filling Vapor when not connected to anaesthesia delivery system.

Only fill Vapor with the anaesthetic agent specified on it.¹
Observe use-by date for anaesthetic agent.

When using branded products from different manufacturers make sure that the correct agent is used, for instance, following the colour coding of the Vapor and the anaesthetic agent bottle:

Halothane	red
Enflurane	orange
Isoflurane	purple
Sevoflurane	yellow

From a **technical viewpoint** the same anaesthetic agent from different manufacturers with different tradenames, which are identical in composition and physical and chemical properties and are approved as medicaments, can be administered separately or in combination in Vapor and monitored with Dräger anaesthetic agent monitors.

Do not use a Vapor which has been filled or partly filled with the wrong anaesthetic agent or other substances.

The concentration delivered may be significantly higher or lower than the concentration set on the control dial.

Risk of explosion from combustible substances.

Many anaesthetic-agent monitors do not identify mixtures of anaesthetic agents and/or detect that the anaesthetic agent being measured differs from the agent that was set. Unusual deviations in the concentration displayed on a monitor may indicate incorrect filling.

If this has happened, mark Vapor for appropriate substance and call DrägerService for repair.

Make sure that the drainage valve is closed as significant quantities of anaesthetic agent may escape if it is not.

Keep Vapor upright, or hanging vertical, while it is being filled.

If it is at an angle it can be overfilled which may lead to concentrations which are too high or too low.

¹ Only use anaesthetic agents approved in the country of use.

Vapor with keyed filling system

Note warnings on page 13.

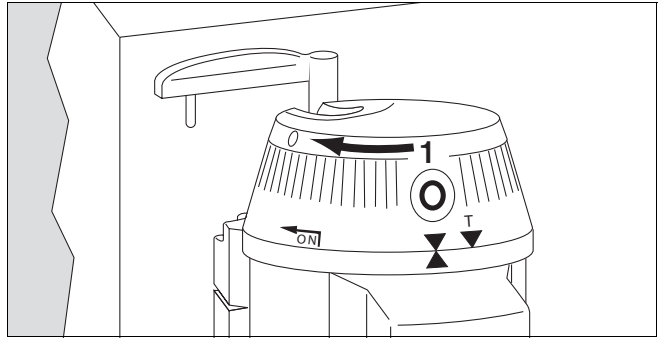
If Vapor is connected to anaesthesia delivery system:
control dial remains engaged at »O«.

When filling during operation:

- Fresh-gas flow can remain as set.

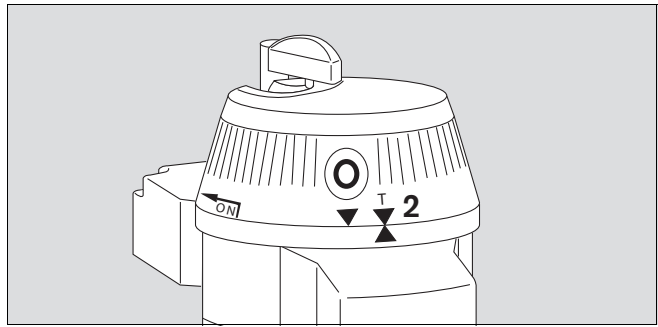
1 Set control dial to »O«

Wait for 5 seconds for pressure to equalise, as fresh gas and anaesthetic agent vapour may escape otherwise.



If Vapor is not connected to anaesthesia delivery system:

2 Control dial remains engaged at »T«.



3 Only use anaesthetic agent bottle with anaesthetic-agent-specific collar on neck of bottle.

Substance-specific filling cannot be assured if bottles without a collar are used.

- Select filling adapter for relevant anaesthetic agent – colour coding and designation/symbols on the filling adapter must correspond to the anaesthetic agent used.

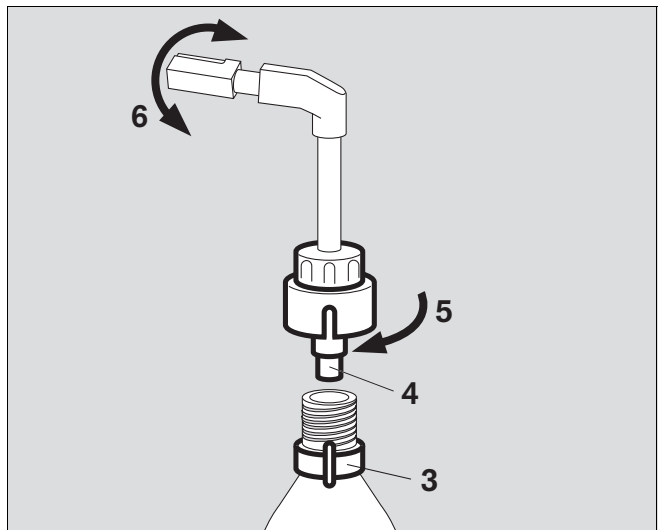
4 Recommendation: only use filling adapter with check valve.

- Do not use filling adapters or bottles which are damaged.

If new, sealed bottles are partly empty there may be a leak.

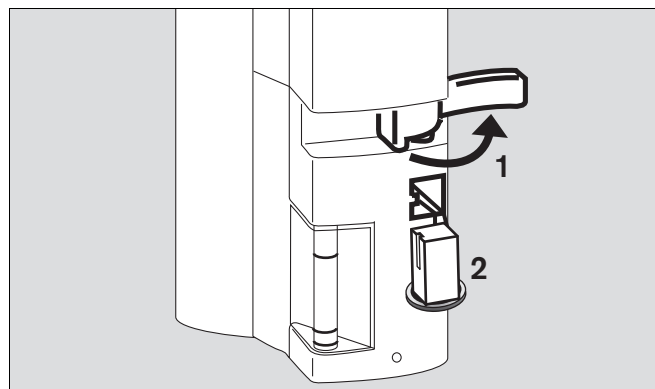
5 Screw filling adapter firmly into anaesthetic agent bottle.

If connection between filling adapter and anaesthetic agent bottle is not leak-tight, Vapor can overfill and anaesthetic agent vapour escape. Danger to health.



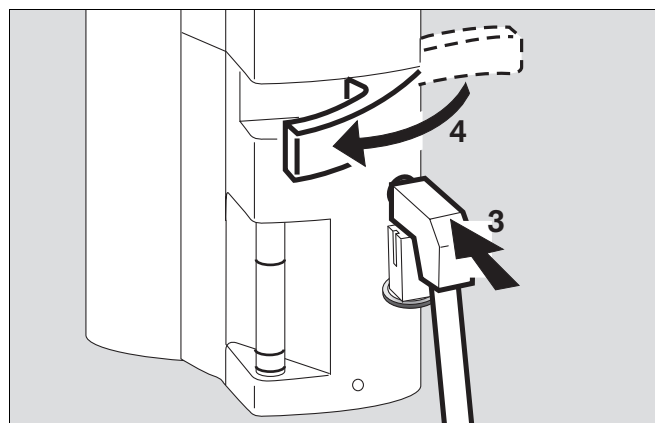
6 Rotate square section on filling adapter so that holes are on the underside.

- 1 Swing lever **slowly** so that pressure in Vapor can escape slowly.
- 2 Pull sealing block out completely and fold down.
- Hold anaesthetic agent bottle below Vapor.
The holes on the adapter must be on the underside.



- 3 Push filling adapter into the opening of the filling system until it engages.
- 4 Tighten lever – do not use excessive force.
The lever need **not** be flush with the front of the machine.

**Excessive force may damage the seal and fresh gas and anaesthetic agent vapour may escape.
Danger to health.**



- 5 Swing anaesthetic agent bottle upside down **slowly** and **hold** in this position.

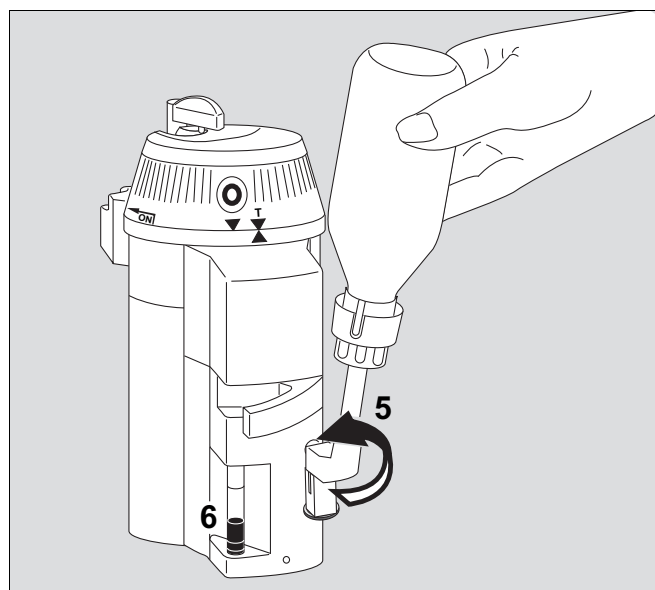
A bottle which is dropped may release significant quantities of anaesthetic agent.

- 6 Watch filling level on sight glass.
When maximum mark is reached, flow stops automatically.

If, however, the filling adapter has not been connected to the anaesthetic agent bottle or to Vapor sufficiently securely or tightly anaesthetic agent may continue to flow into the Vapor*.

Fill to maximum mark only.

If the Vapor is filled above the maximum mark by a few millimetres, the anaesthetic agent will start to overflow through an overflow hole.



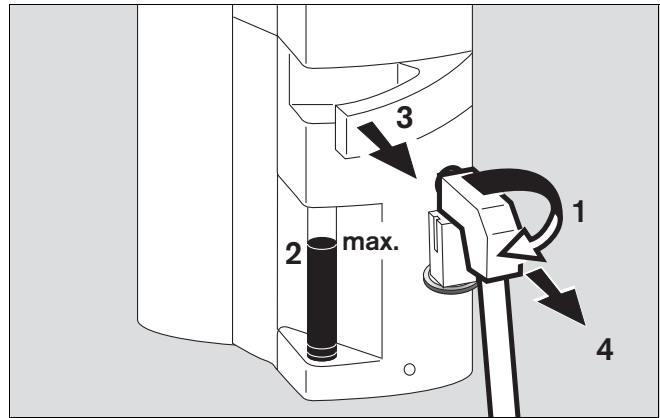
* Seals on Vapor and filling adapter are parts subject to wear; check and replace, when necessary.

To finish filling process:

- 1 Swing anaesthetic agent bottle down.
- 2 Check filling level on sight glass – Vapor must be hanging **vertical** during this check or standing upright. Filling level must be visible and must not exceed maximum mark.

If maximum mark has been exceeded there is a **risk of incorrect output concentration**, so

- Swing anaesthetic agent bottle down.
 - Allow anaesthetic agent to flow back into the bottle to maximum mark.
If necessary, see "Draining Vapor", page 41.
- 3 Swing lever up.
 - 4 Pull filling adapter out.



- 5 Insert sealing block, push in **fully** and **keep pushed in**.
- 6 Lock lever.

If this is not done properly, fresh gas and anaesthetic agent vapour may escape.

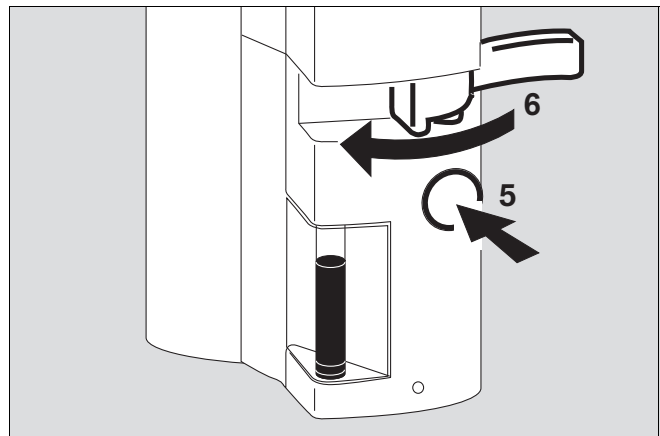
If lever cannot be fully closed, release lever and push sealing block in **fully**. If this is not done, sealing block is not leak-tight, and seal may be damaged.

- Unscrew filling adapter.

Anaesthetic agent bottle must not be stored with the filling adapter screwed on. Anaesthetic agent will escape.

- Close bottle even if it is completely empty, or allow residues of anaesthetic agent in the filling adapter and on the anaesthetic agent bottle to evaporate under an extractor fan.

If this is not done properly, anaesthetic agent vapour will escape into the ambient atmosphere.



Vapor with Dräger Fill filling system**Note warnings on page 13.**

If Vapor is connected to anaesthesia delivery system:

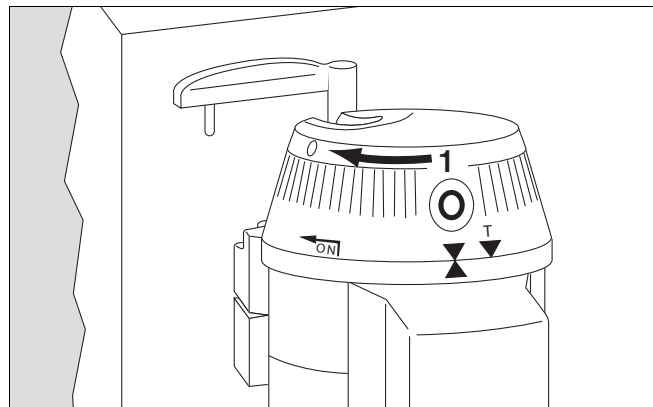
control dial remains engaged at »O«.

Filling during operation:

- Fresh-gas flow can remain as set.

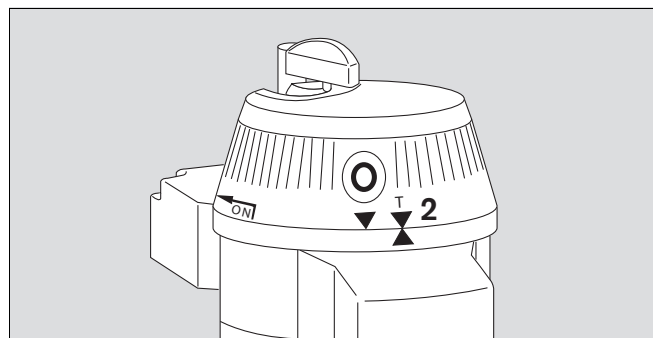
1 Set control dial to »O«.

Wait for 5 seconds for pressure to equalise, as fresh gas and anaesthetic agent vapour may escape otherwise.



If Vapor is not connected to anaesthesia delivery system:

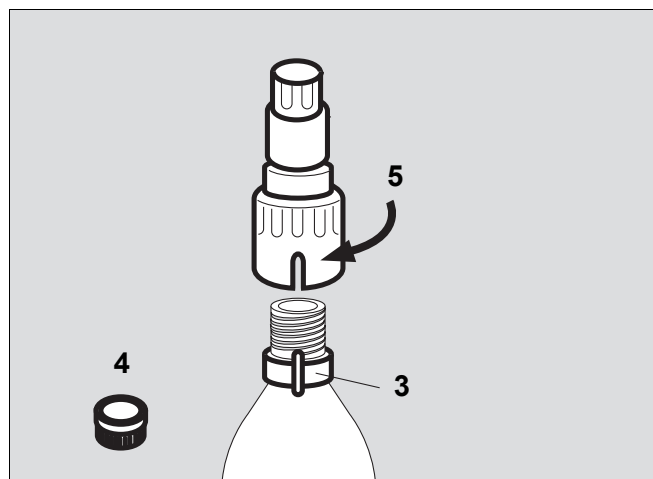
2 control dial remains engaged at »T«.



3 Only use anaesthetic agent bottle with anaesthetic-agent-specific collar on neck of bottle.

Substance-specific filling cannot be assured if bottles without a collar are used.

- Select Dräger Fill filling adapter for relevant anaesthetic agent – colour coding and designation/symbols on the filling adapter must correspond to the anaesthetic agent used.
- 4 Remove screw cap from bottle.
- Do not use filling adapters or bottles which are damaged.
- If new, sealed bottles are partly empty there may be a leak.**
- 5 Screw Dräger Fill filling adapter **firmly** onto anaesthetic agent bottle.



If connection between filling adapter and anaesthetic agent bottle is not leak-tight, Vapor can overfill and anaesthetic agent vapour escape. Danger to health.

- 1 Unscrew locking cap on filling system **slowly** so that any pressure in Vapor can escape slowly.
- 2 Insert bottle with filling adapter into filling opening. Turn the bottle **clockwise** until the coded area of the filling opening has engaged.

Do not turn the bottle anticlockwise. The filling adapter could detach from the bottle.

- 3 Press the bottle to the stop in the filling opening and keep it pressed.
Do not use excessive force and be careful not to twist the bottle.
- 4 Note filling level on sight glass.
When maximum mark is reached, flow stops automatically.

Fill Vapor to maximum mark only.

If, however, the filling adapter has not been connected to anaesthetic agent bottle securely and tightly enough, anaesthetic agent may continue to flow into Vapor.

- 5 If Vapor is filled above the maximum mark by a few millimetres the anaesthetic agent will start to overflow through an overflow hole.

To finish filling process:

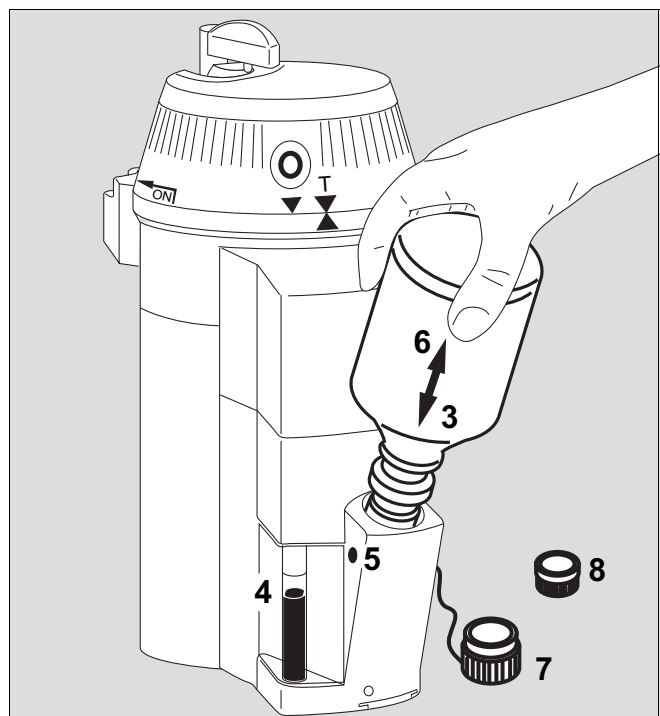
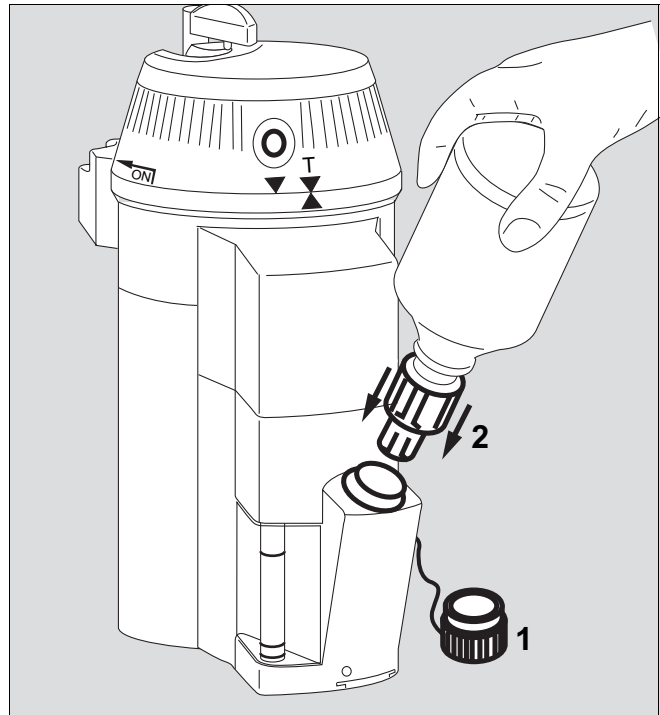
- 6 Reduce the pressure on bottle and pull bottle out slowly.
- 4 Check the filling level on sight glass – Vapor must be hanging **vertical** during this check or standing upright.
Filling level must be visible and not above maximum mark.
If maximum mark has been exceeded there is a **risk of incorrect output concentration**, so:
 - Empty Vapor at least to maximum mark, see "Draining Vapor" page 41.

- 7 Tighten screw cap firmly.

If this is not done properly fresh gas and anaesthetic agent may escape when Vapor is next switched on.

- Unscrew Dräger Fill filling adapter from the bottle and
- 8 close bottle with the screw cap.

Do not store bottle with Dräger Fill filling adapter screwed on.



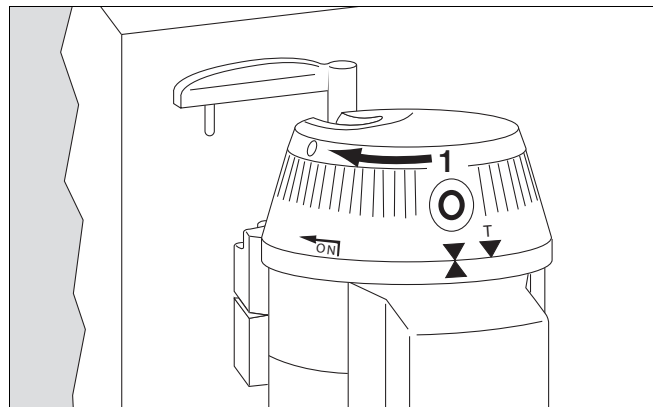
Vapor with Quik Fil filling system**Note warnings on page 13.**

If Vapor is connected to anaesthesia delivery system:
control dial remains engaged at »O«.

When filling during operation:

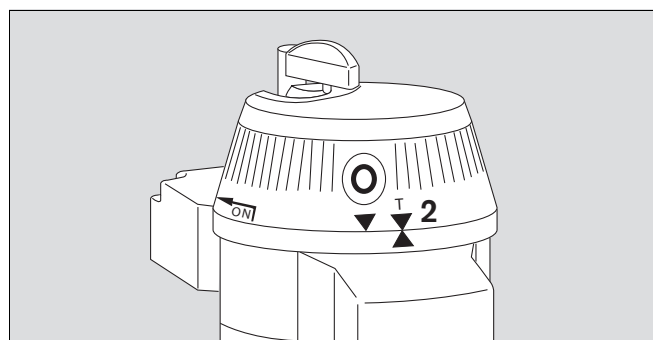
- Fresh-gas flow can remain as set.
- 1 Set control dial to »O«

Wait for 5 seconds for pressure to equalise, as fresh gas and anaesthetic agent vapour may escape otherwise.



