V60 Anesthetic Vaporizer

Operator’s Manual

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WARNING

- **Thi a e he ic a .i e be e a ed b ki ed/ ai ed c i ica . fe i a .**
- **I i i a f he h i a . ga i ai ha e hi e i e . e f a ea . ab e e ice/ ai e a ce a . Neg ec i g hi a e i achi e b eakd . e . a i j .**

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- Malfunction of the instrument or part whose serial number is not legible enough.
- Others not caused by instrument or part itself.

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Please include the instrument model number, the serial number, and a description of the problem with all requests for service.

Any questions regarding the warranty should be directed to your local sales or service representative.

Company Contact

Manufacturer:	Shenzhen Mindray Bio-Medical Electronics Co., Ltd.
Address:	Mindray Building,Keji 12th Road South,High-tech industrial park,Nanshan,Shenzhen 518057,P.R.China
Website:	www.mindray.com
E-mail Address:	service@mindray.com
Tel:	+86 755 81888998
Fax:	+86 755 26582680

Distributor:	Mindray DS USA, Inc.
Address:	800 MacArthur Blvd., Mahwah, NJ 07430
Dom. Customer Service:	1.800.288.2121
Intl. Customer Service:	+1.201.995.8000

FOR YOUR NOTES

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1 Safety

1.1 Safety Information

WARNING

- **I dica e a e ia ha a d afe ac ice ha , if a ided, c d e i dea h e i i j .**

CAUTION

- **I dica e a e ia ha a d afe ac ice ha , if a ided, c d e i i e a i j d c / e da age.**

NOTE

- **P ide a ica i i he ef i f ai e e ha ge he f d c .**

1.1.1 Warnings

WARNING

- **D e a e he a e he ic a ie bef e eadi g hi a a .**
- **The e f he a e he ic a ie f de a d a d ic f he i c i f e.**
- **Bef e i g he e i e a i , he e e if ha he a e he ic a ie i i c ec ki g de a d e a i g c di i .**
- **D e he a e he ic a ie i hee i e ide he ecified e e a e a d e e a ge .**
- **T a id e i ha a d, d e he a e he ic a ie i he e e ce f fa ab e a e he ic age , a i id .**
- **Di e f he ackage a e ia , b e i g he a icab e a ec eg a i a d kee he f chi d e ' each.**
- **T a id e i ha a d, e ecified -c b ib e a e he ic age i c ia ce i h he e i e e f ISO8835-4.**
- **A a h ied ga a i ai ed e cha ge di a e b e he a e he ic a ie .**
- **Thi a e he ic a ie a be dified i h he a fac e ' e i i .**
- **The edica de ice be i ec ed a d e iced eg a b a h ied e ice e e .**
- **Bef e e, check ha he hi i g ackage i i ac .**
- **The a e he ic a ie ha be e iced ai ai ed hi e i e i h a a ie .**
- **D e he a e he ic a ie he he e i a a e he ic age ea k.**
- **The a ie i de ig ed f e i h he ecific a e he ic age a ed he fi e b ck (a d f he i dica ed b abe f diffe e c). D e he a ie if he a ie i fi ed i h a age he ha he age ecified he f abe .**
- **Thi a e he ic a ie i i ab e f e i a MRI e i e .**

1.1.2 Cautions

CAUTION

- **U e acce ie ecified i hi a a .**
- **A he e d fi e ice ife, he a e he ic a i e , a e a i acce ie , be di ed f i c ia ce i h he g ide i e eg a i g he di a f ch d c .**
- **The a e he ic a i e a bec e ab e if he i i i ed be d 10 deg ee .**
- **A a i a ca he a e he ic a i e e a id da age ca ed b d , i ac , g ib a i he echa ica f ce. D ca b he c dia he ha d e f cki g e e .**

1.1.3 Notes

NOTE

- **Kee hi a a c e he a e he ic a i e ha i ca be b ai ed c e ie he eeded.**
- **Thi a a de c ibe a fea e a d i . Y a e he ic a i e a ha e a f he .**

1.2 Anesthetic Vaporizer Symbols

	Refer to instruction manual/booklet
	Gas flow direction
	Adjust concentration as the arrow shows
	Press and lock as the arrow shows

2 The Basics

2.1 Product Description

This vaporizer is an unheated, calibrated anesthetic vaporizer used for evaporating liquid anesthetic agents and delivering mixed gas of controlled concentration to an anesthetic delivery system.

Each vaporizer is calibrated for a specified anesthetic agent and is only suitable for that anesthetic agent. The specific agent that the vaporizer must be used with is marked in text and by specific color on the vaporizer.

The vaporizer compensates for variations of temperature, pressure and flow. Therefore, under the circumstances specified in this manual, the output concentration of the vaporizer is not influenced by ambient conditions, such as temperature, gas flow and ventilation pressure.

The anesthetic vaporizer is not suitable for use with an anesthetic delivery system with vaporizer placed inside the circuit system due to relatively high internal pneumatic resistance.

The vaporizer delivery system is in compliance with ISO8835-4.

The Key Filler system is in compliance with ISO5360.
Quik-Fil system complies with the performance data of ISO5360.

Mindray recommends that the output concentration is monitored through an anesthetic gas monitoring device in compliance with ISO80601-2-55 to detect any hazardous output values.

Use an anesthetic gas scavenging system in compliance with ISO8835-3 to minimize atmospheric pollution in the operating room.

WARNING

- **D e he a e he ic a i e i bi e ehic e , ae a e , he ic e a d/ hi .**

2.2 Intended Use

V60 Anesthetic aporizer is an unheated, calibrated anesthetic vaporizer used for evaporating liquid anesthetic agents and delivering mixed gas of controlled concentration to an anesthetic delivery system.

The V60 Anesthe Vaporizer is available in models specific for use with Isoflurane and models available specific for use with Sevoflurane.

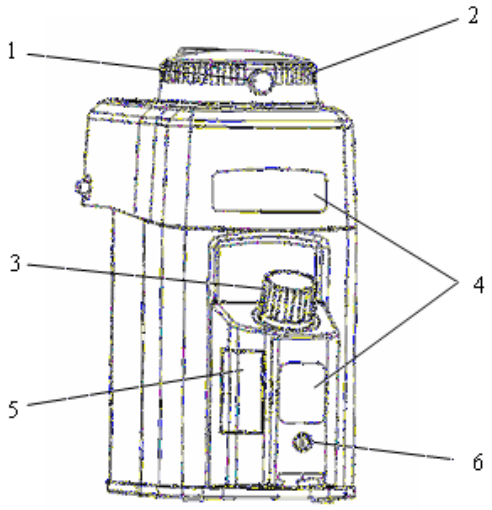
WARNING

- **The a e he ic a i□e i i e ded be e a ed b ice ed c i icia a d a ified a e he ia e e h ha e ecei ed ade a e ai i g i e. A e a h i□ed ai ed□ e f□ a e a i he a e he ic a i□e .**
- **Thi a e he ic a i□e i i ab e f e i a MRI e i□e .**

2.3 Anesthetic Vaporizer Appearance

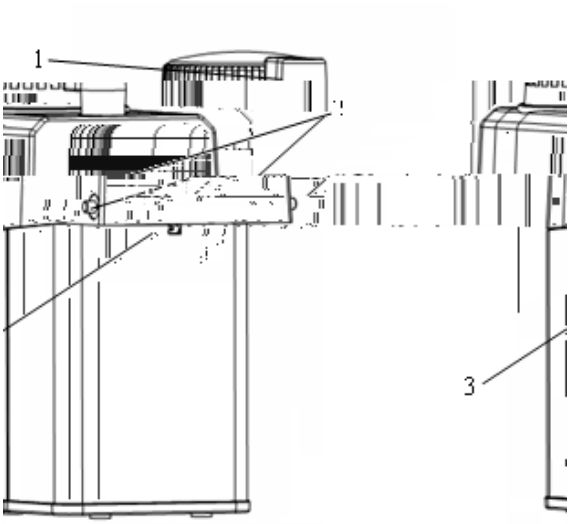
2.3.1 Front View

1. “0” button
2. Control dial
3. Filling system
4. Color mark for anesthetic agent
5. Sight glass for filling level
6. Drainage screw