If Vapor is not connected to anaesthesia delivery system:

- 2 Control dial remains engaged at »T«.

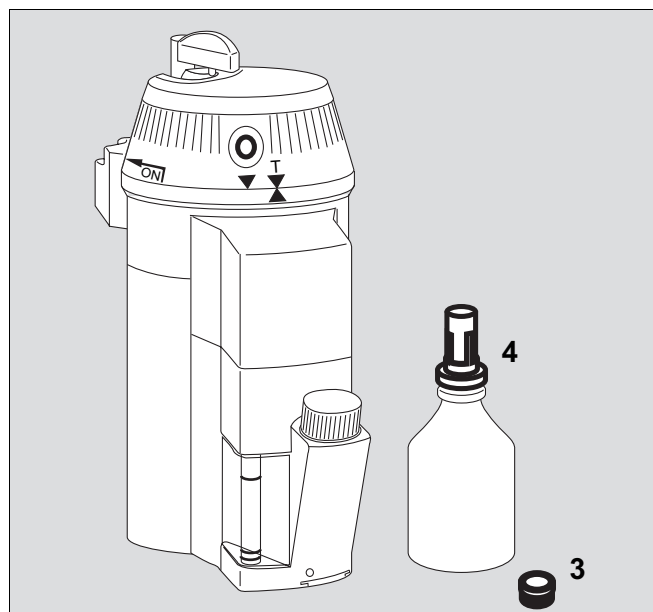


- 3 Unscrew cap from bottle adapter.

- 4 Bottle adapter must rest **securely** and **tightly** on bottle and must not be damaged.

If new, sealed bottles are partly empty, there may be a leak.

If connection between filling adapter and anaesthetic agent bottle is not leak-tight, Vapor can overfill and anaesthetic agent vapour escape. Danger to health.



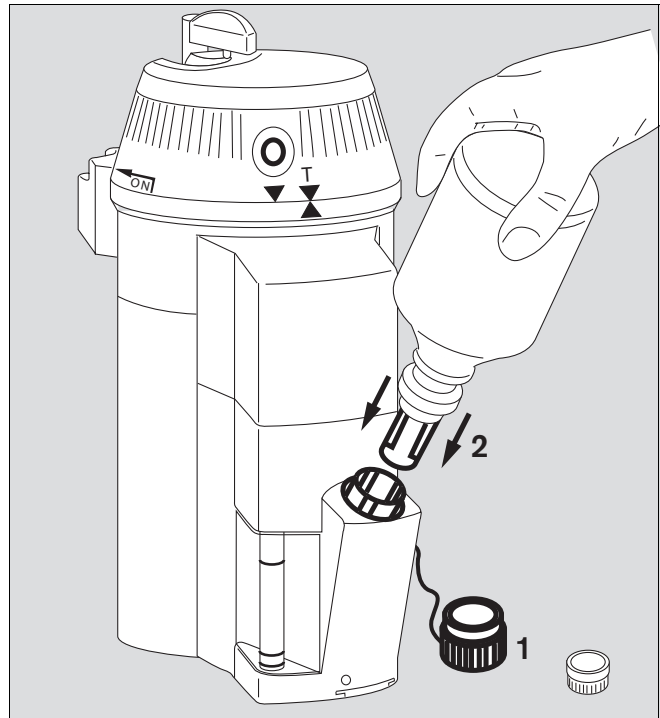
For Quik Fil filling system with screw-on filling adapter:

- Remove screw cap from bottle and screw Quik Fil filling adapter **firmly** onto the anaesthetic agent bottle. See "Vapor with Dräger Fill filling system" Page 17.

Only use anaesthetic agent bottle with anaesthetic-agent-specific collar on neck of bottle.

Substance-specific filling cannot be assured if bottles without a collar are used.

- 1 Unscrew locking cap on filling system **slowly** so that any pressure in Vapor can escape slowly.
- 2 Insert bottle with the flanges going into the matching slots on the filling connector.
Only use bottles with correct flanges.
Take care over colour coding on bottle and Vapor.



- 3 Push bottle into filling connector to the stop and keep pushed in.
Do not use excessive force and be careful not to twist the bottle.
- 4 Note filling level on sight glass.
When maximum mark is reached, flow stops automatically.
Fill Vapor to maximum mark only.

If, however, the filling adapter has not been connected to anaesthetic agent bottle securely and tightly enough, anaesthetic agent may continue to flow into Vapor.

- 5 If Vapor is filled above the maximum mark by a few millimetres the anaesthetic agent will start to overflow through an overflow hole.

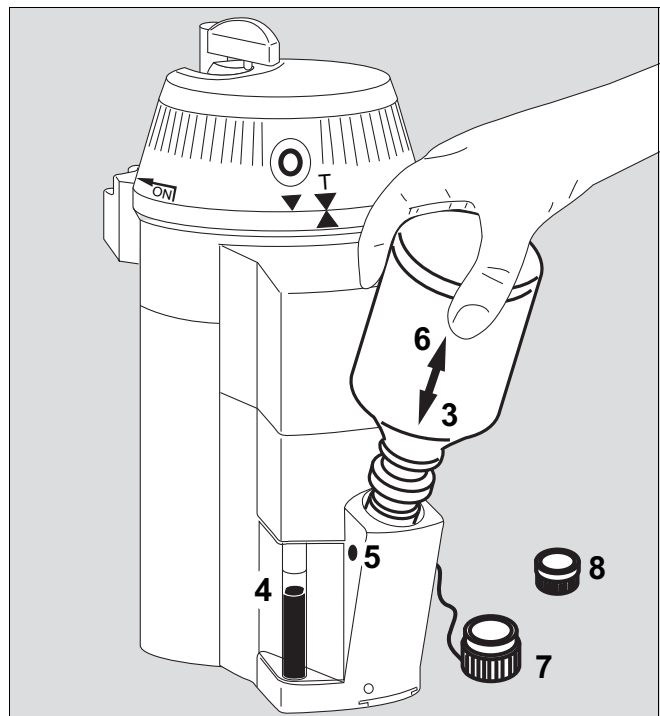
To finish filling process:

- 6 Reduce pressure on bottle and pull bottle out slowly.
- 4 Check filling level on sight glass – Vapor must be hanging **vertical** during this check or standing upright.
Filling level must be visible and not above maximum mark.

If maximum mark has been exceeded there is a **risk of incorrect output concentration**, so:

- Empty Vapor at least to maximum mark, see "Draining Vapor", page 41.

- 7 **Tighten screw cap firmly. If this is not done properly fresh gas and anaesthetic agent may escape when Vapor is next switched on.**



- 8 Screw cap onto bottle adapter.
Always keep bottle closed.

Vapor with filling spout**Note warnings on page 13.**

If Vapor is connected to anaesthesia delivery system:

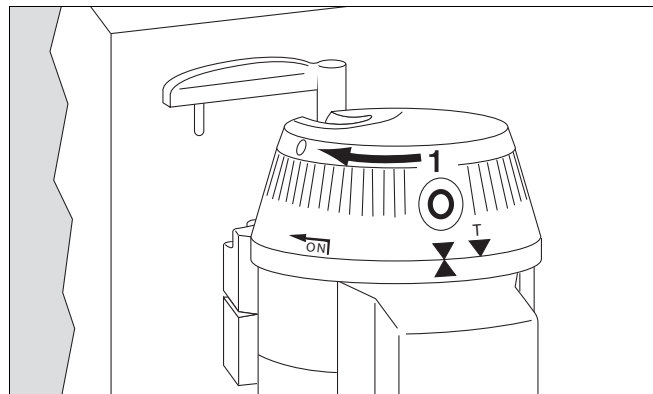
Control dial remains engaged at »0«.

Filling during operation:

- Fresh-gas flow can remain as set.

1 Set control dial to »0«

Wait for 5 seconds for pressure to equalise as fresh gas and anaesthetic agent vapour may escape.



If Vapor is not connected to anaesthesia delivery system:

2 Control dial remains engaged at »T«.

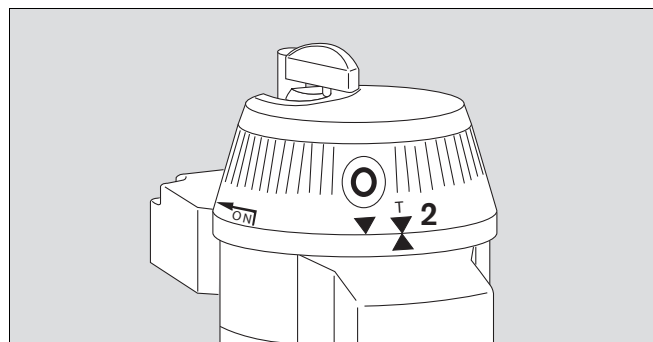
- Use correct anaesthetic agent bottle. Name of anaesthetic agent and colour coding on Vapor and anaesthetic agent bottle must correspond.

3 Unscrew cap from anaesthetic agent bottle.

4 Unscrew locking cap **slowly** from filling inlet, so that any pressure in Vapor can escape slowly.

5 Pour anaesthetic agent slowly into the **inner** filling funnel.

Do not allow anaesthetic agent to overflow. Do not pour any anaesthetic agent between inner filling funnel and housing – anaesthetic agent may overflow.



- Note filling level on sight glass.

If maximum mark has been exceeded:

6 **When Vapor is filled above maximum mark by a few millimetres, the anaesthetic agent will start to overflow through an overflow hole.**

7 Check filling level on sight glass – Vapor must be hanging **vertical** during this check or standing upright. Filling level must be visible and must not exceed maximum mark.

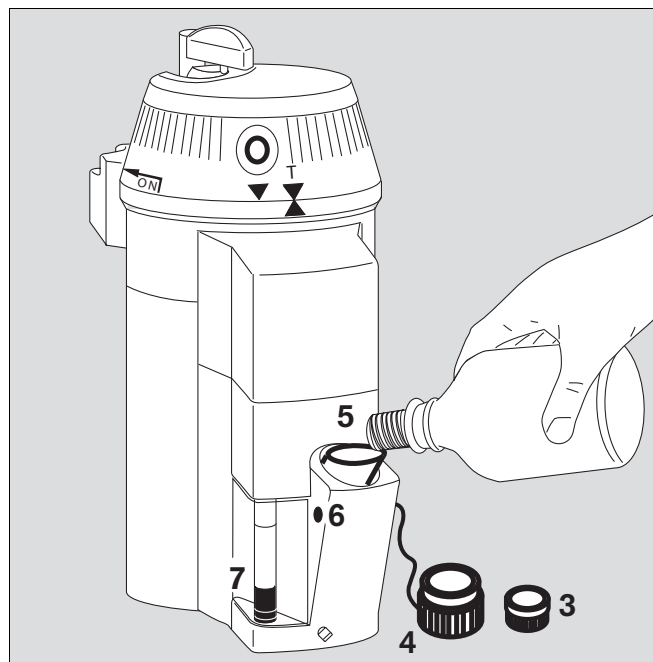
If maximum mark has been exceeded there is a **risk of incorrect output concentration**, therefore:

- Drain Vapor to at least maximum mark, see "Draining Vapor", page 41.

4 Tighten screw cap firmly. If this is not done properly, fresh gas and anaesthetic agent may escape when Vapor is next switched on.

3 Close bottle, even if completely empty, allow any residues of anaesthetic agent to evaporate under extractor fan, if possible.

If this is not done properly anaesthetic agent may escape into ambient atmosphere.



Connecting Vapor

Control dial must be engaged at »T«.

If this is not the case: check concentration before operation, see page 32, "Transport, procedure after tilting".

If Vapor is going to be used on SA2 or Titus anaesthesia delivery systems, check that these have been modified for use with Vapor 2000 (see page 12).

Vapor with plug-in adapter

- 1 Locking lever must be in position over control dial.
- 2 Sealing rings on both pins must be undamaged. There should be no foreign bodies on plug-in connector.

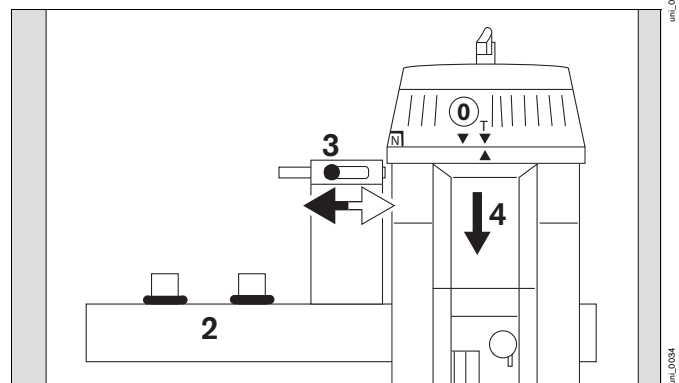
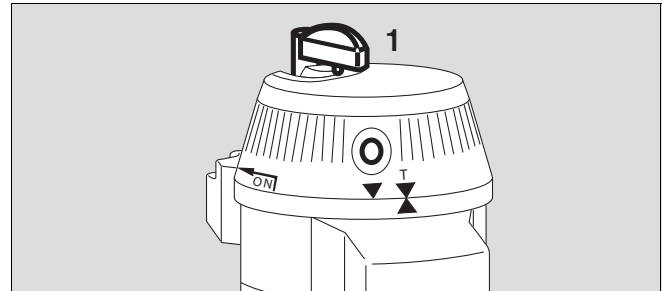
Anaesthesia delivery systems with several plug-in connectors:

Two plug-in connectors and Interlock 2:

- 3 Before hooking Vapor on, slide latch on Interlock 2 to opposite position.
If a Vapor has already been connected and is in operation, it must first be set to »0«.

Several Selectatec-compatible plug-in connectors:

- Switch off vaporisers on other plug-in connectors. Control dial to »0« or »OFF«.
- When several vaporisers are connected, they must always be right next to each other.
For Interlock to operate, it is essential that there is direct contact on the Interlock pin.
For triple plug-in connectors with built-in transmission of safety locking between the two outer plug-in positions, the middle plug-in position may remain unoccupied.
- 4 Hold Vapor in vertical position with both hands and lower gently onto the pins on the plug-in connector.



Risk of injury by trapping finger.

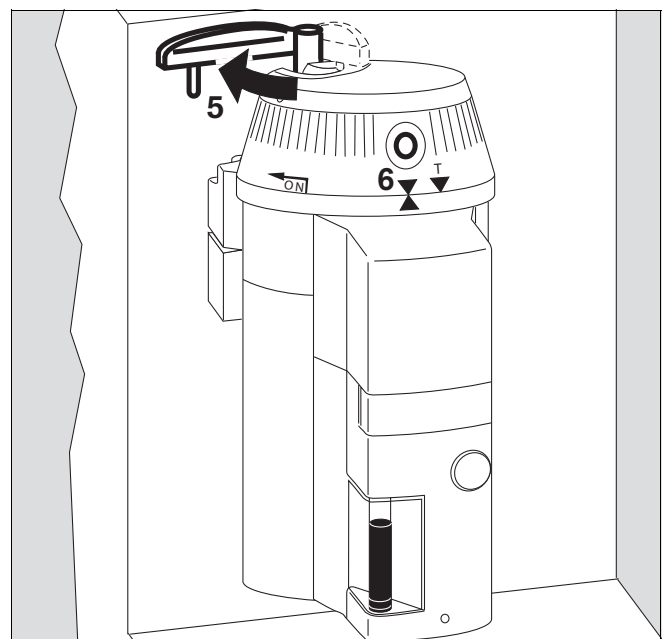
For multiple Dräger Auto Exclusion plug-in connectors:

- Vapor 2000 with Auto Exclusion plug-in adapter can be connected to any free Dräger Auto Exclusion slot.

The plug-in adapter must be level and stable on the sealing rings. If this is not the case, there may be a loss of fresh gas, leaks, excessively low output concentrations or the Interlock locking device may jam.

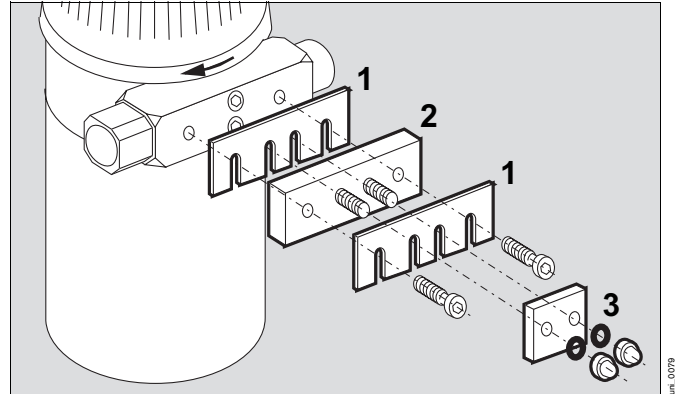
If this is the case: "Disconnecting Vapor" see page 28, check positions of lever and stop-mechanism, and then re-connect Vapor.

- 5 Swing locking lever clockwise through 90° until it engages. The Vapor is then secured and cannot be removed.
- 6 Press »0« button and set control dial to »0«.



Vapor with conical connectors without Interlock system

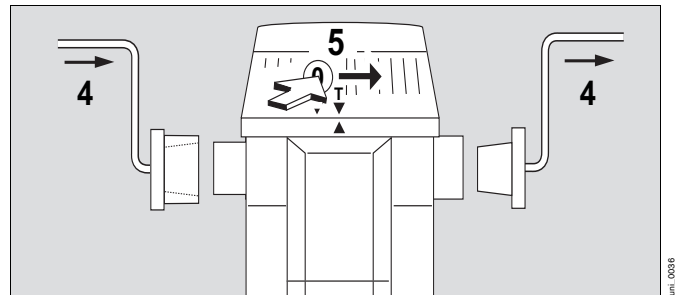
- Insert Vapor in fresh-gas line.
- 1 For anaesthesia delivery systems with rigid conical connectors, adjustment plates may be used for alignment: Between connecting piece and connecting plate and/or connecting plate and anaesthesia delivery system. Ensure adequate screw length – at least 4 engaged threads. If necessary, use longer screws, strength at least 500 N/mm².
- 2 Fasten connecting plate to connecting piece using M6 DIN 912-A4 cap screws, torque (7±0.5) Nm.
- 3 Tighten Vapor with clamping plate and two M6 DIN 1587M-A4 cap screws and two washers A6,4 DIN 125-A4.



The Vapor should not be used in a breathing system. Risk of incorrect output concentration and high resistance may affect breathing.

- 4 Connect gas inlet line and outlet line to Vapor.

Make sure that the direction of flow is correct and corresponds with the arrow on the back of the Vapor, see page 10.



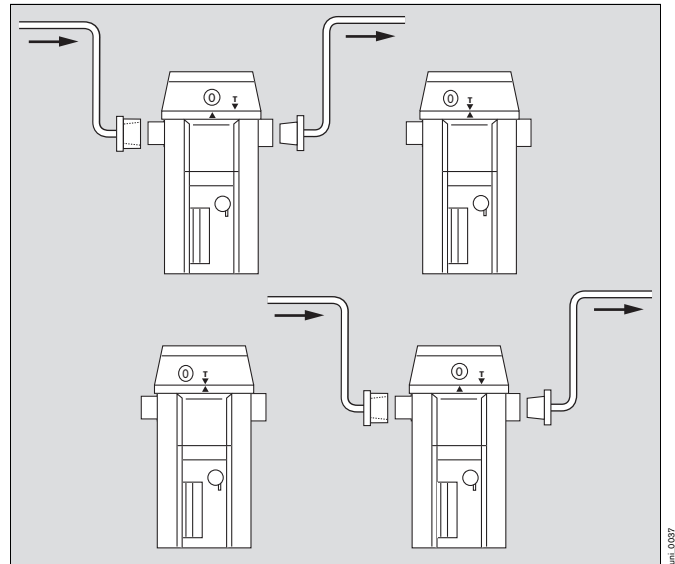
- 5 Press »0« button and move control dial to »0« until it engages.

Secure free-standing Vapor against tilting and falling. Risk of injury.

Make sure that only one Vapor is used at any one time and that only one Vapor is connected at any one time. If this is not done, mixtures or concentrations which are too high may be delivered.

On the Vapor which is not being used:

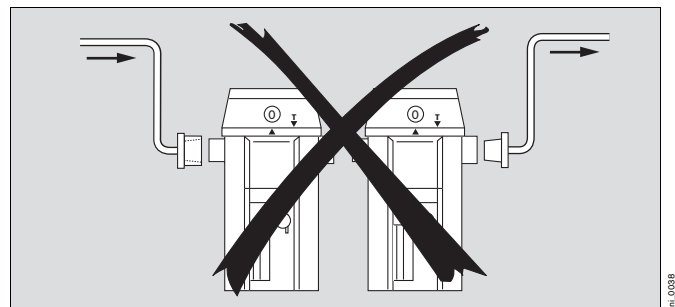
- press »0« button and move control dial to »T« until it engages.



When using several Vapors with conical connectors:

Never connect Vapors in series.

If Vapors are connected in series without an Interlock system there is a risk that several Vapors will be switched on and be operational at the same time. If this happens, gas containing anaesthetic agent would flow from one Vapor into the vaporising chamber of another Vapor resulting in uncontrolled mixtures.



Operation

Checklist – checks before each use

Conditions:

- Operating parameters (e.g. temperature) as specified for the application – otherwise, wait for temperature to equalise with ambient temperature (see page 30).

High temperatures at low atmospheric pressures (high altitudes) may result in an uncontrolled excessive dosage, see page 54.

- Operation in magnetic field
Vapors must not be changed or left unsecured in magnetic fields.

**Vapor can be moved by magnetic attraction.
Risk of injury.**

Only use anaesthesia delivery systems and accessories designed for use in magnetic fields. Use only suitable adapters and drain adapters for filling and emptying the Vapor.

- Operation at an angle, e.g. in portable anaesthesia delivery systems:

At an angle of more than 10° an unsecured Vapor may tilt. If a Vapor is operated at an angle of more than 30° uncontrolled concentrations may occur. (see "Transport, procedure after being tilted", page 32).

Connections, plug-in connectors/plug-in adapters may leak when used at greater angles.

The filling level shown in the sight glass will not be correct when Vapor is used at an angle. This may lead to overfilling.

- Anaesthesia delivery system prepared in accordance with Instructions for Use and anaesthetic gas scavenging system connected.
- Anaesthetic-agent monitor switched on and correct anaesthetic agent set. Alarm limits set.

Dräger recommend monitoring with a monitor with continuous measurement and upper and lower alarm limits to detect any hazardous output values due to deviations in concentration, leaks or incorrect filling, particularly for Vapors with filling spout. For this reason, monitors should be used which can differentiate between different anaesthetic agents.

When using Low Flow and Minimal Flow, the concentration in the breathing system may deviate significantly from the Vapor setting. For this reason, measurement of inspiratory and/or expiratory anaesthetic agent concentration is essential.

- Oxygen monitor switched on. Alarm limits set.

Dräger recommend monitoring with a monitor with continuous measurement and at least a lower alarm limit to detect an insufficient oxygen supply, e.g. due to leaks.

Setting/checking:

- Filling level in sight glass between minimum and maximum mark – must not exceed maximum mark.
- Filling system:
 - Keyed filling system: locking lever fully in place and lever locked.
 - Quik Fil® or funnel filling system: screw cap in place and securely tightened.
- Connector system:
 - Plug-in connector: plug-in adapter level on the seals. Locking lever swung to the left. Vapor secure and hanging vertical on machine, when viewed from front and side.
 - Other connector: Vapor connected firmly and securely on anaesthesia delivery system. Vapor is suspended or stands upright and is secured against tilting or falling.
- Direction of flow corresponds to arrow.
- For several connectors:
 - All connectors occupied, if not
 - any unoccupied permanent and conical connectors or plug-in adapters without valve function, must not be open for operation.

If these are not done, fresh gas and anaesthetic agent vapour will escape, interrupting the patient's supply.

- Only one vaporiser connected at a time, if not:
- check that there is an Interlock system on vaporiser and anaesthesia delivery system, and that it is of same type.

A malfunctioning Interlock may endanger the patient by causing overdosing or a mixture of anaesthetic agents.

- Fresh-gas flow must be switched off.
- Check each vaporiser connected as follows:
 - Set vaporiser to any concentration.
 - All other vaporisers must be switched off, locked off and impossible to switch on.
 - If there is an anaesthetic-agent vaporiser checking system, check that the correct anaesthetic is indicated and that it matches the Vapor connected.

If these are not done, an incorrect concentration may be displayed.

- Switch off vaporiser – control dial set to »0«.
- Check that Vapor, connector and fresh-gas lines are leak-tight (see Instructions for Use for Anaesthesia Delivery System):
 - control dial setting »0« and »T«
 - control dial setting ≥ 0.2 vol.%.
- Flush the breathing system with fresh gas before connecting a patient.

Do not operate Vapor unless all checks have been carried out satisfactorily. Any repairs must be carried out by qualified service personnel.

Adjusting concentration of anaesthetic agent

- First set flow of fresh gas on anaesthesia delivery system, If control dial is set to »T«:

- press »O« button, set control dial to »O«, wait 5 seconds for pressure to equalise.

1 Press »O« button and

2 turn control dial anti-clockwise to the concentration of anaesthetic agent required.

If concentration cannot be set:

Do not force control dial.

Check that all other vaporisers connected are in »O« or »OFF« position and that Interlock is operational.

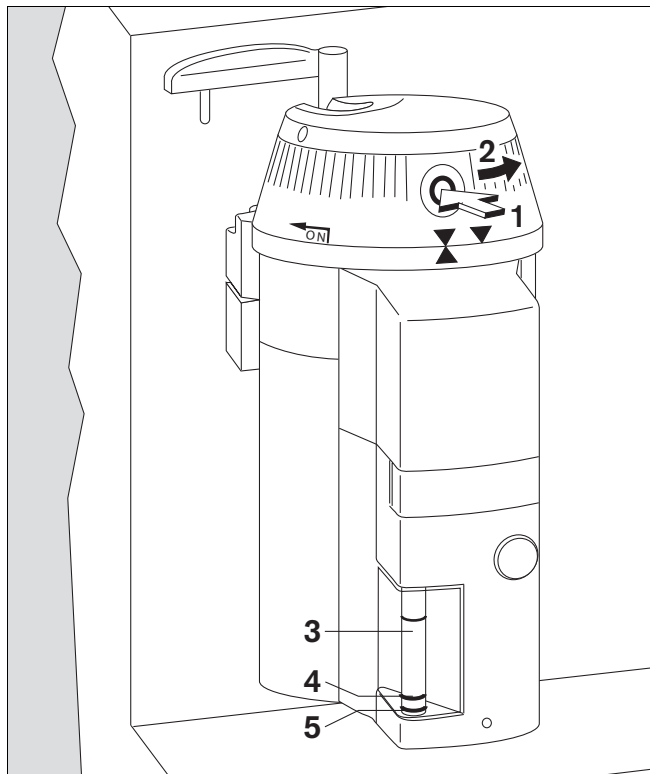
No settings between »O« and »ON«.
In this range concentrations cannot be defined.

3 Check filling level in sight glass regularly. This must be visible between minimum and maximum marks.

If not, do not use Vapor. Vapor could be empty or overfilled, and output concentration could be incorrect.

4 When this mark is reached, Vapor may be refilled with 250 mL (usual anaesthetic agent bottle).

5 When minimum mark is reached, at the latest: see pages 13 to 21, "Filling Vapor".



If the anaesthetic agent monitor shows implausible values, check Vapor for incorrect filling, particularly Vapors with filling spout, and check monitor for wrong setting.

During prolonged operation with both a high flow of fresh gas and a high concentration, the concentration administered may decrease.

Be careful about temperature range, see page 48.

An anaesthesia delivery system may be moved at the workplace with Vapor switched on.

Jerky movements or tilting at an angle of more than 30° can cause incorrect output concentration.

Changing anaesthetic agent

- Set Vapor being used to »O«.
- Switch anaesthetic agent monitor to new anaesthetic agent.

If only one Vapor is connected or if one of the connected Vapors is to be replaced:

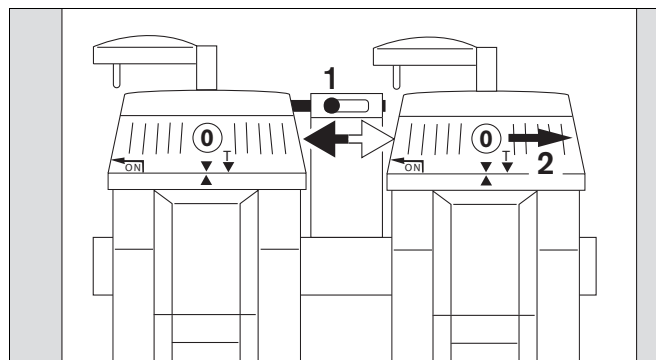
- "Disconnecting Vapor", see page 28.
- "Connecting Vapor", see page 22.

Two Vapors with Interlock 2:

- 1 Slide latch on Interlock 2 into the control dial on the Vapor which has been used until it engages.

On Vapor to be used:

- 2 Press »0« button and set control dial to anaesthetic agent concentration required.



Ending administration of anaesthetic agent

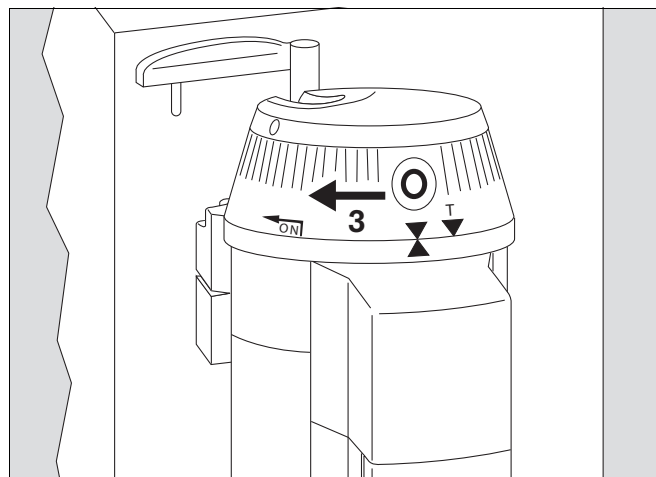
- 3 Switch off Vapor: control dial engaged at »0« to prevent it being switched on accidentally.

Then, if required:

- Switch off fresh-gas flow on anaesthesia delivery system.

Fresh gas flow must never be switched off before Vapor is switched off. Vapor must never be left switched on without a fresh-gas flow.

Anaesthetic agent vapour at a high concentration can get into machine lines and ambient air and harm people and materials.



End of use

When Vapor is not going to be used for up to six months, it may remain filled;

if Vapor is not going to be used for more than 6 months, see "Shut down", page 41.

If Vapor remains on machine:

- For intervals of more than one week, anaesthetic agent loss from the vaporiser chamber can be minimised by using the »T« setting.
- Locking lever on plug-in adapter should remain locked off.
- Keep within permissible temperature range, see page 48.
- Observe use-by date of anaesthetic agent.

If not:

- see "Disconnecting Vapor", page 28, and "Transport when filled", page 29.

Disconnecting Vapor

Take care not to drop Vapor. Do not re-use Vapor if it has been dropped. Damage may cause incorrect output concentration.

Do not carry by the control dial, control dial caps or locking lever for the plug-in adapter.

Risk of injury.

Disconnect Vapor only when control dial is set at »T«.

Risk of incorrect output concentration and of anaesthetic agent escaping otherwise.

Place Vapor only on firm even surfaces or hang from stable brackets. Vapor could be damaged.

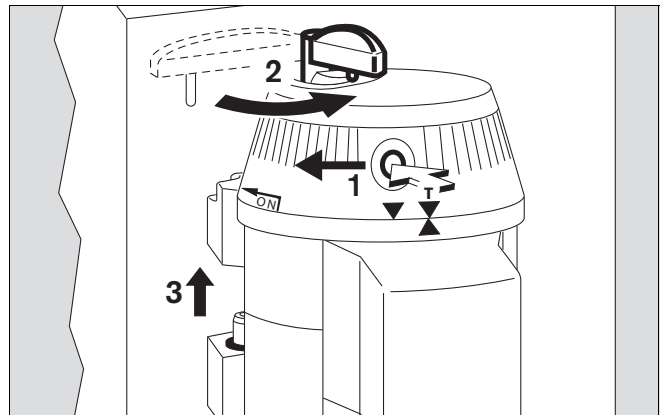
Risk of injury.

Plug-in connector

- When necessary: switch control dials of adjacent anaesthetic vaporisers to »O« or »OFF«.
 - Anaesthesia delivery systems with two plug-in connectors and Interlock 2:
Slide latches to opposite positions.
- 1 Press »O« button and turn control dial clockwise to »T« until it engages.
 - 2 Turn locking lever 90° anti-clockwise and engage in control dial.
 - 3 The Vapor can now be lifted off the plug-in connector smoothly, using both hands.

For plug-in connectors without valves in this condition, the fresh-gas supply is now disconnected. Fresh gas and anaesthetic agent vapour may escape.

When operating an anaesthesia delivery system with several vaporisers and Interlock S, Interlock S may cease to function effectively when one vaporiser is disconnected.



For Auto Exclusion plug-in connector

- 1 Press »O« button and turn control dial clockwise to »T« until it engages.
- 2 Turn locking lever 90° anti-clockwise and engage in control dial.
- 3 The Vapor can now be lifted off the plug-in connector smoothly, using both hands.

For conical connectors

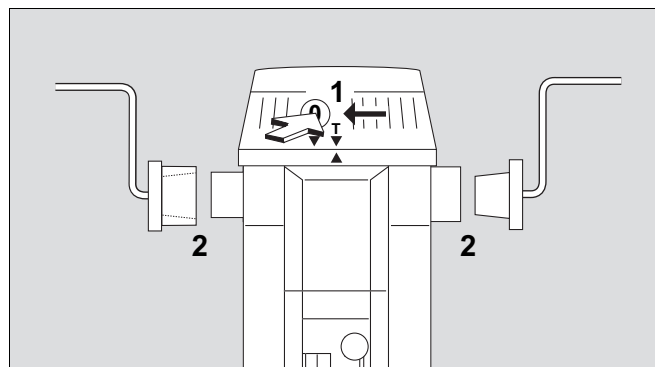
- 1 Press »O« button and turn control dial clockwise to »T« until it engages.
 - 2 Detach gas supply and gas delivery line from Vapor.
- The Vapor can now be disconnected.

The fresh-gas line is now disconnected. Fresh gas and anaesthetic agent vapour may escape.

- If fresh gas is to flow to breathing system, gas supply and delivery line must be connected securely together.

Permanent connection

Only trained service personnel may disconnect Vapor.

**Transport when filled**

by itself or with transportable anaesthesia delivery system, for instance.

Only to be done as part of normal clinical operation, not for storage and despatch.

"Storage", see page 46,

"Despatch", see page 46.

Only to be done when ambient conditions are in accordance with "Technical Data – Shutdown", see page 48.

An anaesthesia delivery system can be moved around at the workplace with Vapor switched on.

Jerky movements and tilting at an angle of more than 30° can cause incorrect output concentration.

Anaesthesia delivery systems with securely fastened Vapors may be moved within or between buildings with hand-wheel set at »O«, if there is no risk of tilting by more than 30°.

When tilted at an angle of more than 30°

- anaesthetic agent may overflow when control dial is set at »O«. **Danger to health.**
- when control dial is set above »O«, anaesthetic agent may leak and get into the flow control system and cause excessively high or low concentrations when Vapor is next used.

Disconnect detachable Vapors from anaesthesia delivery systems and transport separately.

For Transport – control dial must always be engaged at »T«.

Always make sure that Vapor is appropriately secured against tilting at an angle or falling every time it is transported, in compliance with the Instructions for Use for Anaesthesia Delivery Systems, and that it is packed safely to prevent damage.

It is recommended that Vapors are kept in an upright position, though other positions are allowable in the »T« setting.

Fault – Cause – Remedy

Fault	Cause	Remedy
Operation:		
No concentration delivered or concentration excessively high/low	Vapor not full, Vapor empty	Fill Vapor
	Control dial setting at »0« or »T«	Set control dial to ≥ 0.2 vol.%
	No Vapor connected, or if several connections, one unoccupied and open	Connect Vapor, or close open connections with Vapor or by direct gas connections
	Vapor tilted during or before operation when control dial not at »T« setting. If this has happened, liquid anaesthetic agent may have entered flow control system	Before operation: flush and then check concentration , see "Transport, procedure after tilting", page 32
	Vapor filled with incorrect anaesthetic agent or mixture of agents	Drain Vapor and blow off, see pages 41 to 46, Repair*
	Gas is flowing through Vapor in wrong direction	Check connection system, see page 11
	Leak, e.g. plug-in adapter is not fitted flush on seals	Disconnect Vapor; check plug-in adapter safety locking device and sealing rings; replace. Leak test with Vapor at control dial setting »0« and ≥ 0.2 vol.%
	Leak at connector, e.g. Vapor connected to SA2 or Titus which are not modified for Vapor 2000, see page 12	Have modification carried out by DrägerService
	Valves in plug-in connector damaged	Repair*
	Vapor temperature outside specified application range, e.g. filled with very cold anaesthetic agent, or operated with both flow and concentration high over a prolonged period	Allow Vapor to reach normal temperature, allowing at least 15 min per °C deviation from specified range, see page 54; refill with anaesthetic agent at room temperature
	Vapor being operated with carrier gas other than air	Concentration changed because of carrier gas, see pages 39 and 56
	Monitor displays volume percentage, not partial pressure	To convert measured value to partial pressure, see page 40
	Vapor or anaesthetic monitor faulty	Check with another Vapor to establish whether Vapor or anaesthetic agent monitor faulty, repair*

* to be carried out only by trained service personnel

Fault	Cause	Remedy
The vaporiser detection system on anaesthesia delivery system to which Vapor is connected displays anaesthetic agent which is different from the Vapor	Coding of plug-in adapter or Vapor damaged, faulty, or incorrectly fitted	Check coding, if necessary re-fit, repair*
Monitor indicates different anaesthetic agent from that on the Vapor (applies only to anaesthetic agent monitors with anaesthetic-agent detection system)	A different anaesthetic agent has just been used and high concentrations of it are still present in the breathing system	Flush breathing system or wait for gas to change
	Monitor has not been switched over after anaesthetic agent has been changed	Switch over monitor
	Incorrect anaesthetic agent or anaesthetic agent mixture in Vapor	Check Vapor, drain and blow off, see pages 41 to 46; repair*
Control dial cannot be set to concentration	»0« button not pressed	Press »0« button
	Interlock not switched over; Interlock jamming or another vaporiser still switched on	Switch off other vaporiser and switch over Interlock. Checks, see page 27; repair*
Control dial can be moved from »0« to »T« without pressing button	»0« button defective	Repair*
Smell of anaesthetic agent, anaesthetic agent vapour leaking, leakage too high during leak test	Plug-in adapter not fitted flush	Check plug-in connector sealing rings and sealing surfaces; alternatively locking lever not engaged or was twisted before connection
	Leak on connector, e.g. Vapor connected to SA2 or Titus which are not modified for Vapor 2000, see page 12	Have modification carried out by DrägerService
	Locking device on filling system not tightened, or defective seals	Tighten locking device on filling system, or check seals, replacing if required, or repair*
	Drainage screw not closed	Screw drainage screw tight
	Lever of keyed filling system too loose so that seals not compressed enough	Adjust lever; repair*
	Sealing block on filling system not fully pushed in	Loosen lever, push sealing block in fully, re-tighten lever

* to be carried out only by trained service personnel

Fault	Cause	Remedy
Filling level cannot be read in sight glass	Vapor completely empty	Refill Vapor
	Vapor overfilled	Drain Vapor to maximum mark. Check concentration
	Sight glass display faulty	Repair*
Anaesthetic agent is obscured in sight glass.	Halothane contains thymol, which has accumulated in the vaporiser	Drain discoloured substance completely; clean Vapor, see page 38

Transport, procedure after tilting:

Anaesthetic agent has leaked	Control dial not engaged at »T« and Vapor tilted at an angle of more than 30°	Place Vapor upright. Set control dial to »T« and engage. – Flush Vapor for 2 hours at 10 L/min or 8 hours at 4 L/min. – Set Vapor at maximum concentration and flush for 5 minutes at 10 L/min. – Check concentration at 0.5 L/min. Air with control dial set at »0«. Concentration must be less than 0.1 vol.%. If not, flush as above. Check concentration, see page 39. If output concentration is not within permissible range, do not use Vapor. Repair*
Vapor not set at »T«, even though it is not connected to anaesthesia delivery system	Vapor may have been tilted at an angle of more than 30° when last handled. Liquid anaesthetic agent may have leaked or entered flow control system to give incorrect concentration	Flush before start-up and check concentration, see above
Smell of anaesthetic agent during or after transport	Anaesthetic agent vapour may escape or liquid anaesthetic leak because of pressure in Vapor when an extreme rise in temperature and/or drop in atmospheric pressure has occurred, see page 49	Do not inhale anaesthetic agent vapour. Ventilate room. Allow Vapor to reach normal temperature. Do not exceed application range for filled Vapor with control dial set at »T« see page 48. Flush before start-up and check concentration, see above.

* to be carried out only by trained service personnel

Fault	Cause	Remedy
Draining and filling Vapor:		
Anaesthetic agent is leaking from drainage outlet	Drain valve not closed	Close drain valve
Vapor accidentally filled with incorrect anaesthetic agent		Drain Vapor completely and blow off, see pages 41 to 46; repair*
Anaesthetic agent does not flow into Vapor	Filling adapter being used without check valve	Use filling adapter with check valve or modify
Anaesthetic agent leaks from bottle thread	Filling adapter not screwed tight enough on bottle	Screw filling adapter on firmly
	Seal in screw-cap on filling adapter missing or damaged	Check seals, Repair*
Anaesthetic agent leaks from filling system	Filling adapter not inserted properly or lever not tightened properly	Loosen lever, push filling adapter in as far as it will go; tighten lever
	Lever does not press down sufficiently firmly onto filling adapter	Adjust lever, Repair*
	Filling adapter damaged	Use another filling adapter, Repair*
	Seal on filling system damaged	Leak test Vapor with control dial set at ≥ 0.2 vol.%. Repair*
Anaesthetic agent is leaking from overflow	Vapor filled above maximum	Drain Vapor to maximum mark; check concentration
Sealing block cannot be removed	Lever not opened enough, or lever incorrectly set	Open lever more, or get it adjusted*
Anaesthetic agent does not flow out when draining	When control dial is set at »T« vaporiser chamber is hermetically sealed	When draining with control dial set at »T« open locking device on filling outlet; close filling outlet again tightly after draining
Quik Fil drain adapter overflows	Drain valve opened too far	Do not open drain valve so far
	Bottle screwed on incorrectly or not fully so that bottle valve does not open	Unscrew bottle from drain adapter, screw back on again
	Bottle full	Unscrew drain adapter and screw onto another suitable bottle; continue draining

* to be carried out only by trained service personnel

Fault	Cause	Remedy
Plug-in adapter:		
Locking lever does not engage in control dial when disconnected	Control dial still set at »0«	Set control dial to »T« and engage
Locking lever cannot be swung out of the control dial	Control dial to »0« or ≥ 0.2 vol.%. During preceding transport, control dial may have been set at »0« or ≥ 0.2 vol.%, liquid anaesthetic agent may have entered the flow control system to give an incorrect concentration	Set control dial to »T« and engage. Flush before start-up and check concentration: see page 32, "Transport, procedure after tilting"
Vapor cannot be disconnected	Control dial not set at »T«	Set control dial to »T« and engage
	Interlock still engaged	Disengage Interlock
	Locking lever cannot be swung back into control dial; locking device between plug-in adapter and plug-in connector is jammed	Remove locking cap on top of locking lever shaft; loosen screw in shaft with 3 mm hexagon socket spanner so that Vapor can be disconnected; Repair*
Plug-in adapter not fitting flush on plug-in connector seals	Locking lever not engaged in hand-wheel, as control dial is set at »0« or ≥ 0.2 vol.%	Set control dial to »T« and engage; insert pin on locking lever into socket on control dial and engage
	Engagement mechanism on plug-in adapter or plug-in connector damaged	Excessive force used may lead to jamming or problems when disconnecting. Repair*
	Locking lever was turned to the left before connection	Disconnect Vapor (control dial at »T«); engage locking lever in hand-wheel; reconnect Vapor
	O-rings on plug-in adapter missing	Fit O-rings
	Extra O-ring on a pin on the plug-in connector or foreign body between plug-in connector and plug-in adapter	Remove O-ring or foreign body
For plug-in adapter S-2000 only: Control dial cannot be turned	Interlock pins are not in their original position	Check whether control dial can be turned after adjacent vaporisers have been disconnected; squeeze both interlock pins inwards by hand, one after the other, and release. If this does not correct the problem, repair*

* to be carried out only by trained service personnel

Care

Do not immerse Vapor and filling adapter in detergents.