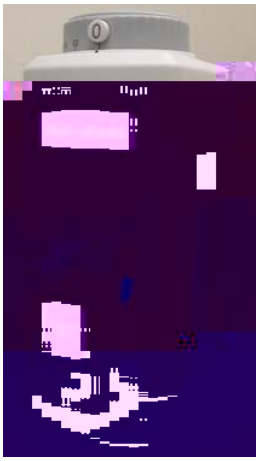


2.3.2 Rear View

1. Handle for locking lever
2. Interlock system
3. Locking pin



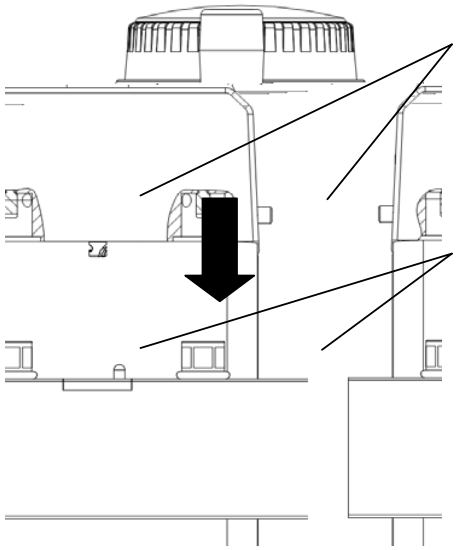
2.4 Configuration Differences

Model	Sevoflurane Key Filler Vaporizer	Isoflurane Key Filler Vaporizer	Sevoflurane Quik-Fil Vaporizer
Anesthetic agent	Sevoflurane	Isoflurane	Sevoflurane
Filling system	Key Filler system	Key Filler system	Quik-Fil system
Picture			
Filler Accessory			
Drainage Accessory			

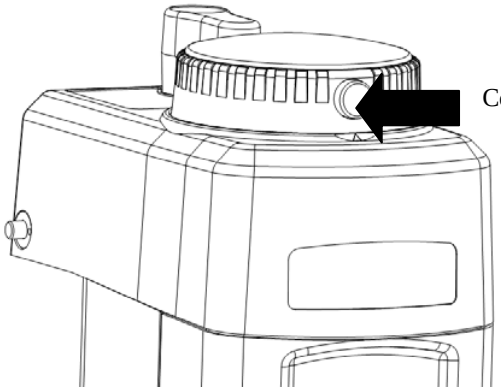
3.2.1 Plug-in Adapter/Plug-in Connector

The vaporizer is for use with anesthetic delivery systems utilizing the Ohmeda Selectatec® compatible manifold system.

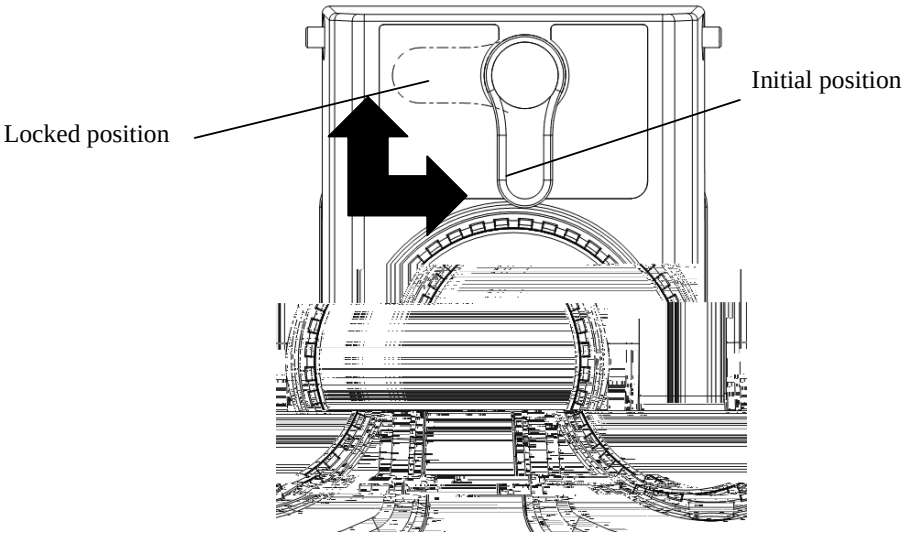
The openings in the plug-in adapter on the vaporizer fit onto the pins on the plug-in connector on the anesthetic delivery system.