Detergents must not be allowed to get under the control dial.

Do not allow detergents to get into the gas inlet or gas outlet, or the filling system.

If liquids other than the anaesthetic agents specified for the Vapor get into the Vapor, the patient may be harmed.

Do not sterilize Vapor or filling adapter. Damage inside may cause incorrect output concentration.

Do not use solvents on Vapor.

Cleaning

Wipe heavy stains off with disposable cloth.

Disinfecting

Use surface disinfectants for disinfection. For reasons of material compatibility use disinfectants based on:

- aldehydes,
- alcohols,
- quaternary ammonium compounds.

Follow the manufacturers' instructions for use.

Do not use preparations which are based on:

- halogen-releasing compounds,
- strong organic acids,
- oxygen-releasing compounds.

We recommend that disinfectants on the current DGHM (DGHM: German Society for Hygiene and Microbiology) (mhp-Verlag GmbH, Wiesbaden, Germany) are used. This gives the composition of each disinfectant.

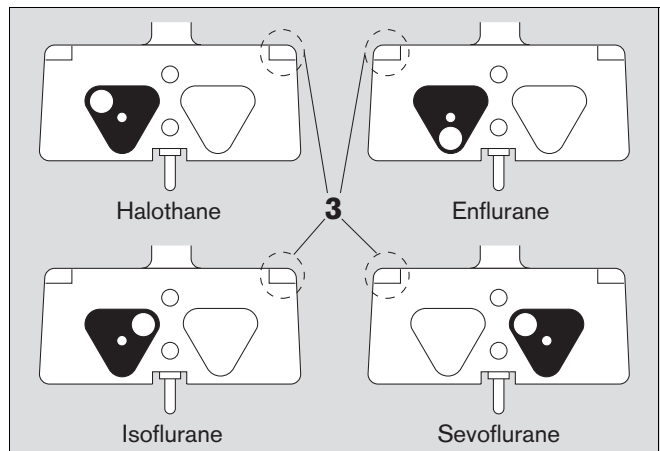
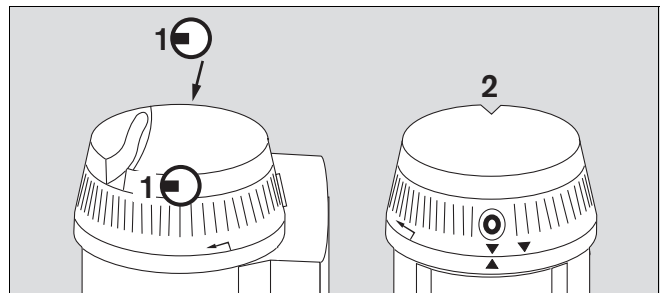
Disinfecting in Aseptor

- Wipe heavy stains off with disposable cloth.
- Vapor must be connected to anaesthesia delivery system and anaesthesia delivery system must be approved for disinfecting in Aseptor. Vapor can remain filled.
- Control dial engaged at »T«.
- Disinfect in accordance with Instructions for Use for Aseptor. Only use programmes with temperatures below 40 °C.

Checking Readiness for Operation

Test after care and service of anaesthesia delivery system or Vapor, after prolonged shutdown and at least every six months.

- Previous inspection less than 6 months ago.
 - Accompanying documents/Instructions for Use present.
 - No damage on Vapor and no loose parts.
 - Anaesthetic agent display on Vapor, colour code on cover plate and other anaesthetic-agent-specific codings, when present (e.g. identification initials or codings on plug-in adapter), are all consistent (see page 13).
 - Gas inlet and gas outlet are not soiled.
 - Control dial engages at »0« setting as well as at »T« setting and cannot be turned without »0« button being pressed.
 - After »0« button has been pressed, control dial can be turned right to the stop, close to highest concentration mark.
-
- Interlock disc rests firmly on control dial.
- 1 Interlock 2 and Dräger Auto Exclusion: nibs are present in both openings and are undamaged.
 - 2 Interlock NMD: Notch at the back when control dial set at »0«.
 - 3 Plug-in adapters must not be fitted to Vapor with an Interlock NMD control dial cap.

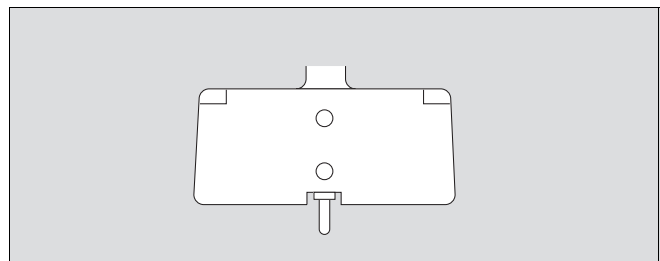


Plug-in adapter DW-2000, Dräger Auto Exclusion and S-2000:

Vapor not on plug-in connector:

- Turn locking lever to locking position – it must turn back automatically.
Re-engage locking lever in control dial.

The newer version of the DW-2000 plug-in adapter, the Auto Exclusion plug-in adapter and S-2000 plug-in adapter do not contain an anaesthetic agent code.

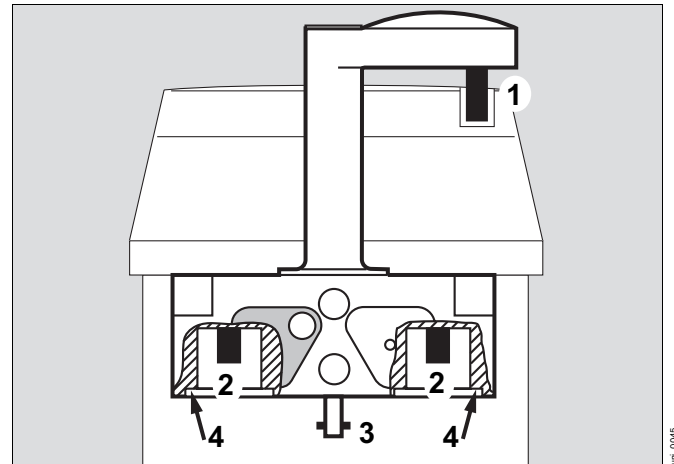


Plug-in adapter DW-2000:

Only use white plug-in adapter for Vapor 2000.

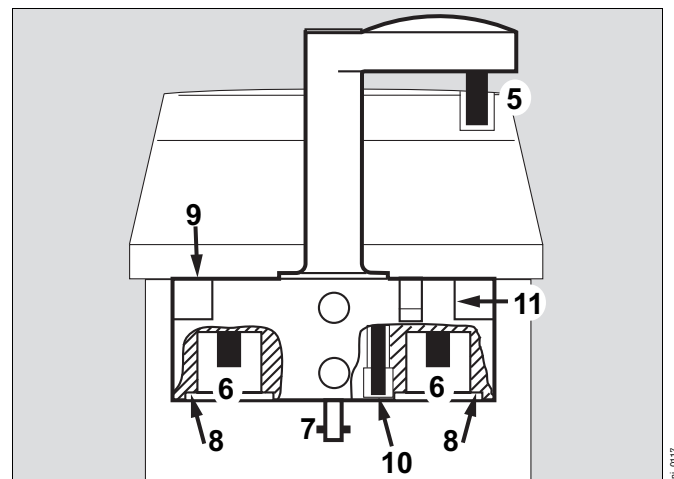
(Vapor 19.n plug-in adapters, which are silver in colour, must never be used on Vapor 2000).

- 1 Drop-in pin on locking lever secure and straight.
- 2 Valve control pins both present.
- 3 Transverse pin at the bottom of the locking lever is tight, in the centre and not buckled.
- 4 Sealing surfaces undamaged.



Dräger Auto Exclusion plug-in adapter:

- 5 Drop-in pin on locking lever secure and straight.
- 6 Valve control pins both present.
- 7 Transverse pin at the bottom of the locking lever is tight, in the centre and not buckled.
- 8 Sealing surfaces undamaged.
- 9 Cover plate present and undamaged.
- 10 Auto Exclusion transmission pin present, moveable and cannot be removed.
- 11 Bearing pin present, tight and flush with housing.

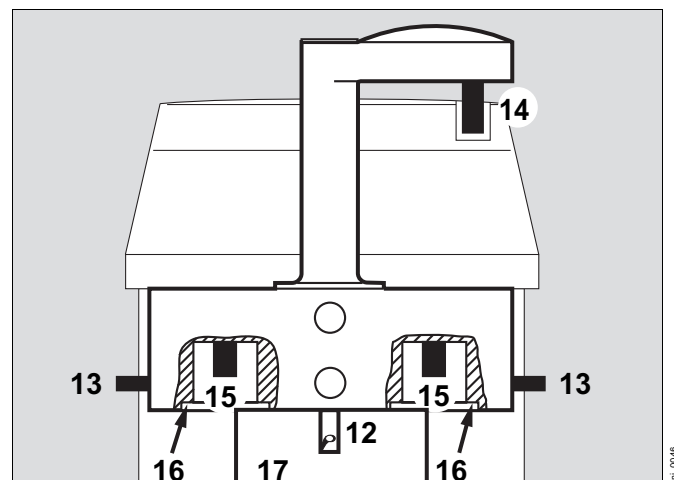


Plug-in adapter S-2000:

Only use white plug-in adapters for Vapor 2000.

(Vapor 19.n plug-in adapters, which are grey in colour, must never be used on Vapor 2000).

- 12 Stop mechanism undamaged, not buckled.
- 13 Interlock pins undamaged, glide easily and cannot be removed.
- 14 Drop-in pin on locking lever secure and straight.
- 15 Valve control pins both present.
- 16 Sealing areas undamaged.
- 17 Manufacturer's plate on the back of Vapor present and secure.



Conical connector:

- Male cone connected to Vapor inlet.
- Female cone connected to Vapor outlet.
- Cones and sealing surfaces undamaged.

Permanent connection:

- Vapor fixed securely to connector.

Keyed filling system and Quik Fil:

- Filling adapter coded on both ends for the correct anaesthetic agent. Seal present in bottle connector and undamaged.
- Only the correct filling adapter fitted into the filling opening.
- Anaesthetic agent in unstained sight glass. Any stains must be removed by trained service personnel.
- Anaesthetic agent in sight glass which is not discoloured. Halothane, for example, contains thymol to stabilise it. Thymol and other reaction products may gradually accumulate in the wick and the vaporising chamber and colour the Halothane yellow.

If this has happened:

- Drain off discoloured anaesthetic agent, see pages 41 to 45.
- Re-fill to the maximum mark with fresh anaesthetic agent (see pages 13 to 21), allow to interact for about 6 hours and then drain completely.
- Dispose of drained anaesthetic agent in accordance with local regulations.

If yellow discolouration persists, have wick replaced by trained service personnel.

- Check output concentration of anaesthetic agent weekly, when continuous monitoring is not available, see page 39.
- Check Vapor in accordance with Checklist, page 24.

Checking concentration

Weekly, when continuous monitoring is not available.

Preparation

- Fill Vapor – at least half full between minimum and maximum mark.
- Allow the filled Vapor to warm up to room temperature of 20 to 24 °C.
Wait long enough for the temperature to equalise – the time will vary depending on the temperature difference ΔT :

ΔT	up to ± 2 °C	± 6 °C	± 10 °C	± 20 °C
Hours	1	3	4	5

- Check anaesthetic agent monitor. Carry out zero calibration on monitor with gas required (Air or O₂).
- Connect monitor to fresh-gas outlet or Y-piece.
Make sure that the connections are leak-tight.
- Connect scavenging line and start operation.

Setting

- Switch off ventilator or set so that the ventilation pressure is less than 5 mbar.
- Set monitor to anaesthetic agent being used and to continuous measurement.
- Set flow of 2.5 to 4 L/min Air.
Use O₂ if Air is not available.
- Let Vapor dose for about 1 to 2 minutes with a flow of 2.5 L/min and the anaesthetic agent set to maximum concentration.

Measuring

Check »0« and »T« marks, 1 and 4 vol.% as well as at least 3 concentrations in ascending order.

Set control dial.

Take reading of measured value once it has stabilised.

Correcting measured values

depending on carrier gas used

- Air check: no correction.
- O₂ check (see page 56): reduce the measured values as follows:

Measured value vol.%	Correction
≤ 1.0	–0.05
1.5 to 2.0	–0.10
2.5 to 4.0	–0.20
5.0 to 8.0	–0.30

Display on monitor

- in % partial pressure: no correction.
- in vol. %: convert to partial pressure:

$$\text{Concentration} = \frac{\text{Measured value [vol.\%]} \times \text{atmospheric pressure [hPa]}}{1013 \text{ hPa}}$$

[% partial pressure]

Determining permissible range

See Accuracy Data ("Technical Data", page 48) for permissible range of output concentration.

Determine the permissible deviation of monitor.

The sum total of both sets of data gives the permissible range for the output concentration for Vapor.

Test result

If the corrected measured value is within the permissible range of output concentration, Vapor may be put into operation.

If the corrected measured value is not within the permissible range:

Do not use Vapor. Patient may be harmed.

Have Vapor checked by trained service personnel.

After test

- Switch off Vapor: set control dial to »0« and engage.

If Vapor is not on anaesthesia delivery system:

- Press »0« button and set control dial to »T« and engage.
With plug-in adapter, engage locking lever in control dial.
- Switch off Air or O₂ flow.

Example of concentration test:

Halothane Vapor is being tested at 3 % setting.
Measured value is 3.58.

Measurement was carried out using O₂.
So correct the measured value of 3.58 by $-0.2 = 3.38$.

Monitor display in partial pressure, so no correction required.

The permissible range is ± 20 % rel. of set value,
i.e. 2.4 to 3.6 % partial pressure.

The Technical Data for the monitor gives an accuracy of ± 5 %,
i.e. a tolerance of ± 0.18 % partial pressure for a measured value of 3.58 %.

The permissible range is, therefore, increased by this amount
to 2.22 to 3.78 % partial pressure.

The corrected measured value of 3.38 is within the permissible range.

Shut-down

Draining Vapor

**Take care not to spill anaesthetic agent.
Do not inhale anaesthetic agent vapour.
Danger to health.**

Recommendation: Drain Vapor under suitable scavenging as small amounts of anaesthetic agent vapour will always escape.

Whilst draining, avoid contamination.

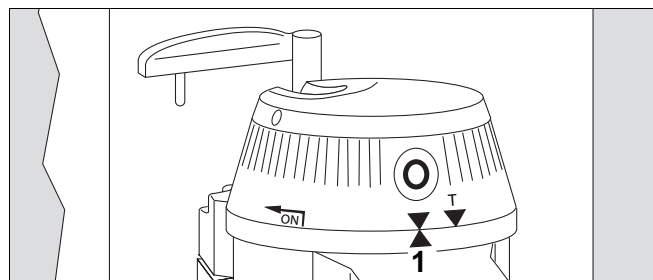
Anaesthetic agent which has been drained off must be handled, stored and disposed of as medicament. If this is not done there will be a risk of administering incorrect anaesthetic agents or mixtures.

- **Place Vapor upright or suspend,**
so that all the anaesthetic agent can drain off.

Vapor with keyed filling system

If Vapor is connected to anaesthesia delivery system:

- 1 Control dial must be engaged at »0«.



If Vapor is **not** connected to anaesthesia delivery system:

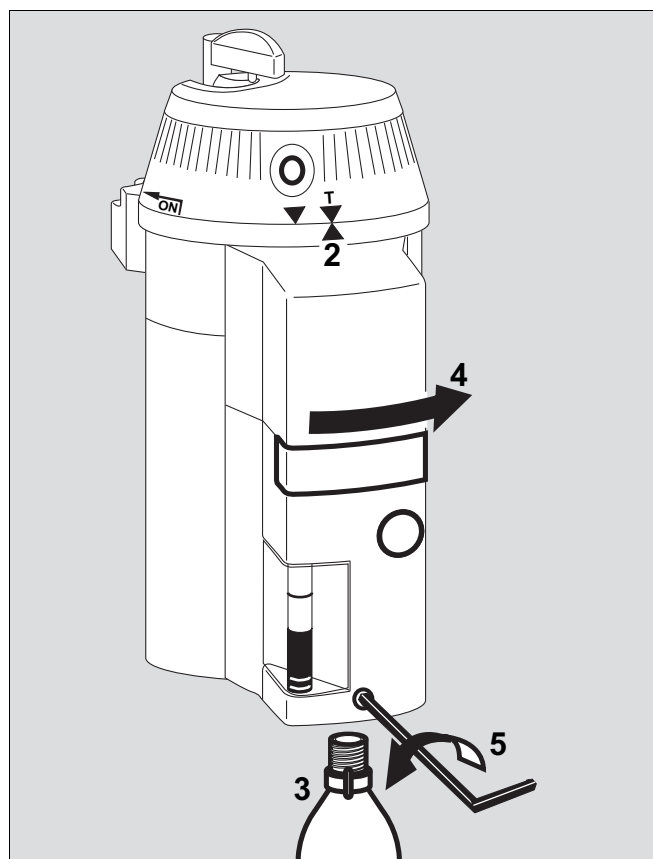
- 2 Control dial remains engaged at »T«.
- 3 Hold **correct bottle for the anaesthetic agent concerned** below the drainage outlet at the bottom of the filling device.

Check that the name of anaesthetic agents and colour coding on the Vapor and the anaesthetic agent bottle correspond so that dangerous mixtures of anaesthetic agents do not occur.

- 4 As well as setting control dial at »T«, swing lever over. Sealing block should slide forward.
 - 5 Use 2.5 mm Allen key to turn drainage valve one or two times anti-clockwise.
- Drain until no more anaesthetic agent can be seen in the sight glass and no more anaesthetic agent runs into the bottle.
If the anaesthetic agent in the wick also needs to be removed, see "Blowing off Vapor", page 46.

Do not fill the bottle to the very top. This can lead to a significant amount of anaesthetic agent escaping.

If necessary, close drainage valve in good time and continue process with a new bottle.



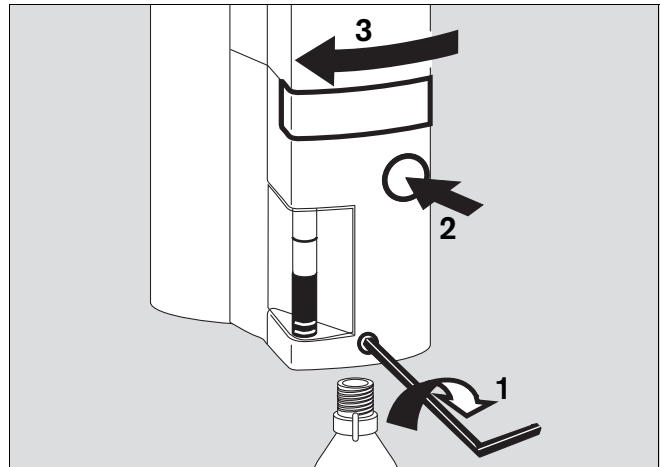
- 1 Turn drainage valve clockwise to close.
- 2 Push sealing block in **fully**.
- 3 **Close lever, as fresh gas and anaesthetic agent vapour may escape when Vapor is switched on again, otherwise.**

If the lever cannot be closed completely, release lever and push sealing block in **fully**, otherwise the sealing block will not function properly and may damage the seal.

- Close anaesthetic agent bottle.

Anaesthetic agent may otherwise be released.

- Mark bottle. "Used anaesthetic agent".
Recommendation: **Do not re-use.**

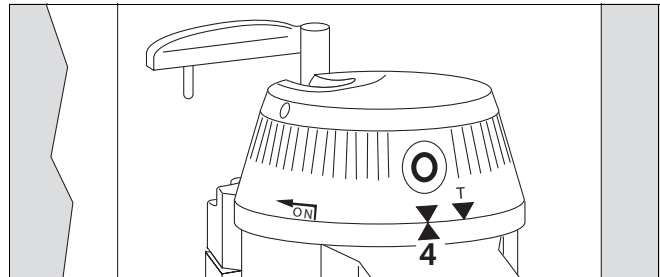


Vapor with Dräger Fill filling system

Note warnings on page 41.

If Vapor is connected to anaesthesia delivery system:

- 4 Control dial must be engaged at »0«.



If Vapor is **not** connected to anaesthesia delivery system:

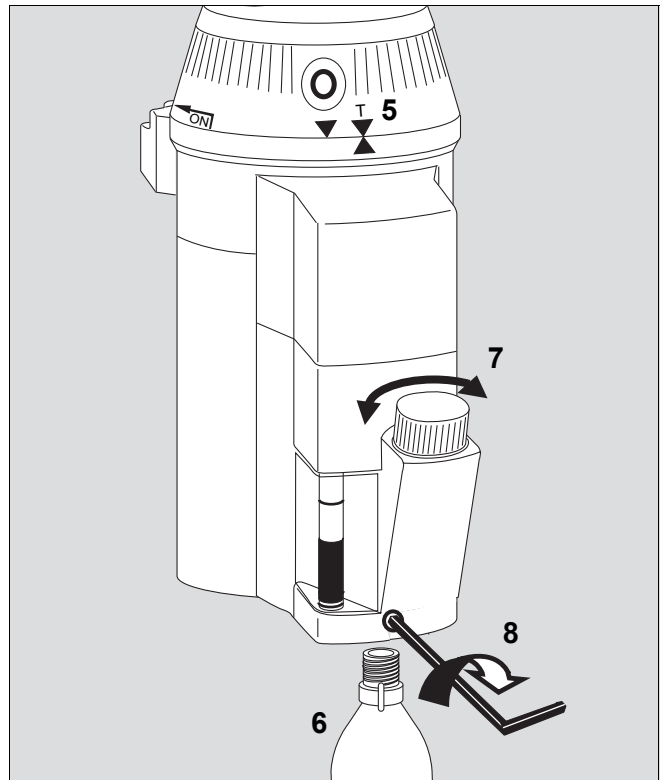
- 5 Control dial remains engaged at »T«.
- 6 Hold **correct bottle for the anaesthetic agent concerned** below the drainage outlet at the bottom of the filling device.