To connect/disconnect the vaporizer, the control dial must be at the “0” setting indicating locked status.

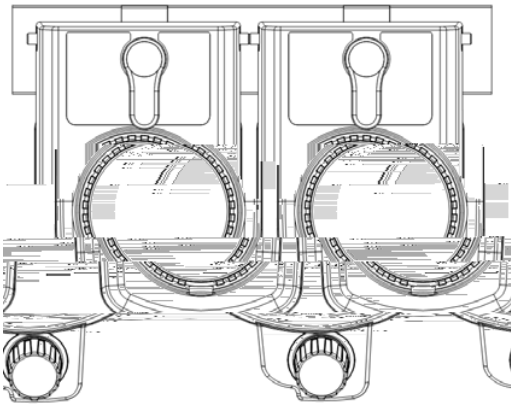


Press the handle for locking lever and turn the handle clockwise for 90° to lock the vaporizer and counter clockwise for 90° to release locking.



3.2.2 Interlock Device

Ohmeda Selectatec® compatible interlock device is used. When the anesthetic delivery system is connected to multiple vaporizers, if one vaporizer is switched on, the two pins on the interlock device are pushed out, preventing other vaporizers from being switched on.



WARNING

- **Bef e a i , check if he i e ck de ice i f f c i a.**
- **A af c i i he i e ck e ca e da ge he a ie b e d i g i i g a e he ic age .**

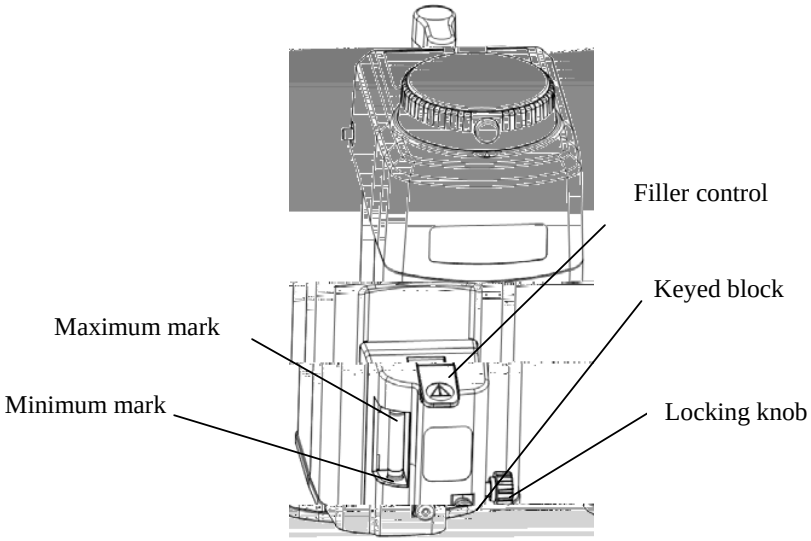
NOTE

- **T e e he . a . e a i . f he a . i e , c ec he a . i e i he c ec f di ec i c e . di g ih hea . he a e he ic a . i e .**
- **I he ca e he e a a e he ic de i e . e ha 3 i - i e a . i e . i g . i i , b he e . 2 a . i e a e . ed i . adjace . ca i , e e ha he i e . ck i f c i a . O he i e, a . i e a e ec e ded . be c ec ed igh e . each . he .**

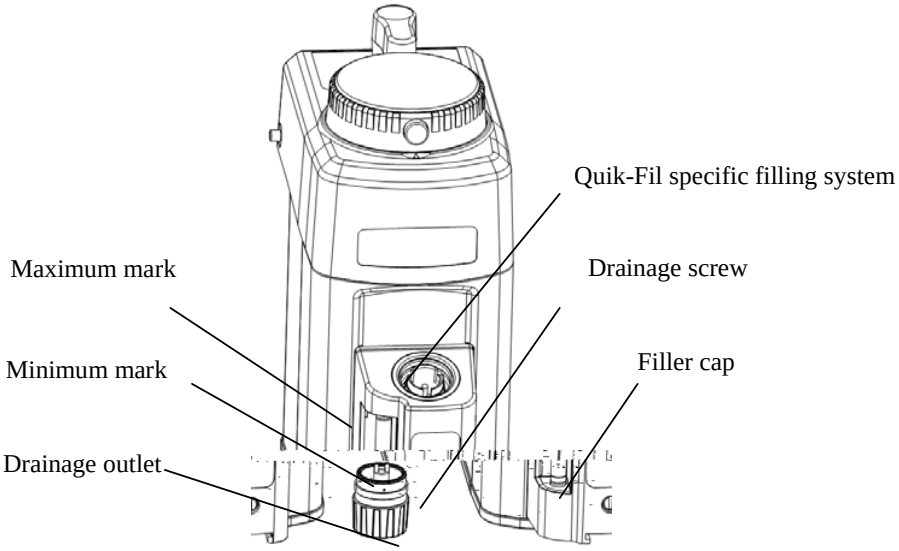
3.3 Filling System

The filling system is used to fill and drain the specific anesthetic agent. The filling system has a liquid level indicator which displays filling level with the maximum and minimum levels marked.

- Key Filler system



- Quik-Fil system



FOR YOUR NOTES

4 Filling and Draining

4.1 Checks before Filling

1. Check the vaporizer for damage.
2. Set the control dial to the “0” position.
3. Observe use-by date for anesthetic agent.
4. Use on anesthetic delivery systems made by other manufacturers only after a functional system check for proper seating, leakage, pressure and flow has been carried out by trained service personnel (on each type of anesthetic delivery system).
5. After filling for the first time, wait 15 minutes for the dry wicks inside to become saturated (The filling level of the anesthetic agent may drop. Refill if required.)

NOTE

- **The a e he ic a i e a be ed he a e he ic de i e e af e he e a i g ga i a i ha e ed a ech ica ecifica i f he a i e a d he a e he ia e a e e. A de ia i igh e i i c ec c ce a i bei g de i e ed.**

4.2 Filling the Vaporizer

WARNING

- **O fi he a i e i h he a e he ic age ecified i .**

CAUTION

- **Take ca e i a e he ic age .**

NOTE

- **E e ade a e a bie e i a i he fi i g he a i e .**

Before use, check that the correct anesthetic agent is used. For instance, check the name of anesthetic agent and color mark on the vaporizer and the anesthetic agent bottle.

Isoflurane	Purple
Sevoflurane	Yellow

WARNING

- If a ...ie ha bee fi ed a ia fi ed i h he g a e he ic age , i g he a ...ie i...edia e . Re... ead ag he a ...ie a d c ac a a h ...ed e ice age e ai .
- U e a e he ic age ... i i c ... ia ce i h ISO80601-2-55. Ma a e he ic age ... i d ide if ...i e f a e he ic age ca he de ec ha he a e he ic age bei g ...ea ed diffe f ... he age ha a e . U a de ia i i he c ce a i di a ed a... i ...a i dica e i c ec fi i g. If hi ha ha e ed, e... e a d ag he a ...ie a d c ac a a h ...ed e ice age e ai .