Check that the name of the anaesthetic agent and colour coding on the Vapor and the anaesthetic agent bottle correspond so that dangerous mixtures of anaesthetic agent do not occur.

- 7 As well as setting control dial to »T«, open locking cap on the filling device.
- 8 Use 2.5 mm Allen key to turn drainage valve one or two times anti-clockwise.
- Drain until no more anaesthetic agent is visible in sight glass and no more anaesthetic agent runs into bottle.
If anaesthetic agent has also to be removed from the wick, see "Blowing off Vapor" Page 46.

Do not fill bottle to very top. This can lead to significant amounts of anaesthetic agent escaping.

- If necessary, close drainage valve in good time and continue process with new bottle.
- Turn drainage valve clockwise to close.



- Close anaesthetic agent bottle.

Anaesthetic agent may otherwise be released.

Mark bottle "Used anaesthetic agent".

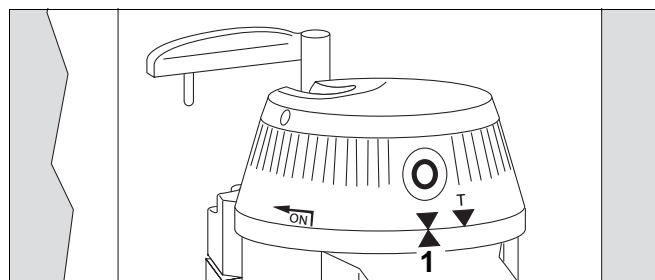
Recommendation: **Do not re-use.**

Vapor with Quik Fil filling system

Note warnings on page 41.

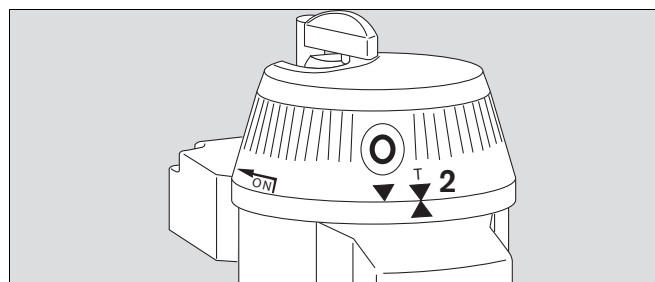
If Vapor is connected to anaesthesia delivery system:

- 1 Control dial must be engaged at »O«.



If Vapor is **not** connected to anaesthesia delivery system:

- 2 Control dial remains engaged at »T«.



- Only use undamaged bottles and Quik Fil drain adapter.

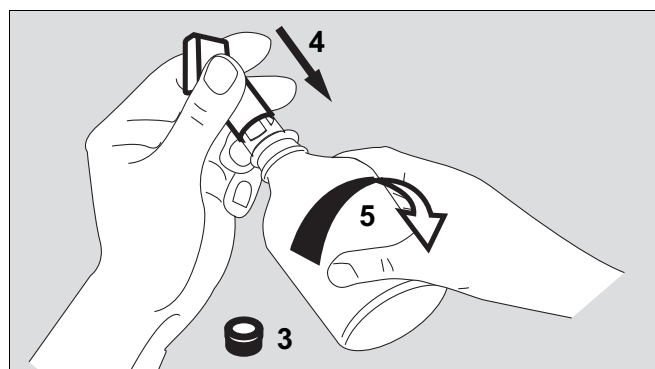
Quik Fil drain adapter must be flush and secure on the bottle, as significant quantities of anaesthetic gas may escape otherwise.

- Use correct bottle for anaesthetic agent concerned.

Check that the name of the anaesthetic agent and colour coding on the Vapor and the anaesthetic agent bottle correspond so that dangerous mixtures of anaesthetic agent do not occur.

- 3 Unscrew cap from bottle adapter.
- 4 Fit slots on socket of drain adapter onto corresponding ridges on bottle adapter.
- 5 Push drain adapter against bottle and turn bottle. Screw up tightly.

If bottle is not screwed on tightly, valve in bottle will not open and anaesthetic agent may leak during draining. Danger to health.

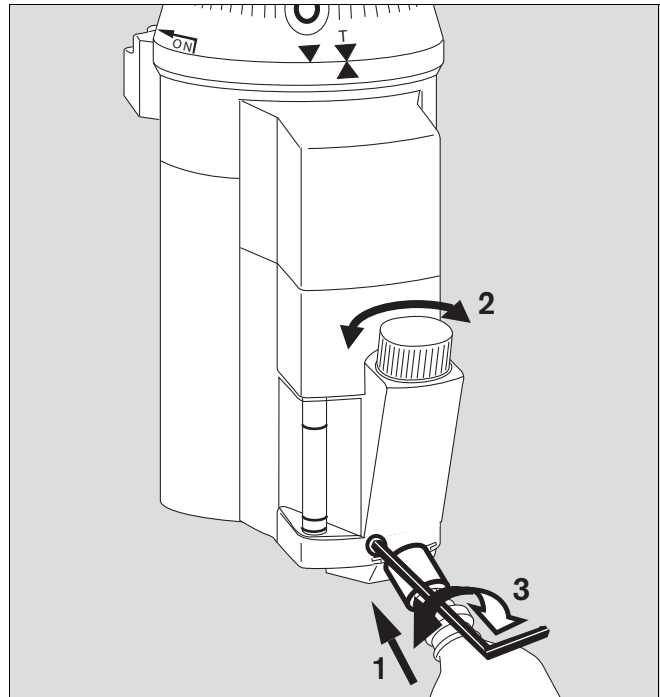


- 1 Push drain adapter into the slot on the filling system **to the stop** and keep holding bottle in this position during draining.
 - 2 As well as setting control dial to »T«, open locking cap on the filling device.
 - 3 Use 2.5 mm Allen key to turn one or two times anti-clockwise taking care that no anaesthetic agent overflows from the drain adapter. If necessary, close drainage valve a little.
- Drain until no more anaesthetic agent is visible in sight glass and no more anaesthetic agent runs into bottle. If anaesthetic agent has also to be removed from the wick, see "Blowing off Vapor", page 46.

Do not fill bottle to very top. This can lead to significant amounts of anaesthetic agent escaping.

If necessary, close drainage valve in good time and continue process with new bottle.

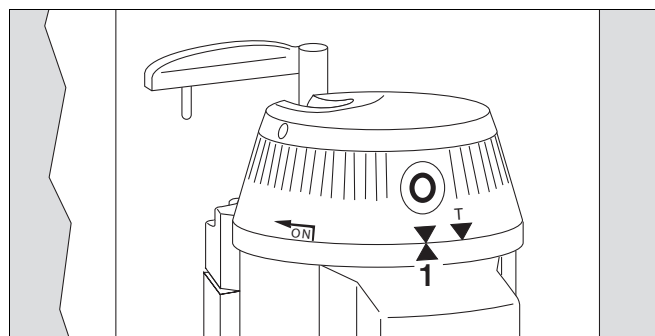
- 3 Turn drainage valve clockwise to close.
- Pull out bottle and keep upright.
 - Unscrew drain adapter from bottle.
As bottle valve will not close otherwise and anaesthetic agent may evaporate or run out.
- 2 Tighten screw cap firmly, otherwise fresh gas and anaesthetic agent may escape.**
- Screw cap onto bottle adapter.
 - Mark bottle "Used anaesthetic agent".
Recommendation: **Do not re-use.**



Vapor with filling spout**Note warnings on page 41.**

If Vapor is connected to anaesthesia delivery system:

- 1 Control dial must be engaged at »O«.

If Vapor is **not** connected to anaesthesia delivery system:

- 2 Control dial remains engaged at »T«.
- 3 Hold correct bottle for the anaesthetic agent concerned below the drainage outlet.

Check that the name of anaesthetic agent and colour coding on the Vapor and the anaesthetic agent bottle correspond so that dangerous mixtures of anaesthetic agent do not occur.

- 4 As well as setting control dial to »T«, open locking cap on filling device.
- 5 Turn drainage valve anti-clockwise one or two times.
- Drain until no more anaesthetic agent is visible in sight glass and no more anaesthetic agent runs into bottle. If the anaesthetic agent has also to be removed from the wick see "Blowing off Vapor", page 46.

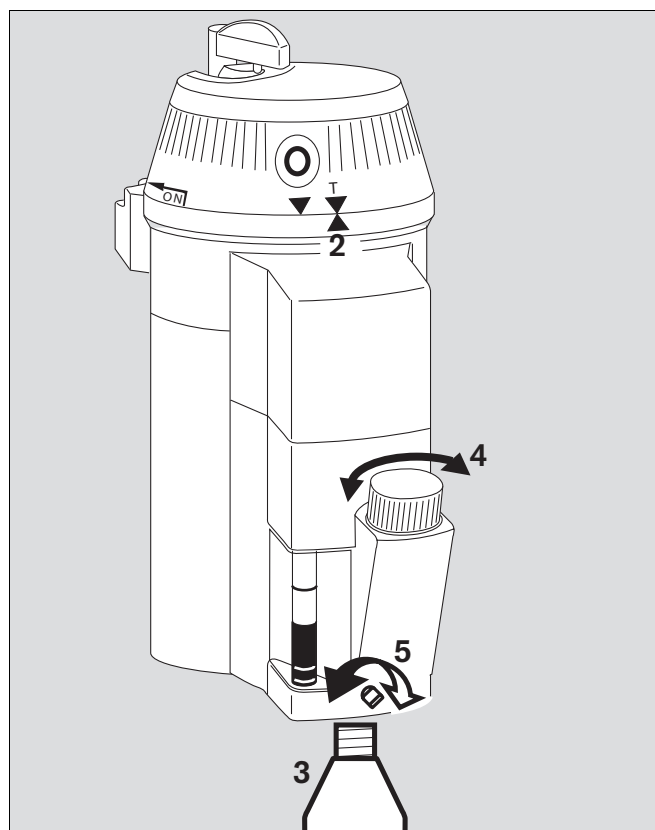
Do not fill bottle to very top. This can lead to significant amounts of anaesthetic agent escaping.

If necessary, close drainage valve in good time and continue process with new bottle.

- 5 Close drainage valve clockwise.
- Close anaesthetic agent bottle.

4 Tighten screw cap firmly, as fresh gas and anaesthetic agent may escape otherwise.

- Mark bottle "Used anaesthetic agent".
Recommendation: **Do not re-use.**



Blowing off Vapor

If anaesthetic agent has also to be removed from the wick after draining:

- Set control dial to 5 vol.% and flush for about 5 hours at 5 L/min Air or 1 hour at 15 L/min Air.
- Allow gas to flow into the scavenging line.
- Press »O«-button, engage control dial at »T«.
Plug-in adapters: engage locking lever in control dial.

Storage

Storage for longer than 6 months:

- "Draining Vapor", pages 41 to 45 and "Blowing off Vapor", see above.
- Press »O« button and engage control dial at »T«.
Plug-in adapters: engage locking lever in control dial.
- Vapor may be stored in any position.
- If packing is necessary, see "Despatch".
- **Observe storage temperatures, see page 48. If storage temperature range is exceeded, internal damage may occur which could cause incorrect output concentration.**

Before putting into operation again carry out inspection and service, and test for Readiness for Operation.

Despatch

- **Drain Vapor completely** (page 41), clean and disinfect (page 35).
- Disconnect Vapors from anaesthesia delivery systems for despatch – unless permanently connected.
- Set control dial to »T« and engage.
- Each Vapor must be packed **separately** with care.
Use original packaging, when possible. If original packing is not available, use strong packing with at least 5 cm of impact-resistant material around each Vapor.
Fasten packing securely.

Liquid anaesthetic agents and filled Vapors are subject to Hazardous Goods Regulations (under no. UN 8027 in accordance with Class 9 of IATA/ICAO). These regulations do not apply to the residues of anaesthetic agents left in the wick after draining.

Return, disposal

When repair is not economical, DrägerService offer an exchange service for disposing of Vapors.

Before disposal, drain completely (page 41), blow off (page 46), clean and disinfect (page 35).

Worn parts can be disposed of in the normal way.

Maintenance Intervals

Clean and disinfect Vapor before each service¹ and when returning for repair (see page 35).

Inspection and service

Yearly, at the same time as the anaesthesia delivery system, to be carried out by trained service personnel, following a protocol.

Recommendation: Call DrägerService for inspection and service.

The Vapor 2000 inspection and maintenance schedule is specified in the "DrägerService Test Certificate for the Vapor 2000". The following wear parts must be replaced if any non-conformities with the specified values are found during maintenance and inspections or during routine checks by the user.

Wear parts

- Gas inlet filter
- Mounting screws
- Seal of keyed filling system (interface to filling adapter)
- Seal of screw cap for Dräger Fill-, Quik Fil® and funnel filling systems
- Seal of drainage valve
- Vaporising chamber valve
- Wick of vaporising chamber (only for Halothane)

¹ Definitions:
 Inspection = determining actual condition
 Service = measures to maintain required condition
 Repair = measures to re-establish required condition
 Maintenance = inspection, service and, when necessary, repair

Technical Data

Classification as per EC Directive 93/42/EEC Annex IX	Class II b
UMDNS-Code Universal Medical Device Nomenclature System – Nomenclature for medical products	10-144
Operating range	
Ambient and Vapor Temperature	
during operation	10 to 40 °C; but Halothane and Isoflurane Vapors may only be operated between 35 and 40 °C if atmospheric pressures is between 850 and 1100 hPa
during shut-down (filled, control dial at »T«)	0 to 40 °C
during storage (empty, dry wick)	–20 to 70 °C
Atmospheric pressure	
during operation and shut-down (filled, control dial at »T«)	700 to 1100 hPa but Halothane and Isoflurane Vapors may only be operated between 35 and 40 °C if atmospheric pressures is between 850 and 1100 hPa
during storage (empty, dry wick)	500 to 1200 hPa
Relative humidity	0 to 95 %
Magnetic induction	<70 Millitesla
Flow range	0.25 to 15 L/min 0.25 to 10 L/min for concentrations >5 vol.%
Direction of flow	as per arrow on back of Vapor (see page 11)
Quality of gases required	Clean, medically pure mixtures of O ₂ and Air or O ₂ and N ₂ O O ₂ and Air: dewpoint ≤5 °C at 0.5 MPa (5 bar) N ₂ O: water content ≤2 mg/L at 0.5 MPa (5 bar) AIR: oil content ≤0.5 mg/m ³
Difference between pressure range and ambient pressure on Vapor outlet (e.g. due to machine components or O ₂ flush)	–10 to 20 kPa (–100 to 200 mbar)
Alternating pressure due to ventilation on Vapor outlet, relative to pressure on Vapor outlet without ventilation	–1 to 8 kPa (–10 to 80 mbar)
Maximum angle of tilt	
alone, freestanding	10°
during operation, fixed position	30°
during transport (control dial at »T«)	any position and angle

Set values

0 and 0.2 to maximum concentration on control dial scale.
When control dial at »O« and »T« no output of anaesthetic agent.

Accuracy of concentration delivered
(highest value always applies)

Vapors up to 6 vol.% max. concentration

Vapors above 6 vol.% concentration

at 15 to 35 °C at 0.25 to 10 L/min	at 10 to 15 °C at 35 to 40 °C at 10 to 15 L/min
±0.20 vol.% or ±20 % rel.	+0.30 / -0.20 vol.% or +25 / -20 % rel.
±0.25 vol.% or ±20 % rel.,	+0.35 / -0.25 vol.% or +30 / -20 % rel.

including one of the following conditions (single parameter variation):

- variation of air flow in range given at 22 °C room and Vapor temperature and 1013 hPa or
- variation of temperature in range given at an Air flow of 2.5 L/min and 1013 hPa or
- variation of atmospheric pressure in range given at Air flows of 2.5 L/min Air and 22 °C room and Vapor temperature
- variation of operating time at 22 °C, Air flow of 2.5 L/min and 1013 hPa, provided that Vapor temperature does not deviate from the range given above.

Filling volume for anaesthetic agent

about 360 mL with dry wick
about 300 mL with moist wick
about 260 mL between minimum and maximum mark

Consumption of anaesthetic agent [mL/hour]

~3 x fresh gas flow [L/min] x concentration [vol.%]

Rough formula for running time [hours] =
(for 260 mL anaesthetic agent)

$$\frac{85}{\text{Fresh gas flow [L/min] x concentration [vol.\%]}}$$

Example: Fresh gas flow = 2 L/min, concentration = 1.4 vol.%
running time = 30 hours

Loss of anaesthetic agent into atmosphere per
24 hours in mL liquid

setting »O« (max. 30° tilted)
setting »T« (max. 30° tilted)
setting »T« (horizontal or upside down)

10 °C	22 °C	40 °C
≤0.3	≤0.5	≤0.7
≤0.2	≤0.3	≤0.4
≤0.8	≤1.5	≤2.5

Anaesthetic agent only escapes in very small quantities into Vapor or towards patient.

Flow resistance (without connector)
at 10 L/min Air in mbar (1 mbar = 100 Pa)

Vapor set at »O« or »T«
Vapor switched on

10 °C	22 °C	40 °C
<40	<35	<30
<150	<70	<35

Materials

Vapor 2000 contains no latex.

Vapor conforms to Standards¹⁾

EN 740^{2) 3) 4)}
ASTM F1161
ISO 5358
ISO 8835 (1997)^{2) 3) 4)}
93/42/EEC Medical Device Directive
EN 1280
EN 1280
EN 1280, ISO 5360
ISO 5356-1

CSA-Z168.3

Dräger Fill filling system with Dräger filling adapter

Quik Fil filling system

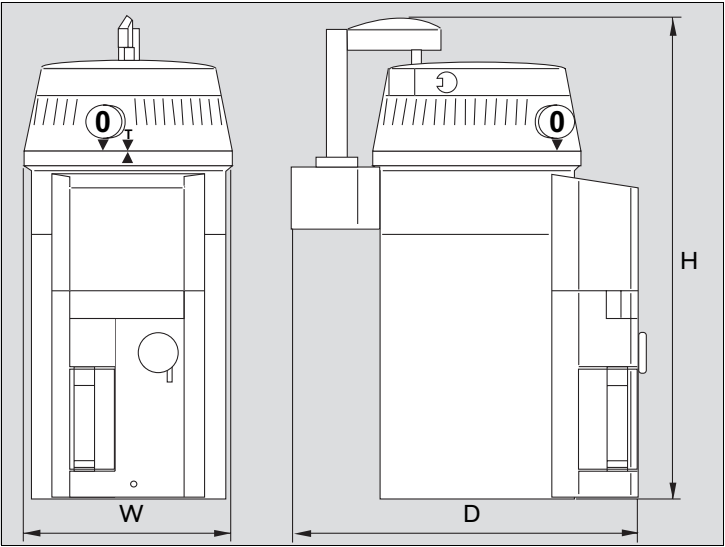
Keyed filling system with Dräger filling adapter

23 mm Conical connector

Vapor dimensions and weight
with keyed filling system

Dimensions in mm			
Connector	W	H	D
DW-2000	108	246	188
S-2000	120	246	188
Cone	133	226	158 to 200 ⁵⁾
Permanent	108	226	145

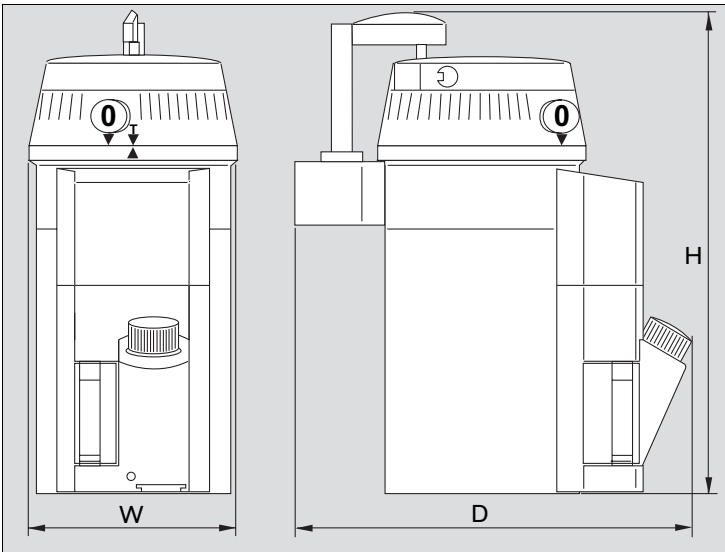
Weight in kg		
Connector	empty	full
DW-2000	7.8	8.5
S-2000	7.6	8.3
Cone	7.8 to 8.1	8.5 to 8.8
Permanent	7.2	7.9



with Dräger Fill, Quik Fil or with filling spout

Dimensions in mm			
Connector	W	H	D
DW-2000	108	246	197
S-2000	120	246	210
Cone	133	226	180 to 222 ⁵⁾
Permanent	108	226	163

Weight in kg		
Connector	empty	full
DW-2000	8.1	8.8
S-2000	7.9	8.6
Cone	8.1 to 8.4	8.8 to 9.1
Permanent	7.5	8.2

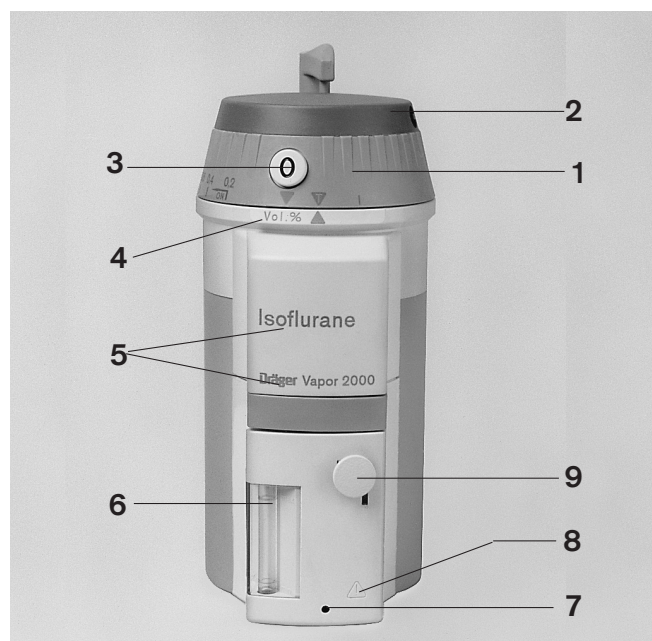


1) When used in combination with other machines/medical products the relevant Standards for the machine combination must be followed.
2) These Standards require an anaesthetic agent-specific filling system.
3) Conforms to IEC 601-1/EN 60601-1.
4) These Standards require anaesthetic agent measurement for operation of Vapor with an anaesthesia delivery system.
5) Depending on Vapor fitting to anaesthesia delivery system.