CAUTION

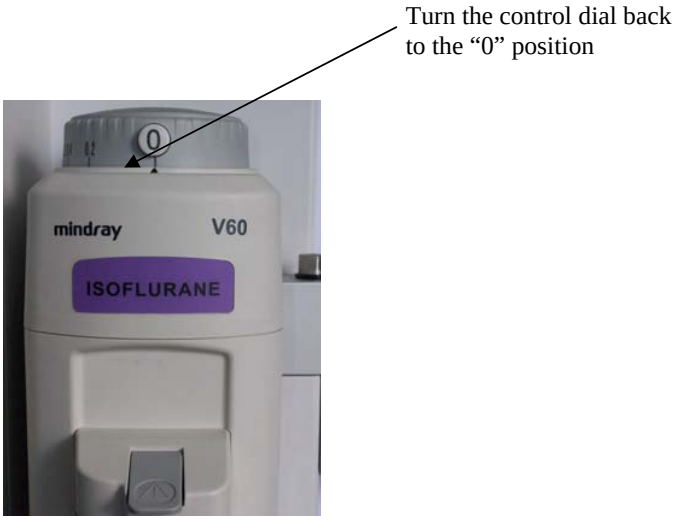
- Make e he d ai age c e i c ed he fi i g he Q ik-Fi Se f a e a ...ie a a e he ic age ...a e ca e f ... he d ai age e if i i c ed.
- Kee he a ...ie igh e ... ed hi e i i bei g fi ed. If i i a a g e i ca be e fi ed hich ...a ead c ce a i hich a e high .
- D i g di c ec i f Ke Fi e a d Q ik-Fi fi i g ada f ... he a ...ie a d he b e ada f ... he b e, ...a a... f a e he ic age ...a e ca e he e i ...e .

4.2.1 Key Filler System

The filling steps of V60 Isoflurane Key Filler Vaporizer are described below.

If the vaporizer is connected to the anesthetic delivery system, fresh gas flow can remain as set.

1. Turn the control dial clockwise back to the “0” position until the “0” button pops up.



WARNING

- **A e he ic age a . a e ca e if he c . dia d e e he 0 . i i .**

CAUTION

- **I i ece a . ai a ea 5 ec d af e e i g he c . dia . he 0 . i i bef e . e i g he a . i e . Thi a . he e e . ba a ce a d e e f e h ga a d a e he ic age a . f . i g e ca i g f . he a . i e .**

2. Select the correct filling adapter and anesthetic agent bottle. Screw the filling adapter firmly into the anesthetic agent bottle. Before use, check that the color marks and names/symbols of anesthetic agent on the filling adapter, anesthetic agent bottle and vaporizer correspond to the anesthetic agent used.

WARNING

- **D . e a da aged fi i g ada e . a a e he ic age b e i h c a .**

CAUTION

- **If he c ec i be ee he fi i g ada e a d a e he ic age b e i . eak- igh , a e he ic age a e ca e.**

NOTE

- **If a e . e ed a e he ic age b e i a e , he e a be a eak.**

3. Turn the locking knob counter clockwise.

4. Remove the keyed block.

5. Push the keyed end of the filling adapter into the opening of the filling system until it is fully and properly seated.

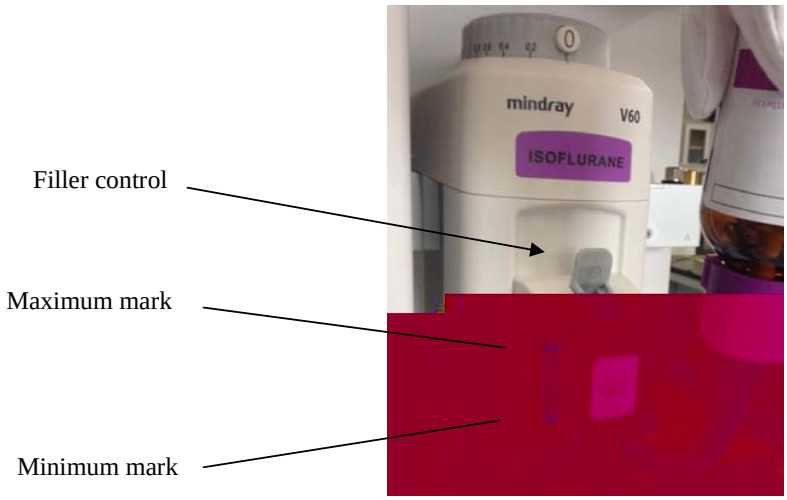
6. Tighten the locking knob by turning it clockwise.

CAUTION

- **If he c ec i be ee he fi i g ada e a d fi i g e i eak- igh , a e he ic age a e ca e.**

7. Raise the anesthetic agent bottle upside down.

8. Open the filler control and the liquid agent will flow into the vaporizer.



NOTE

- **If he age d e f i he a ˙e af e he fi e c i e ed, he b e h d be e ed a d he ai ed back ick ake e he e e i c e a ed.**

9. Check the filling level in sight glass during filling. When the maximum mark is reached, flow stops automatically.

CAUTION

- **If he c ec i be ee he fi i g ada e a d a e he ic age b e ha be ee he fi i g ada e a d fi i g e i eak- igh , a e he ic age a c i e f i he a ˙e .**

10. Close the filler control.
11. Slowly lower the anesthetic agent bottle.
12. Unscrew the locking knob.
13. Pull the keyed end of the filling adapter out of the filling system.
14. Put the keyed block back into the opening of the filling system.
15. Tighten the locking knob.
16. Unscrew the filling adapter from the anesthetic agent bottle.
17. Tighten the cap of the anesthetic agent bottle even if it is completely empty.

CAUTION

- **If he c ec i be ee he ke ed b ck a d fi i g e i eak- igh , a e he ic age a e ca e.**

NOTE

- **A e he ic age b e be ed i h fi i g ada e c ec ed, he i e a e he ic age a e ca e.**
- **D i g di c ec i f he a e ada f he a i e a d he b e ada f he b e, a a f a e he ic age a e ca e he e i e .**

4.2.2 Quik-Fil System

If the vaporizer is connected to the anesthetic delivery system, fresh gas flow can remain as set.

1. Turn the control dial clockwise back to the “0” position until the “0” button pops up.

WARNING

- **A e he ic age a a e ca e if he c dia d e e he 0 i i .**

CAUTION

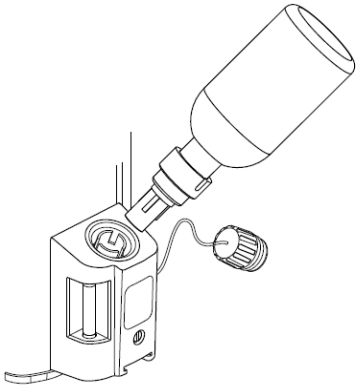
- **I i ece a ai a ea 5 ec d af e e i g he c dia he 0 i i bef e e i g he a i e . Thi a he e e ba a ce a d e e f e h ga a d a e he ic age a f i g e ca i g f he a i e .**

2. Select the correct filling adapter and anesthetic agent bottle.
3. Remove the cap from the anesthetic agent bottle, ensuring the bottle and filler mechanism are not damaged.
4. Screw the Quik-Fil adapter firmly into the anesthetic agent bottle.

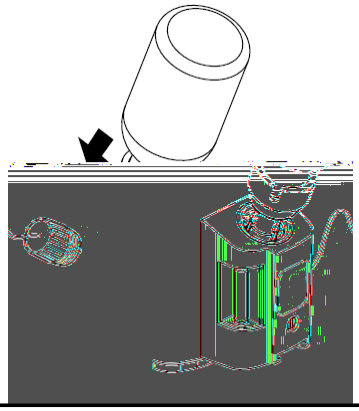
CAUTION

- **If he c ec i be ee he fi i g ada e a d a e he ic age b e i eak- igh , a e he ic age a e ca e.**
- **Age - ecific fi i g ca be a ed he b e i h c a ed.**

5. Remove the filler cap and insert the bottle equipped with adapter into the filler receptacle. Rotate the bottle gently to align the bottle filler adapter with the slots in the filler receptacle.



6. Apply pressure to the bottle in line with the insertion angle into the vaporizer to allow liquid to flow. Maintain pressure to ensure flow continues.