What's What

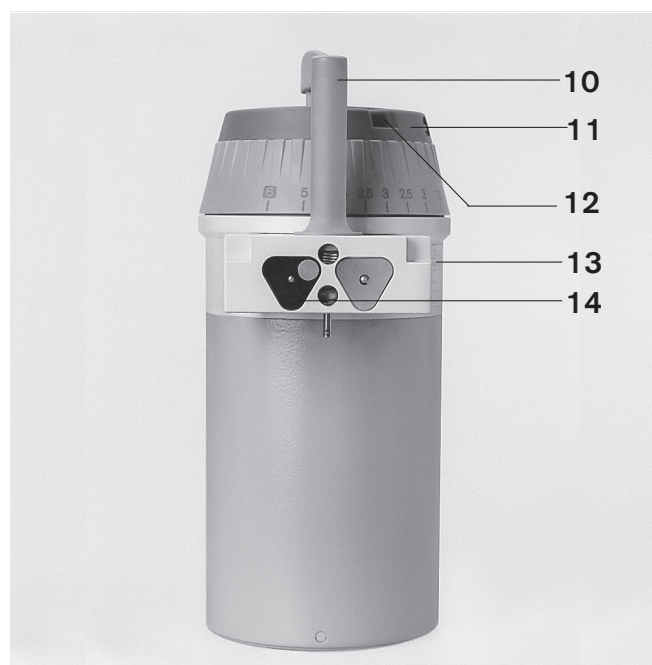
Front view

- 1 Control dial with concentration scale and letter for anaesthetic agent
- 2 Cover plate colour coded for anaesthetic agent with Interlock coding
- 3 »O« button for setting »O« and »T«
- 4 Indication of concentration units
- 5 Indication of anaesthetic agent and Vapor type
- 6 Sight glass for filling level
- 7 Drainage valve
- 8 "Observe Instructions for Use" sign
- 9 Filling system (illustrated: keyed filling system)



Back View

- 10 Locking lever for plug-in system
- 11 Opening for Interlock locking (illustrated: Interlock 2)
- 12 Slot for locking lever to prevent Vapor being disconnected from anaesthesia delivery system except when control dial is at »T«
- 13 Type plate with manufacturer and type details and serial no.
- 14 Connector system (illustrated: DW-2000 plug-in adapter with anaesthetic agent-specific colour-coding) and code letter



Description

Operating principle

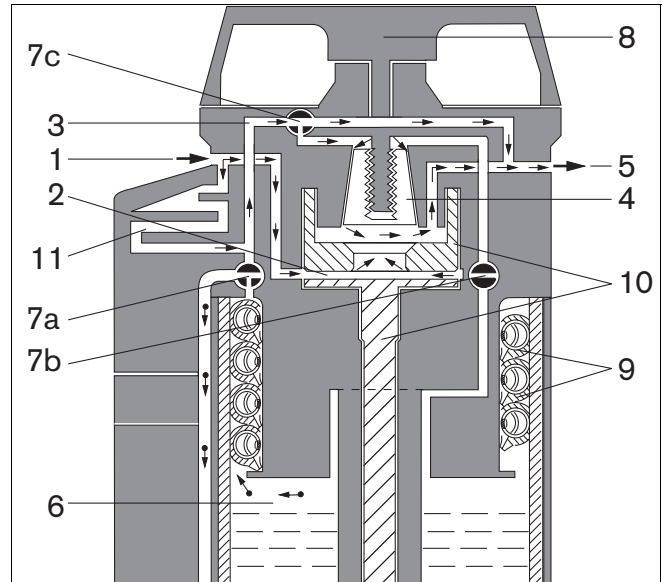
Control dial at »0« (switched off)

Fresh gas (arrow) flows from Vapor inlet **1** to the vaporising chamber-bypass **2** and then passes from the outside to the inside through this gap. In parallel, some of the fresh-gas flows via an additional bypass **3** and flow control cone **4** to Vapor outlet **5**.

The vaporising chamber **6** is completely shut off from the gas flow by valves **7a** and **7b**. No anaesthetic agent can enter the dosing gap and the fresh-gas.

A small bleed hole in valve **7a** connects the vaporising chamber to the atmosphere to prevent any build-up of pressure. Through diffusion and pressure equalisation during temperature and pressure fluctuations small quantities of anaesthetic-agent vapour may escape. This process is hindered by ducts and buffer volumes.

When the Vapor is at an angle anaesthetic agent may leak through the bleed hole in the vaporising chamber.



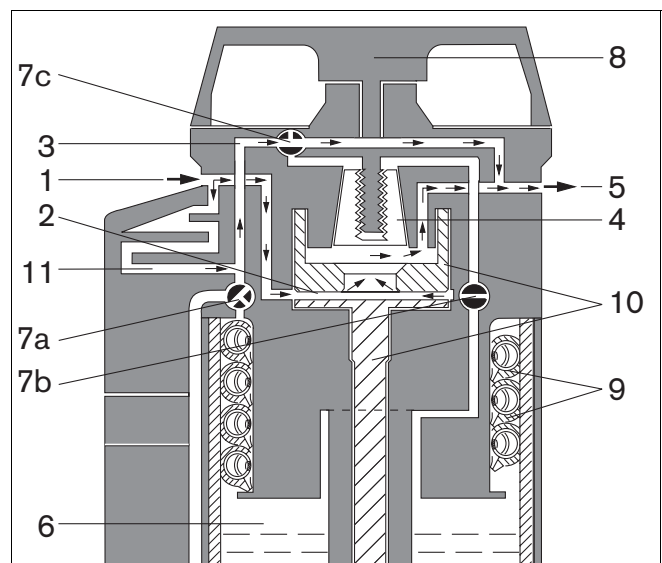
Control dial at »T« (transport)

Fresh gas no longer flows over valve **7c** to the flow control cone **4**. The bleed hole in the vaporising chamber is closed by valve **7a**. No anaesthetic-agent vapour can escape and Vapor is protected against overflowing, even when at an angle. It may be transported in any position.

Closing off the vaporising chamber completely may result in a small positive or negative pressure due to temperature and pressure fluctuations in the room.

Higher pressure is only caused by a rapid rise in temperature and/or falling atmospheric pressure, e.g. during transport in the sun or at high altitudes.

This pressure is adjusted to ambient conditions by setting the control dial to »0« or by opening the filling system. Small quantities of anaesthetic agent may escape during these processes.



Control dial above »ON« (switched on)

Fresh gas (arrow) is routed through valves **7a** and **7b**, linked to the control dial **8** and through the vaporising chamber **6**.

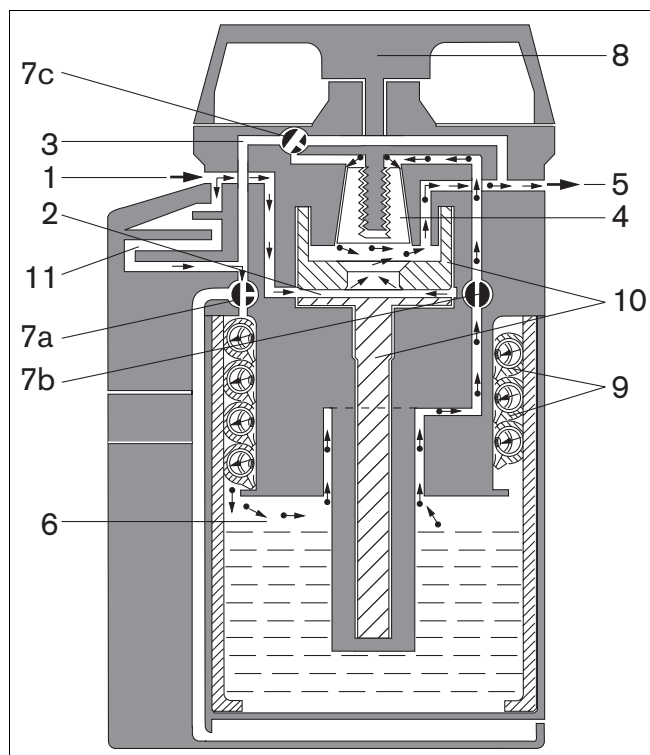
Valve **7c** closes off bypass **3**.

Some of the fresh gas is enriched with anaesthetic-agent vapour (arrow with dot) in the saturated wick **9**. The rest of the fresh gas is routed past the vaporising chamber **6** through a bypass **2**.

The two flows are mixed in the space behind the two flow controls and routed to outlet **5**. The concentration is the result of mixing the two gas flows and of the saturation concentration of the anaesthetic agent.

The concentration of anaesthetic agent is also influenced by the temperature compensator **10**, which makes use of the thermal expansion characteristics of two different materials to expand or contract the vaporising chamber bypass **2**, depending on temperature. This process compensates for the influence of temperature on saturation.

The pressure compensating labyrinth **11** effectively reduces any pumping effect caused by pressure fluctuations (see "Influence of fluctuations in pressure", page 58).

**Calibration**

Every Vapor is individually set at 22 °C and at a continuous air flow of 2.5 L/min without ventilation pressure, and tested at 22 °C and 30 °C as well as 2.5 L/min.

Calibration is in % partial pressure (% of 1013 hPa) as the depth of anaesthesia depends on the patient's uptake which is itself determined by partial pressure.

Concentration delivered in % partial pressure at normal pressure of 1013 hPa is identical numerically with the output given in volume percent, so the marking on the Vapor is given in vol.%.

The output in vol.% must be corrected for other atmospheric pressure values (see "Influence of atmospheric pressure", page 57) but partial pressure always remains constant (see also pages 39 and 56).

For simplicity, settings on the Vapor and in the Instructions for Use are given in the abbreviated form of vol.%, which means vol.% at 1013 hPa and % partial pressure in the abbreviated form.

The scale values on the control dial show the concentration delivered at 22 °C with dry gases (see "Technical Data", page 48).

Influence of temperature

Vapor compensates for changes in temperature. The saturation concentration of the anaesthetic agent, which rises as temperature rises, is automatically balanced by routing a higher proportion of the gas flow through the vaporising chamber-bypass (see page 53).

The linear change of the bypass gap changes the flow through the bypass in a non linear manner which do not match perfectly the non-linear variation of the partial pressure exactly for the full temperature range, so that the concentration delivered still remains slightly dependent on temperature.

The diagrams show typical temperature dependence when operating with a 2.5 L/min flow of Air. The deviations increase for temperatures outside this range, despite continuing compensation.

Under no circumstances must the temperature of the anaesthetic agent reach boiling point, as the output concentration will then become impossible to control.

As altitude increases, boiling point falls:

Atmospheric Pressure/ Altitude	Boiling point of anaesthetic agent °C			
	1013 hPa 0 m	900 hPa 1000 m	800 hPa 2000 m	700 hPa 3000 m
Halothane	50.2	46.8	43.4	39.8
Enflurane	56.5	53.4	50.3	46.8
Isoflurane	48.5	45.4	42.2	38.9
Sevoflurane	58.6	53.4	52.1	48.7

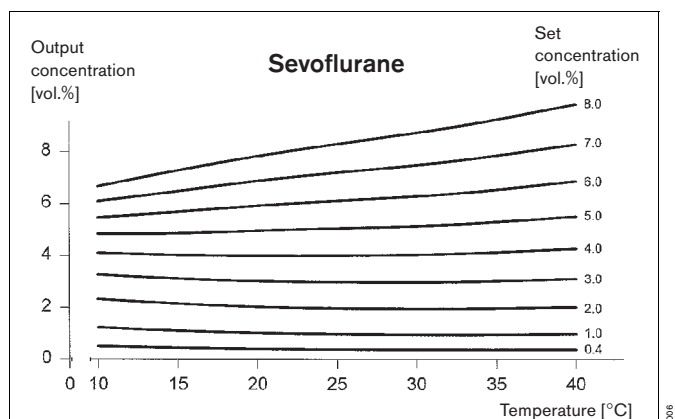
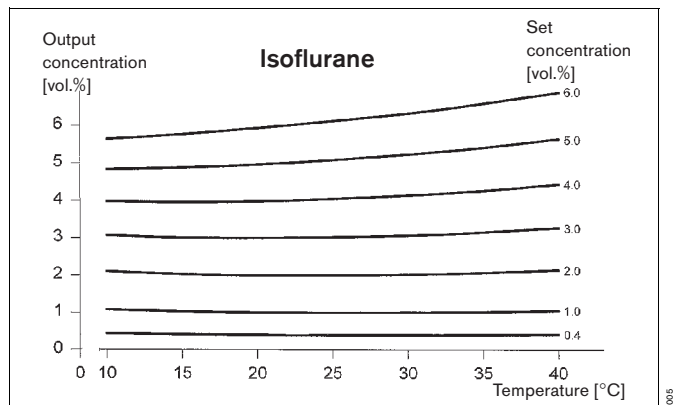
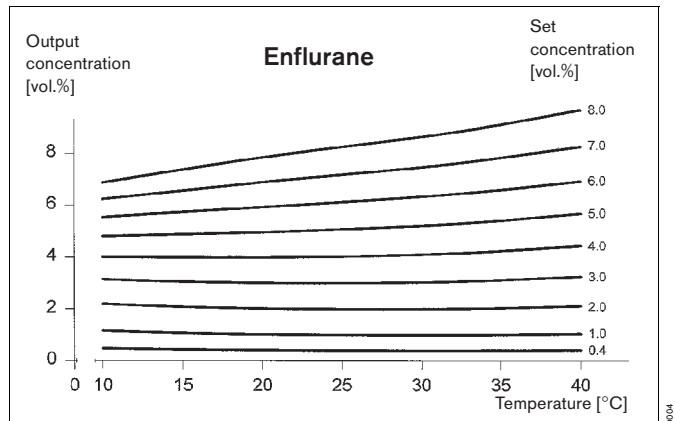
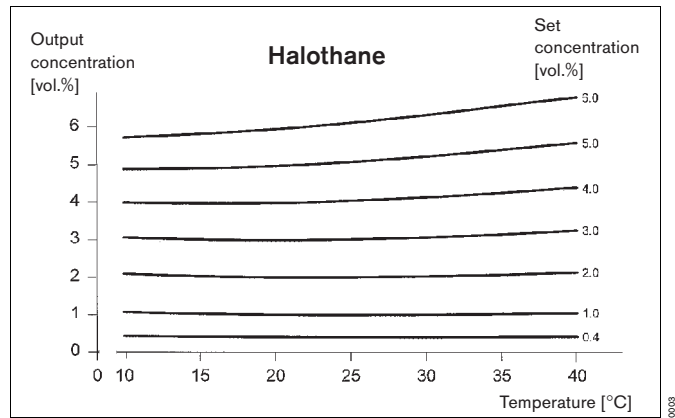
= non-permissible operating ranges.

The operating range for Vapor when used with Dräger anaesthesia delivery systems has been set in such a way that, in the critical situation of 700 hPa, 40 °C (or 850 hPa for Halothane or Isoflurane Vapors) and a maximum negative pressure of –100 mbar on the Vapor, the boiling point of the anaesthetic agent cannot be reached.

The extension of temperature compensation is independent of ageing and hysteresis and Vapor's large mass also provides some compensation for differences in temperature.

Differences in temperature between Vapor and the atmosphere within the operating range are compensated for within the concentration accuracy specified. If the temperature of the Vapor before use is outside 10 to 40 °C, a time of 15 min/°C has to be allowed for temperature adjustment, if the concentration is to remain within the accuracy specified.

When Vapor is being operated with a high gas flow or a high concentration, it cools through evaporation (see "Influence of running time", page 59).

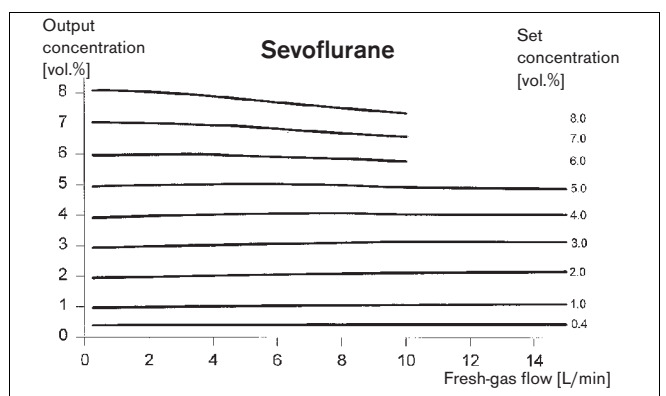
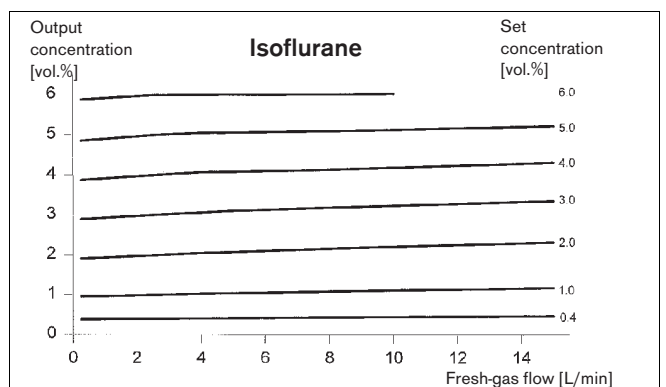
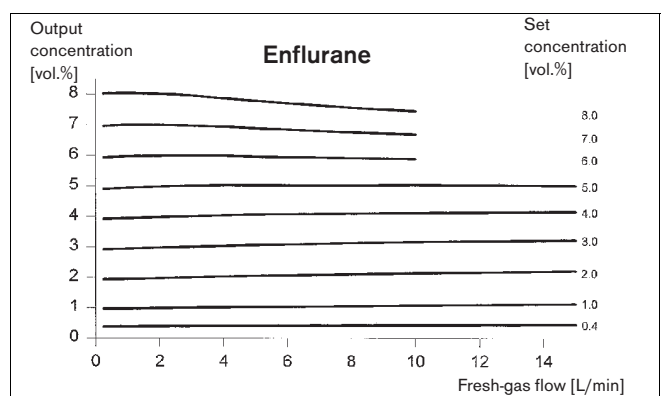
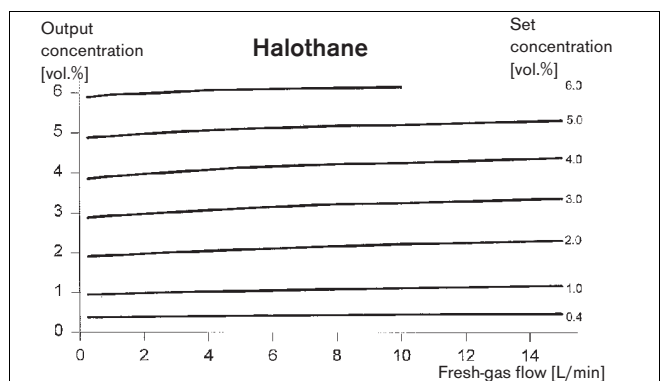


Influence of flow

Within the specified flow range, the concentration delivered by Vapor is only slightly dependent on the fresh-gas flow.

The output concentration is reduced slightly when high concentrations are set at the same time as a high fresh-gas flow. Under such conditions total saturation of the gas flowing through the vaporising chamber does not occur and also full compensation is not made for the cooling of the anaesthetic agent due to evaporation (see "Influence of running time", page 59).

The diagrams show the typical influence of flow on the concentration delivered after 1 minute at 22 °C, 1013 hPa when operating with Air.



Influence of gas composition

The concentration delivered is dependent on the composition of the fresh gas since the viscosity and density of the gas changes from one gas to another. Vapor is calibrated with Air because the concentration delivered is then exactly in the middle of the range for the anaesthetic gas mixtures which are available.

When 100 % O₂ is used the output concentration compared with Air rises by 10 % of the set value and by not more than 0.5 vol. %.

When a mixture of 30 % O₂ and 70 % N₂O is used, the concentration falls by 10 % of the set value at most, and by not more than 0.5 vol. %.

The effect of gas composition is different for different anaesthetic agents and, for this reason, maximum effects are given here.

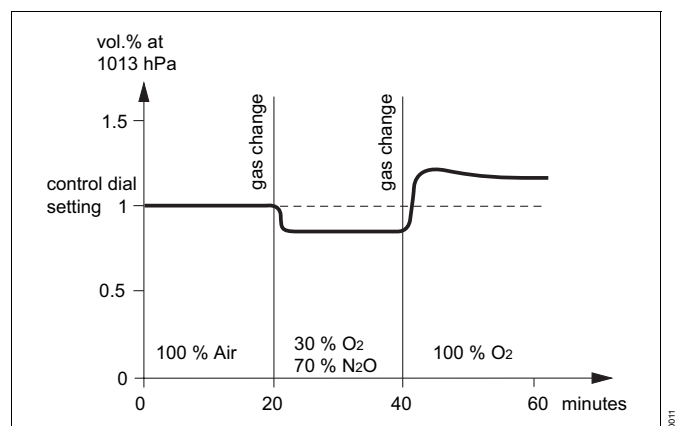
When changing from one gas mixture to another, an additional dynamic effect can occur which may result in a further deviation in concentration until any earlier fresh gas is flushed out of the vaporising chamber.

These deviations and their duration will all be greater,

- the lower the volume of anaesthetic agent in the Vapor,
- the lower the concentration set
- the lower the gas flow and
- the more extreme the change of gas type.

The extent of this dynamic deviation increases as gas flow increases, though the duration of the deviation will decrease. The duration with, e.g. 1 L/min, 1 vol. % and slightly filled Vapor is up to 30 minutes.

Influence of gas composition on output concentration in carrier gas at 1 vol. % setting.



If the humidity in a gas is higher than that specified in "Technical Data" output concentration will be affected slightly.

Influence of atmospheric pressure

The anaesthetic agent partial pressure delivered by Vapor (see "Calibration", page 53) is all but independent of atmospheric pressure, so that weather-based fluctuations do not need to be taken into account and altitude-based pressure changes in the range 700 to 1100 hPa will only lead to small deviations within the accuracy specified. For this reason, the physiological effect – the depth of anaesthesia at a defined Vapor setting – is independent of atmospheric pressure.

When measuring the output concentration of Vapor in partial pressure (e.g. with Dräger IRIS or PM 8030/35) there is no influence from ambient pressure. When measuring in volume percent (e.g. Dräger PM 8020 or PM 8050) the measured values do, however, change with atmospheric pressure and measured values rise, when atmospheric pressure falls below 1013 hPa.

The following formula for conversion applies:

$$\text{Concentration} = \frac{\text{Measured value [vol.\%]} \times \text{Atmospheric pressure [hPa]}}{1013 \text{ hPa}}$$

[% partial pressure]

Example:

At 4 % partial pressure at an altitude of 1000 m and at 900 hPa, 4.5 vol.% is displayed, and 5.1 vol.% at an altitude of 2000 m at 795 hPa.

Under no circumstances should Vapor ever be used at atmospheric pressures and temperatures at which the anaesthetic agent could start to boil (see page 54), as the concentration delivered will rise and be uncontrolled.

Influence of positive/negative pressure relative to ambient and dynamic pressure

Vapor's operating range is limited to between –100 and 200 mbar, relative to ambient atmospheric pressure at the Vapor outlet.

Pressure in the Vapor is a little higher than ambient atmospheric pressure, as the fresh-gas flow builds up a dynamic pressure of up to 115 mbar in the flow control system. Vapor cannot distinguish between a constant dynamic pressure and an ambient pressure influenced by altitude. For this reason, the influence on output concentration is in accordance with the data given above under "Influence of atmospheric pressure".

For effective O₂ flushing on Dräger anaesthesia delivery systems a negative pressure is produced at the Vapor outlet which may be up to 100 mbar. 100 mbar negative pressure has the same effect as raising the altitude by 1000 m or a drop in boiling point of about 3.5 °C (see page 54). As a protection against excessive pressure, e.g. if the fresh-gas hose is kinked, the Vapor has a self-resetting pressure relief mechanism which vents the fresh gas to the atmosphere at high pressures.

Influence of fluctuations in pressure during ventilation

When ventilation is being carried out or when the O₂ flush is operated without fresh-gas de-coupling, pressure fluctuations on the anaesthetic vaporiser can cause a higher concentration to be delivered than is shown on the control dial setting.

The vapour in the vaporising chamber is compressed when pressure rises, and it expands when pressure falls. If this effect is strong enough small quantities of saturated vapour will be pumped backwards through the inlet of the vaporising chamber into the fresh gas.

This is described in the literature as the pumping effect.

This pumping effect is greater,

- the higher the ventilation pressure and ventilation frequency,
- the more rapid the fall in pressure during expiration,
- the lower the fresh-gas flow,
- the lower the concentration set,
- the smaller the quantity of anaesthetic agent in the vaporiser.

The compensation system of the Vapor will reduce these effects.

When using anaesthesia delivery systems without fresh gas de-coupling and with ventilation pressures greater than 30 mbar, Vapor should be filled completely, if concentration set is <1 vol.% and/or fresh-gas flow is <1 L/min, to keep deviations due to fluctuations in pressure as low as possible.

Continuous monitoring of the inspiratory side of the breathing system will easily show when an overdosage is likely to occur.

The concentration set on the Vapor can then be slightly reduced.

Influence of running time

Evaporation of the anaesthetic agent during operation cools Vapor slowly.

The saturation concentration of the anaesthetic agent in Vapor decreases more rapidly the longer the duration of operation, the higher the concentration set and the higher the fresh-gas flow selected, i.e. when more anaesthetic agent evaporates with time.

Temperature compensation counters this effectively and limits deviations in the concentration delivered. After a certain period of operation Vapor stabilises at a slightly lower temperature and an output concentration which is a slight deviation from the initial value.

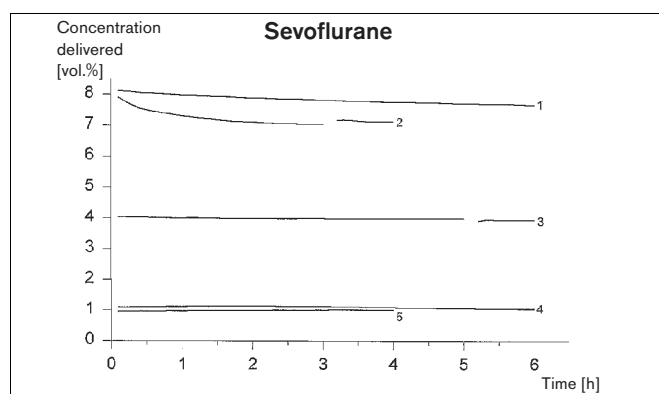
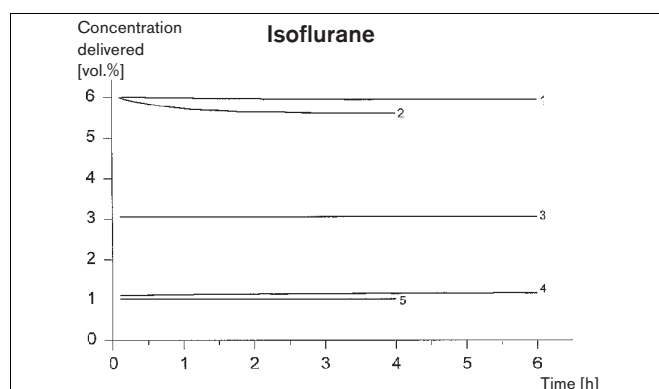
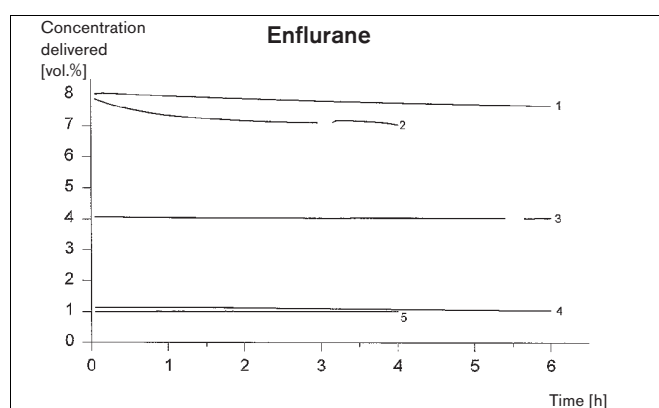
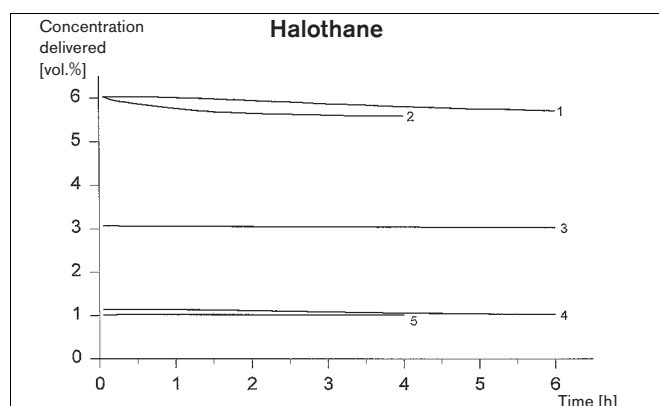
The accuracy given in "Technical Data", page 48, applies as long as the temperature of the Vapor does not fall below the lower limit of the operating range.

The diagrams show typical concentration curves over 4 hours and 6 hours of running time respectively, measured at 22 °C and 1013 hPa.

The numbers on the curves refer to the operating conditions used:

- 1 6 or 8 vol.% at 1 L/min
- 2 6 or 8 vol.% at 4 L/min
- 3 3 or 4 vol.% at 4 L/min
- 4 1 vol.% at 10 L/min
- 5 1 vol.% at 4 L/min

Breaks in the curves show pauses whilst the anaesthetic agent was being refilled.



Order List

Name and description		Order no.
Filling adapter s for Sevoflurane		M 35 322
Filling adapter i for Isoflurane		M 35 323
Filling adapter e Enflurane		M 35 321
Filling adapter h Halothane		M 35 320
Dräger Fill filling adapter for:		
Halothane		M 36 090
Isoflurane		M 36 110
Sevoflurane		M 36 120
Ball-check valve modification set (for older Dräger filling adapter)		M 34 614
Quik Fil drain adapter		M 34 206
Parking holder for wall rail for 2 Vapors with plug-in adapters		M 26 966
Parking holder for wall mounting for 2 Vapors with plug-in adapters		M 26 374
Instructions for Use	German	DB 01 188
	English	DB 01 189
	French	DB 01 190
	Spanish	DB 01 191
	Italian	DB 01 260
	Dutch	DB 01 261
	Swedish	DB 01 262
	Finnish	DB 01 263
	US English	DB 01 273
	Russian	DB 01 351
	Portuguese	DB 01 352
	Japanese	DB 01 353
	Chinese	DB 01 354
	Norwegian	DB 01 355
	Hungarian	DB 01 356
	Polish	DB 01 357
	Czech	DB 01 358
	Danish	DB 01 359
	Slovak	DB 01 362
	Turkish	DB 01 363
Technical documentation available on request		

Abbreviations and Symbols

Air	Medical Air
N ₂ O	Medical Nitrous Oxide
O ₂	Medical Oxygen
CE0123	Conformité Européenne. Vapor 2000 conforms to 93/42/EEC Medical Device Directive
®	Registered trademark
™	Trademark, protected trademark
% rel.	Relative deviation as % of value
	Observe Instructions for Use
ON	Vapor switched on. Operation between »0« setting and this mark is not allowed, as Vapor has not been calibrated for this range
0,2; 0,4;.....	Concentration scale on Vapor control dial with values up to and including 5 vol.%
	Concentration values on the Vapor control dial drawing attention to the danger of a high output concentration and restricted flow range
vol.%	Volume percent anaesthetic agent in fresh gas at Vapor outlet. Unit of concentration, see "Calibration", page 53.
0	on push-button to stop control dial. »0« setting on control dial, see page 5
T	Transport setting (»T« setting) on control dial, see page 6
	on back of Vapor or on connector indicates direction of flow of Vapor
H, E, I, S	on control dial or on DW-2000 plug-in adapter. Code letter for anaesthetic agent for which Vapor 2000 has been calibrated, or for which plug-in adapter is coded.
min.	minimum permissible filling level on sight glass
max.	maximum permissible filling level on sight glass
ASTM	American Society for Testing and Materials
CSA	Canadian Standards Organisation
DGHM	German Society for Hygiene and Microbiology
EN	European standard
ISO	International Organization for Standardization

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Quality Inspection Certificate

(Do not remove. Photocopy if necessary.)

Dräger Medical AG & Co. KGaA
Moislinger Allee 53-55
D-23542 Lübeck

is certified as a manufacturer of medical products according to Annex II to Directive 93/42/EEC,
ISO 9001: 2000.

We hereby confirm to our client

(to be completed by the Dräger Medical AG & Co. KGaA marketing partner)

.....
.....
.....
.....
.....

that the product

Vapor 2000

with Serial no.

has been inspected and complies with the technical specifications.

Vapor units bearing the CE mark fulfil the requirements of Annex I to
Directive 93/42/EEC (Medical Products).

Dräger Medical AG & Co. KGaA
Anaesthesia Division
Vapor Production – Final Inspection

These Instructions for Use apply only to
Vapor 2000
with Serial No.:

If no Serial No. has been filled in by
Dräger these Instructions for Use are
provided for general information only
and are not intended for use with any
specific machine or device.



Directive 93/42/EEC
concerning Medical Devices

The CE symbol in these Instructions for
Use applies only in connection with the
CE symbol on the machine!

Dräger Medical AG & Co. KGaA

Germany



Moislinger Allee 53 – 55
D- 23542 Lübeck

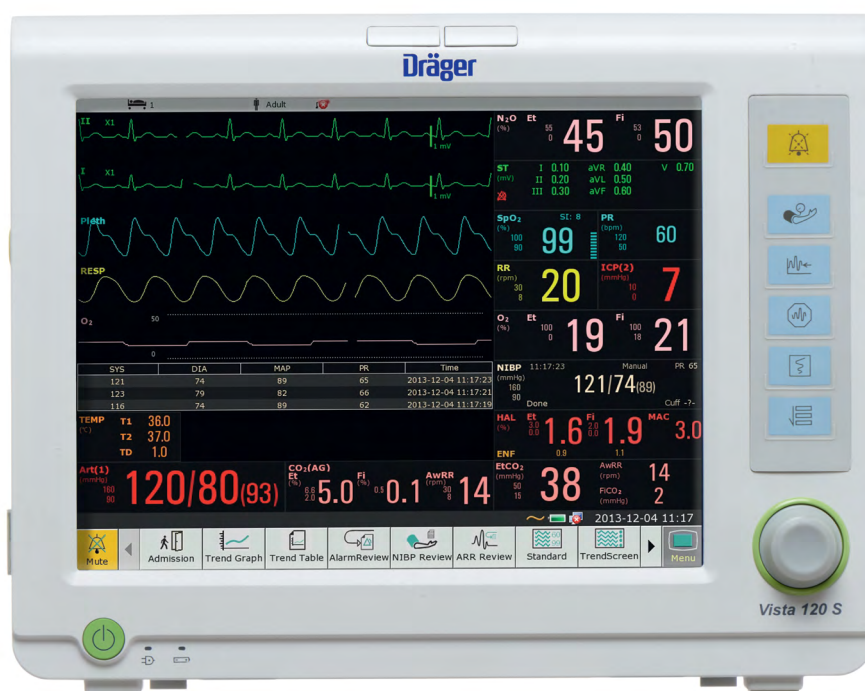


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<http://www.draeger.com>



Vista 120 S

Soluție de monitorizare a pacienților

Dräger înțelege nevoia tot mai mare de monitoare pentru pacient cu conectivitate încorporată, care să ofere monitorizare esențială la un preț bun. Vista 120 S este compatibil cu pacienți adulți, copii și nou-născuți și poate fi utilizat independent sau cu un dispozitiv de terapie Dräger ca stație de lucru complet integrată.

Vista 120 S

Ecran tactil TFT color, de 305 mm (12.1")
Afișajul de înaltă rezoluție (800 x 600) este luminos și ușor de citit, chiar și de la distanță

Format configurabil
Vă prezintă informațiile pe care doriți să le vedeți, în formatul dorit

Tendențe îmbunătățite

- Stochează până la 120 de ore de date despre tendințe pentru toți parametrii, în formatele tabelar și grafic
- Stochează până la 1.200 de măsurători NIBP și 200 de evenimente de alarmă

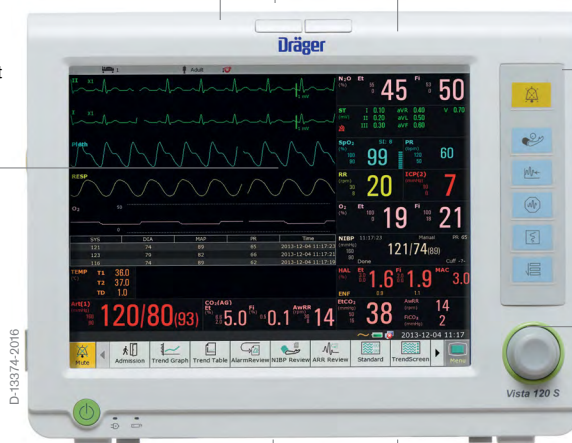
Conectivitate Medibus/Medibus-X
Oferă funcționalitate de stație de lucru integrată în toate segmentele de îngrijire

Set de bază de parametri esențiali
ECG cu 3/5 derivații, SpO₂, tensiune arterială măsurată neinvaziv, respirație și temperatură duală

Capacități de rețea
Permite monitorizarea centrală

Alarmer
Indicator de alarmă și pauză/oprire alarmă

Taste de comandă rapidă
Acces direct la funcțiile principale



Beneficii

Parte a unei soluții complete pentru secție

Vista 120 S se poate folosi la pacienții adulți, copii și nou-născuți, într-o varietate de medii de îngrijire – inclusiv unități de terapie intensivă, săli de operație, secții de urgență și unități de terapie intensivă neonatală. Utilizați Vista 120 S independent sau cu un dispozitiv Dräger complementar, cum ar fi un aparat de ventilație sau un aparat de anestezie pentru o stație de lucru complet integrată.

Capacități de monitorizare esențiale, valoare excepțională

Vista 120 S afișează până la unsprezece forme de undă într-un afișaj ușor de configurat și oferă un set de bază de parametri esențiali, printre care EKG cu 3/5 derivații, tensiunea arterială determinată neinvaziv, respirația și două valori de temperatură. De asemenea, sunt disponibili parametri avansați, care includ trei valori ale tensiunii arteriale determinate invaziv, etCO₂ în fluxul principal, debit cardiac și etCO₂ în fluxul secundar.

Utilizatorii au libertatea să adauge module de parametri externi, inclusiv SCIO pentru toate modelele și CO₂ pe modelul C/C+, după achiziția inițială a dispozitivului.

Facilitează fluxul de lucru într-o manieră eficientă și rentabilă

Vista 120 S este ușor de învățat și ușor de utilizat. Puteți configura afișajul pentru a vedea informațiile dorite, în forma dorită. Tastele de acces rapid și meniurile simplificate vă pun la îndemână datele de care aveți nevoie. Este ușor, portabil și gata de utilizare, cu un cârlig de pat integrat pentru transportul ușor al pacientului.

Imprimantă încorporată

Vista 120 S are o imprimantă integrată care imprimă până la trei canale de informații, ca să lucrați mai rapid având la dispoziție documentația, în momentul și locul în care aveți nevoie.

Prezentarea clară a datelor pacientului

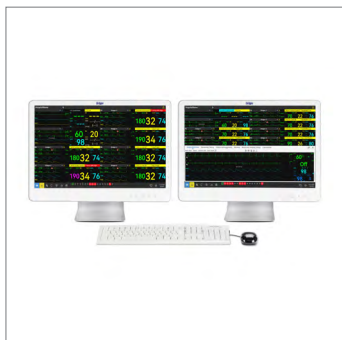
Vista 120 S are un ecran tactil TFT color, de 305 mm (12,1"), luminos și clar. Afișează cu ușurință datele complete ale pacientului.

Dräger - o tradiție a calității

Pentru Dräger, fiecare viață este unică. Protejarea, sprijinirea și salvarea de vieți este baza filosofiei companiei. Scopul nostru este să oferim produse și soluții care să susțină îngrijirea afecțiunilor acute, să ajute la îmbunătățirea rezultatelor pacienților, să reducă costurile și să obțină o mai mare satisfacție generală a pacientului.

Produse asociate

D-45196-2021



Sistem central de monitorizare Vista

Odată conectat la monitoare Vista, sistemul central de monitorizare Vista (CMS) urmărește semnele vitale a până la 128 de pacienți. Datele pacienților pot fi accesate oricând, de oriunde, simplu și ușor, de la distanță și din alte secții, într-o singură rețea, pentru a face schimburi de date și a evalua rapid starea pacientului, în vederea asistării avansate a deciziilor. Acest lucru facilitează fluidizarea fluxurilor de lucru și urmărirea atentă a pacienților.

D-6829_2014



Vista 120 și Vista 120S

Spitalele din toată lumea se confruntă cu aceeași problemă: cum să asigure îngrijire optimă în condițiile în care populația crește, reglementările financiare se înăspresc și personalul de îngrijire este suprasolicitat. Echipamentele Vista 120/120S au fost create anume pentru a vă satisface cerințele clinice fără a depăși bugetul, ca să le puteți oferi pacienților îngrijire eficientă și de calitate superioară.

D-863-2021



Vista 120 SC

Având în vedere solicitarea din ce în ce mai intensă a clinicienilor, este esențial să aveți un monitor de funcții vitale ușor de utilizat, care vă poate îmbunătăți procesele clinice și vă poate ajuta să luați decizii informate, care să influențeze pozitiv îngrijirea pacientului. Întrucât oferă funcții atât pentru verificări instantanee, cât și pentru monitorizarea de lungă durată la pat, acesta este monitorul ideal pentru diferitele necesități clinice.

Date tehnice

Clasificare

Clasă de protecție	Echipament clasa I, echipament cu alimentare internă
Grad de protecție împotriva electrocutării	CF: EKG (RESP), TEMP, IBP, C.O. BF: SpO ₂ , NIBP, CO ₂ , AG, BIS
Protecție la defibrilare	Da
Protecție împotriva pătrunderii lichidelor	IPX1
Metoda de dezinfectare/sterilizare	Pentru detalii, consultați capitolul „Îngrijire și curățare”.
Mod de funcționare	Continuu
Conform cu standardele	IEC 60601-1: 2005+A1: 2012; IEC 60601-1-2: 2014; EN 60601-1: 2006+A1: 2013; EN 60601-2: 2015; IEC 60601-2-49: 2011

Parametri acceptați

EKG

Mod derivații	3 derivații: I, II, III 5 derivații: I, II, III, aVR, aVL, aVF, V
Formă de undă	3 derivații: formă de undă cu 1 canal 5 derivații: formă de undă cu 2 canale, max. șapte forme de undă
Stil denumire derivații	AHA, IEC
Sensibilitate de afișare	1,25 mm/mV (x0,125), 2,5 mm/mV (x0,25), 5 mm/mV (x0,5), 10 mm/mV (x1), 20 mm/mV (x2), 40 mm/mV (x4), AUTO gain
Scanare	6,25, 12,5, 25, 50 mm/s
Lățime de bandă (-3 dB)	Diagnostic: între 0,05 și 150 Hz Monitorizare: între 0,5 și 40 Hz Operație: între 1 și 20 Hz
CMRR (Common mode rejection ratio / rată de suprimare a semnalului)	Diagnostic: > 95 dB Monitorizare: > 105 dB Operație: > 105 dB
Atenuarea semnalelor	50 Hz/60 Hz (Filtrul de atenuare a semnalelor poate fi selectat manual)
Impedanță de intrare diferențială	> 5 MΩ
Interval semnal de intrare	±10 mVPP
Toleranță potențial de compensare electrod	±800 mV
Intensitate curent auxiliar (Detectare derivații desprinse)	Electrod activ: < 100 nA Electrod de referință: < 900 nA
Timp de revenire după defibrilare	< 5 s (măsurat fără electrozi conform cerințelor IEC60601-2-27:2011, Secț. 201.8.5.5.1)
Curent de scurgere la pacient	<10 μA
Semnal scală	1 mV _{PP} , precizie ±5

Date tehnice

Zgomot sistem	< 30 μV_{pp}
Protecție ESU	Mod incizie: 300 W Mod coagulare: 100 W Timp de revenire: ≤ 10 s
Suprimarea zgomotului ESU	Testat conform metodei de testare din ANSI/AAMI EC13-2002: Sect. 5.2.9.14, este conform cu standardul
Viteză de creștere minimă intrare (derivația II)	> 2,5 V/s

Puls

Indicator puls	Se înregistrează un puls dacă se respectă cerințele IEC 60601-2-27: 2011, Sect. 201.12.1.101.12: Amplitudine: între ± 2 mV până la ± 700 mV Lățime: între 0,1 ms și 2,0 ms Timp de creștere: între 10 μs și 100 μs
Respingere puls	Pulsul se respinge dacă sunt îndeplinite cerințele IEC 60601-2-27: 2011, Sect. 201.12.1.101.13: Amplitudine: între ± 2 mV și ± 700 mV Lățime: între 0,1 ms și 2,0 ms Timp de creștere: între 10 μs și 100 μs

Ritm cardiac

Interval	ADU: între 15 și 300 bpm PED/NEO: între 15 și 350 bpm
Precizie	Valoarea mai mare dintre $\pm 1\%$ și ± 1 bpm
Rezoluție	1 bpm
Sensibilitate	$\geq 300 \mu\text{V}_{\text{pp}}$

PVC

Interval	ADU: între 0 și 300 PVC/min PED/NEO: între 0 și 350 PVCs/min
Precizie	valoarea mai mare dintre 1 PVC/min și 2% din măsurare
Rezoluție	1 PVC/min

Valoare ST

Interval	între -2,0 și 2,0 mV
Precizie	între -0,8 mV și +0,8 mV: valoarea mai mare dintre $\pm 0,02$ mV și 10%.
Rezoluție	0,01 mV

Date tehnice

Metodă de determinare a ritmului cardiac mediu

Metoda 1	Ritmul cardiac se calculează prin excluderea valorilor minimă și maximă din cele mai recente 12 intervale RR și calcularea mediei celor 10 intervale RR rămase.
Metoda 2	Dacă fiecare dintre trei intervale RR consecutive depășește 1200 ms, ritmul cardiac se calculează ca media celor mai recente patru intervale RR.

Interval ritm sinus și SV

Tahicardie	Adult: interval RR în 5 complexe QRS consecutive $\leq 0,5$ s. Pediatric/neonatal: interval RR în 5 complexe QRS consecutive $\leq 0,375$ s.
Normal	Adult: $0,5 \text{ s} < \text{interval RR în 5 complexe QRS consecutive} < 1,5 \text{ s}$. Pediatric/neonatal: $0,375 \text{ s} < \text{interval RR în 5 complexe QRS consecutive} < 1 \text{ s}$.
Bradicardie	Adult: interval RR în 5 complexe QRS consecutive $\geq 1,5$ s. Pediatric/neonatal: interval RR în 5 complexe QRS consecutive $\geq 1 \text{ s}$.

Interval ritm ventricular

Tahicardie ventriculară	Intervalul de 5 complexe ventriculare consecutive este sub 600 ms
Ritm ventricular	Intervalul de 5 complexe ventriculare consecutive este între 600 ms și 1000 ms
Bradicardie ventriculară	Intervalul de 5 complexe ventriculare consecutive depășește 1000 ms

Timp pornire tahicardie

Tahicardie ventriculară 1 mV 206 bpm	Amplificare 0,5: 10 s Amplificare 1,0: 10 s Amplificare 2,0: 10 s
Tahicardie ventriculară 2 mV 195 bpm	Amplificare 0,5: 10 s Amplificare 1,0: 10 s Amplificare 2,0: 10 s
Timp de răspuns al măsurătorii la schimbările ritmului cardiac	Interval ritm cardiac: între 80 și 120 bpm Interval: în 11 s Interval ritm cardiac: între 80 și 40 bpm Interval: în 11 s
Respingere undă T înaltă	În conformitate cu IEC 60601-2-27: 2011, Sect. 201.12.1.101.17: amplitudine undă T minimă recomandată 1,2 mV

Date tehnice

Precizia determinării ritmului cardiac și răspunsul la ritmul neregulat	În conformitate cu IEC 60601-2-27: 2011, Sect. 201.7.9.2.9.101 b) 4). Valoarea ritmului cardiac după 20 s: Bigeminism ventricular: 80 ±1 bpm Schimbare lentă bigeminism ventricular: 60 ±1 bpm Schimbare rapidă bigeminism ventricular: 120 ±1 bpm Sistole bidirecționale: 91 ±1 bpm
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Respirație

Metodă	Impedanță între RA-LL, RA-LA
Interval de referință al impedanței	între 200 și 2500 Ω (cu cabluri EKG cu rezistență 1 KΩ)
Măsurarea sensibilității	În intervalul de impedanță de bază: 0,3 Ω
Lățimea de bandă a formei de undă	între 0,2 și 2,5 Hz (-3 dB)
Interval de măsurare și alarmă RR:	Adult: între 0 și 120 rpm Neo/Ped: între 0 și 150 rpm
Rezoluție	1 rpm
Precizie	Adult: între 6 rpm și 120 rpm: ±2 rpm între 0 rpm și 5 rpm: nespecificat Neo/Ped: între 6 rpm și 150 rpm: ±2 rpm între 0 rpm și 5 rpm: nespecificat
Selectare amplificare	x 0,25, x 0,5, x 1, x 2, x 3, x 4, x 5

NIBP

Metodă	Oscilometrică
Mod	Manual, automat, continuu
Interval de măsurare în modul automat	1, 2, 3, 4, 5, 10, 15, 30, 60, 90, 120, 240 și 480 min
Continuu	5 min, intervalul este 5 s
Tip de măsurare	Tensiune sistolică, tensiune diastolică, tensiune medie
Tip alarmă	SYS, DIA, MAP

Interval de măsurare și alarmă

Mod adulți:	SYS: între 40 și 270 mmHg DIA: între 10 și 215 mmHg MAP: între 20 și 235 mmHg
Mod pediatric	SYS: între 40 și 230 mmHg DIA: între 10 și 180 mmHg MAP: între 20 și 195 mmHg
Mod neonatal	SYS: între 40 și 135 mmHg DIA: între 10 și 100 mmHg MAP: între 20 și 110 mmHg
Interval de măsurare tensiune cu manșeta	între 0 și 300 mmHg
Rezoluție tensiune	1 mmHg
Abatere standard maximă	8 mmHg

Date tehnice

Durată maximă de măsurare

Adult/Pediatric	120 s
Nou-născuți	90 s
Durată tipică de măsurare	între 20 și 35 s (în funcție de ritmul cardiac/perturbații de mișcare)

Protecție de suprapresiune

Pentru adulți	297 ± 3 mmHg
Copii	245 ± 3 mmHg
Nou-născut	147 ± 3 mmHg

PR

Interval de măsurare	între 40 și 240 bpm
Precizie	Valoarea mai mare dintre ± 3 bpm și 3,5%

SpO₂

Interval de măsurare	între 0 și 100%
Rezoluție	1%

Precizie

Adulți (inclusiv copii)	± 2% (între 70 și 100% SpO ₂) Nedefinit (între 0 și 69% SpO ₂)
Nou-născuți	± 3% (între 70 și 100% SpO ₂) Nedefinit (între 0 și 69% SpO ₂)

PI

Interval de măsurare	între 0 și 10, valoarea PI nevalidă este 0
Rezoluție	1

Puls

Interval de măsurare a pulsului	între 25 și 300 bpm
Interval de alarmă	între 30 și 300 bpm
Precizie	± 2 bpm

Date tehnice

Modul Nellcor

Interval de măsurare	între 1 și 100%
Interval de alarmă	între 20 și 100%
Rezoluție	1%
Perioadă de actualizare a datelor	1 s
Precizie (între 70% și 100% SpO ₂):	
DS-100A, OXI-A/N (adulți)	±3 %
OXI-A/N (nou-născuți)	±4%
D-YS (de la copii mici la adulți)	±3%
D-YS (nou-născuți)	±4%
D-YS cu clemă ureche D-YSE	±3,5%
MAX-FAST	±2%

Puls

Interval de măsurare	între 20 și 300 bpm
Rezoluție	1 bpm
Precizie	3 bpm (între 20 și 250 bpm)
Lungime de undă senzor	Aproximativ 660 și 900 nm
Energie luminoasă emisă	<15 mW

NOTĂ: informațiile despre lungimile de undă pot fi extrem de utile clinicienilor (de exemplu, la administrarea terapiei fotodinamice).

Temperatură

Canale	2
Interval de măsurare și alarmă	între 0 și +50 °C (între 32 și 122 °F)
Tip senzor	YSI 10 k
Rezoluție	±0,1 °C (0,1°F)
Precizie (fără senzor)	±0,1 °C
Timp de reîmprospătare	La fiecare 1 - 2 s

IBP

Canale	3
Precizie	Valoarea mai mare dintre ±2% și ±1 mmHg
Rezoluție	1 mmHg

Date tehnice

Senzor de presiune

Sensibilitate	5 (μ V/V/mmHg)
Interval de impedanță	între 300 și 3000 Ω
Filtru	c.c.~ 12,5 Hz; c.c.~ 40 Hz
Zero	Interval: $\pm$ 200 mmHg

Interval de măsurare și alarmă

Art	între 0 și 300 mmHg
PA	între -6 și 120 mmHg
CVP/RAP/LAP/ICP	între -10 și 40 mmHg
P1/P2	între -50 și 300 mmHg

CO₂

În conformitate cu ISO 80601-2-55: 2011

Modulul G2

Pentru pacienți	Adulți, copii, nou-născuți		
Parametri măsurați	EtCO ₂ , FiCO ₂ , AwRR		
Unitate	mmHg, %, kPa		
Interval de măsurare	CO ₂	între 0 mmHg și 150 mmHg (0% la 20%)	
	AwRR	între 2 și 150 rpm	
Rezoluție	EtCO ₂	1 mmHg	
	FiCO ₂	1 mmHg	
	AwRR	1 rpm	

Precizie			
EtCO ₂	± 2 mmHg, între 0 mmHg și 40 mmHg	Frecvență respiratorie ≤ 60 rpm	Condiții tipice: Temperatură ambientală: (25±3) °C Presiune barometrică: (760±10) mmHg Gaz de completare: N ₂ Debit mostră de gaz: 100 ml/min
	± 5% din valoarea măsurată, între 41 și 70 mmHg		
	± 8% din valoarea măsurată, între 71 și 100 mmHg		
	± 10% din valoarea măsurată, între 101 și 150 mmHg	Frecvență respiratorie ≤ 60 rpm	Toate condițiile
	± 12% sau ± 4 mmHg din valoarea măsurată, valoarea mai mare dintre cele două		
AwRR	± 1 rpm		

Date tehnice

Deviere precizie de măsurare	Respectă cerințele preciziei de măsurare
Debit mostră de gaz	70 ml/min sau 100 ml/min (implicit), precizie: ± 15 ml/min
Timp de încălzire	Afișarea valorii măsurate în 20 s, atingerea preciziei proiectate în 20 de minute
Timp de creștere	< 400 ms (sifon cu tub de eșantionare 2 m, debit eșantion de gaz: 100 ml/min)
Timp de răspuns	< 4 ms (sifon cu tub de eșantionare 2 m, debit eșantion de gaz: 100 ml/min)
Mod de lucru	Așteptare, măsurare
Compensare O ₂	Interval: între 0% și 100% Rezoluție: 1% Implicit: 16%
Compensare N ₂ O	Interval: între 0% și 100% Rezoluție: 1% Implicit: 0%
Compensare AG	Interval: între 0% și 20% Rezoluție: 0,1% Implicit: 0%
Metodă de compensare umiditate	ATPD (implicit), BTPS
Compensare presiune barometrică	Automat (schimbările presiunii barometrice nu introduc erori suplimentare în valorile măsurate)
Calibrare zero	Asistență
Calibrare	Asistență
Alarmă	EtCO ₂ , FiCO ₂ , AwRR
Întârziere alarmă de apnee	10 s, 15 s, 20 s, 25 s, 30 s, 35 s, 40 s, 60 s; valoarea implicită este 20 s
Frecvența de eșantionare a datelor	100 Hz
Modificarea EtCO ₂ ¹	AwRR > 80 rpm, EtCO ₂ scădere 8% AwRR > 120 rpm, EtCO ₂ scădere 10%

NOTĂ: utilizați un dispozitiv de testare echivalent cu EN ISO 80601-2-55 fig 201.101 pentru a măsura la un raport I/E de 1:2. Precizia frecvenței respiratorii este determinată de frecvența dispozitivului, iar modificarea ET READING se referă la valoarea nominală.

Efectele gazelor active

Gaz	Nivel de gaz (%)	Efect cantitativ/Observații
Protoxid de azot	60	Gazele active nu afectează valoarea măsurată dacă valorile de compensare pentru O ₂ , N ₂ O, agenți de anestezie au fost setate corect.
Halotan	4	
Enfluran	5	
Izofluran	5	
Sevofluran	5	
Desfluran	15	

Date tehnice

Modul Respironics

Tipuri de pacienți	Pacienți adulți, pediatrici și nou-născuți
Tehnică	Tehnica absorbției de infraroșii
Parametri măsurați	EtCO ₂ , FiCO ₂ , AwRR
Unitate	mmHg, %, kPa

Interval de măsurare

EtCO ₂	între 0 și 150 mmHg	
FiCO ₂	între 3 și 50 mmHg	
AwRR	între 0 și 150 rpm (flux principal) între 2 150 rpm (flux secundar)	
Rezoluție	EtCO ₂	1 mmHg
	FiCO ₂	1 mmHg
	AwRR	1 rpm
Precizia EtCO ₂	±2 mmHg, între 0 mmHg și 40 mmHg	
	±5% din valoarea măsurată, între 41 mmHg și 70 mmHg	
	±8% din valoarea măsurată, între 71 mmHg și 100 mmHg	
	±10% din valoarea măsurată, între 101 mmHg și 150 mmHg	
	±12% din valoarea măsurată, RR peste 80 rpm (flux secundar). Frecvența respirației nu duce la degradarea performanțelor (flux principal)	
Precizie AwRR	±1 rpm	
Mod de operare	Măsurare, așteptare	
Debit mostră de gaz (flux secundar)	(50 ±10) ml/min	

Compensare O₂

Interval	între 0 și 100%
Rezoluție	1%
Implicit	16%
Compensare presiune barometrică	Configurare utilizator

Compensare gaze anestezice

Interval	între 0 și 20%
Rezoluție	0,1%
Implicit	0,0%
Compensare gaz de completare	Aer din încăpere, N ₂ O, heliu

Date tehnice

Stabilitate

Devier termen scurt	Devier peste 4 ore < 0,8 mmHg
Devier termen lung	120 ore
Calibrare zero	Asistență
Tip alarmă	EtCO ₂ , FiCO ₂ , AwRR
Întârziere alarmă de apnee	10 s, 15 s, 20 s, 25 s, 30 s, 35 s, 40 s; valoarea implicită este 20 s
Frecvența de eșantionare a datelor	100 Hz
Timp de creștere/timp de răspuns CO ₂ (flux principal)	Sub 60 ms
Timp de răspuns senzor (flux lateral)	< 3 secunde, inclusiv timpul de transport și timpul de creștere

Efectele gazelor și vaporilor activi asupra valorilor măsurate ale EtCO₂:

Gaze sau vapori	Nivel de gaz (%)	Efect cantitativ/Observații
Protoxid de azot	60	Gaz uscat și saturat
Halotan	4	(0 ~ 40) mmHg: eroare suplimentară de ± 1 mmHg
Enfluran	5	(41 ~ 70) mmHg: eroare suplimentară de ± 2,5 mmHg
Izofluran	5	(71 ~ 100) mmHg: eroare suplimentară de ± 4 mmHg
Sevofluran	5	(101 ~ 150) mmHg: eroare suplimentară de ± 5 mmHg
Xenon	80	*Eroare suplimentară maximă în cazul în care compensarea pentru PB, O ₂ , N ₂ O, agenți anestezici sau heliu este selectată corect pentru componentele fracționale de gaz efective prezente.
Helium	50	Desfluran: Prezența desfluranului în expirație la concentrații de peste 5% va mări valorile de dioxid de carbon cu încă 3 mmHg la 38 mmHg.
Desfluran	15	Xenon: Prezența xenonului în expirație va reduce valorile de dioxid de carbon cu încă până la 5 mmHg la 38 mmHg.

Date tehnice

Efectele presiunii barometrice asupra măsurării EtCO₂:

Efect cantitativ

Presiune barometrică ambientală, operațional

(0 ~ 40) mmHg: eroare suplimentară de ± 1 mmHg

(41 ~ 70) mmHg: eroare suplimentară de $\pm 2,5$ mmHg

(71 ~ 100) mmHg: eroare suplimentară de ± 4 mmHg

(101 ~ 150) mmHg: eroare suplimentară de ± 5 mmHg

*Eroare suplimentară maximă în cazul în care compensarea pentru PB, O₂, N₂O, agenți anestezici sau heliu este selectată corect pentru componentele fracționale de gaz efective prezente.

NOTĂ: precizia frecvenței respiratorii a fost verificată prin utilizarea unui set de testare cu solenoid pentru a furniza dispozitivului o undă pătratică de concentrație cunoscută de CO₂. Au fost utilizate concentrații de CO₂ de 5% și 10%. Frecvența respiratorie a fost variată pe intervalul de măsurare al dispozitivului. Criteriul de succes/eșec a fost compararea frecvenței respiratorii de la senzor cu frecvența undei pătratică.

C.O.

Pentru pacienți

Pentru adulți

Metodă de măsurare

Tehnica termodiluției

Interval de măsurare

C.O.

între 0,1 l/min și 20 l/min

TB

între 23 °C și 43 °C

TI

între -1 °C și 27 °C

Rezoluție

C.O.

0,1 l/min

TB, TI

0,1 °C

Precizie

C.O.

valoarea mai mare dintre $\pm 5\%$ și $\pm 0,2$ l/min

TB

$\pm 0,1$ °C (fără senzor)

TI

$\pm 0,1$ °C (fără senzor)

Analiza tendințelor

Scurt

1 oră, rezoluție 1 s.

Lung

120 de ore, rezoluție 1 min.

Revedere examinare

1.200 de seturi de date de măsurare NIBP

NOTĂ: pentru specificațiile AG, consultați secțiunea Module suplimentare Scio Four.

Date tehnice

Înregistrator

Lăţime înregistrare	48 mm
Lăţime hârtie	50 mm
Viteză hârtie	12,5, 25, 50 mm/s
Grafic	Până la 3 forme de undă
Tipuri de înregistrări	• Înregistrare continuă în timp real • Înregistrare în timp real 8 secunde • Înregistrarea orei • Înregistrarea alarmei • Înregistrarea graficelor de trenduri • Înregistrarea tabelului de trend • Înregistrarea analizei de NIBP • Înregistrarea analizei de aritmie • Înregistrarea analizei alarmelor • Înregistrarea măsurătorilor de C.O. • Înregistrare formei de undă fixate • Înregistrarea titrărilor pentru calculele de medicamente • Înregistrarea rezultatelor calculelor de hemodinamică

Specificațiile afişajului

Ecran afişare	Ecran tactil TFT color de 305 mm (12,1 inch)
Rezoluție	800 x 600
Număr maxim de forme de undă	11
Indicatoare cu led	1 alimentare, 2 alarme, 1 încărcare

Specificații fizice

Dimensiuni (Î x L x A)	266 x 344 x 145 mm
Greutate	5 kg

Specificații electrice

Alimentarea electrică	100 V – 240 V~, 50 Hz/60 Hz
P _{max}	110 VA
SIGURANȚĂ FUZIBILĂ	T 3,15 AH, 250 V

Clasificare

Tip anti-electrocutare/clasă de protecție	Echipament clasa I, echipament cu alimentare internă
Tip EMC	Clasa A
Grad anti-electrocutare	CF: ECG (RESP), TEMP, IBP, CO BF: SpO ₂ , NIBP, CO ₂ , AG

Date tehnice

Protecție împotriva pătrunderii lichidelor	IPX1
Metoda de dezinfectare/sterilizare	Consultați instrucțiunile de utilizare: Îngrijire și curățare
Mod de funcționare	Echipament cu funcționare continuă
Alimentarea electrică	100 V la 240 V~, 50 Hz/60 Hz Pmax = 110 VA SIGURANȚĂ FUZIBILĂ T 3,15 AH, 250 VP

Baterie litiu-ion (opțională)

Cantitate	1
Capacitate	5000 mAh
Durata de funcționare a acumulatorului	≥ 350 min (la 25±2 °C, cu (a) baterie sau baterii noi, complet încărcate, mod de măsurare continuă a SpO ₂ și măsurare automată a NIBP la intervale de 15 minute, modul Dräger ECG/TEMP conectat, înregistrare la intervale de 10 minute, luminozitate setată la „1”)
Timp de încărcare baterie	≤ 390 min, încărcare 100% ≤ 351 min, încărcare 90% (monitorul este oprit)

Cerințe de mediu

Dacă monitorul este păstrat sau utilizat în afara intervalelor de temperatură, umiditate și altitudine specificate, este posibil să nu atingă performanțele specificate.

Interval de temperatură

Funcționare	între 0 și 40 °C
Depozitare și transport	între -20 °C și 55 °C

Umiditate relativă

Funcționare	Între 15% și 95% (fără condensare)
Depozitare și transport	Între 15% și 95% (fără condensare)

Presiune atmosferică

Funcționare	între 86 kPa și 106 kPa
Depozitare și transport	între 70 kPa și 106 kPa

Date tehnice

Standarde

IEC 60601-1: 2005+A1 :2012; IEC 60601-1-2: 2007; EN 60601-1: 2006+A1 :2013; EN 60601-1-2: 2007; IEC 60601-2-49: 2011 Monitoare Vista 120 S sunt conforme cu Directiva privind dispozitivele medicale (MDD) 93/42/CEE.

Vista 120 S	Model A MS32996	Model A+ MS32998	Model C MS32997	Model C+ MS32999
EKG 3/5 derivații	X	X	X	X
SpO ₂ brevetat	X		X	
SpO ₂ Nellcor		X		X
NBP	X	X	X	X
Temperatură duală	X	X	X	X
3IBP			X	X
CO			X	X
etCO ₂			X	X
Imprimantă încorporată		X	X	X
Consolă gaze	X	X	X	X
LAN	X	X	X	X
Wireless		X	X	X

Monitoare pentru pacient Vista 120 S sunt disponibile numai pe anumite piețe.
Vă rugăm să contactați biroul local de vânzări pentru mai multe informații.

Nu toate produsele, caracteristicile sau serviciile sunt disponibile spre comercializare în toate țările.
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