CAUTION

-

4.3 Draining the Vaporizer

WARNING

- **A e he ic age hich ha bee d ai ed ff be ha d ed, ed di ed f a i acc da ce i h h i a ic a d ca , a e a d fede a eg a i he e a icab e.**

CAUTION

- **Take ca e i a e he ic age . D i ha e a e he ic age a .**

NOTE

- **D d ai i id a e he ic age i a e c ai e .**
- **D e e he a e he ic age d ai ed f he a i e .**

4.3.1 Key Filler System

The draining steps of V60 Isoflurane Key Filler Vaporizer are described below.

Place the vaporizer upright or properly mount it so that all the anesthetic agent can drain out.

1. Turn the control dial clockwise back to the “0” position until the “0” button pops up.
2. Select the correct anesthetic agent bottle and open the bottle. Do not use a damaged filling adapter or anesthetic agent bottle.
3. Select the correct filling adapter for the anesthetic agent.
4. Screw the filling adapter firmly into the anesthetic agent bottle.

CAUTION

- **If he c ec i be ee he fi i g ada e a d a e he ic age b e i eak- igh , a e he ic age a e ca e.**

8. Tighten the locking knob clockwise.

CAUTION

- **If he c ec i be ee he fi i g ada e a d fi i g e i eak- igh , a e he ic age a e ca e.**

9. Keep the anesthetic agent bottle below the vaporizer. Open the filler control to drain until vaporizer is empty and no more anesthetic agent runs into the bottle. If anesthetic agent bottle becomes full and needs to be replaced, close the filler control. Take out the filling adapter. Repeat step 4 after a new anesthetic agent bottle is replaced.

10. Close the filler control.
11. Unscrew the locking knob.
12. Pull the keyed end of the filling adapter out of the filling system.
13. Put the keyed block back into the opening of the filling system.
14. Tighten the locking knob.
15. Unscrew the filling adapter.
16. Tighten the cap of the anesthetic agent bottle even if it is completely empty.

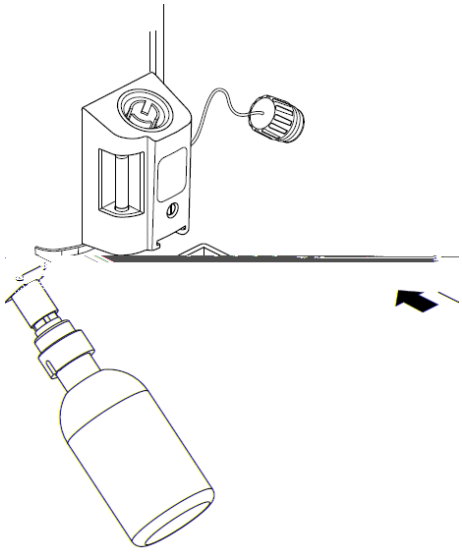
WARNING

- C e he fi e c a d igh e he cki g k b af e d ai i g he a i e i c e ed. Fai e d a ca e a e he ic age e ca e.

NOTE

- A e he ic age b e be ed i h fi i g ada e c ec ed, a e he ic

3. Insert the bottle equipped with Quik-Fil drainage funnel into the slot at the bottom of the vaporizer.



4. Unscrew the filler cap counter clockwise slowly, so that any pressure in the vaporizer can escape slowly.

NOTE

- **D fi he b e he e . Thi a ead e ca e f a e he ic age .**

5. Rotate the drainage screw counter clockwise for three to four turns. Drain until vaporizer is empty and no more anesthetic agent runs into the bottle. To prevent overflow, if necessary, close the drainage knob, replace the full bottle with an empty bottle and continue the drainage process.

6. Close the drainage screw clockwise.
7. Tighten the filler cap.

8. If the anesthetic agent must also be removed from the wick, see .

WARNING

- **Tigh e he fi e ca a d d ai age c e af e d ai i g he a . i□e i c /□ e ed. Fai e . d . /□a ca e a e he ic age . e ca e he e i/□e he a . i□e i ed.**

9. Unscrew the drainage funnel and adapter from the bottle.
10. Tighten the cap of the anesthetic agent bottle even if it is completely empty.

4.4 Blowing off the Vaporizer

If the anesthetic agent must also be removed from the wick after draining, set the vaporizer control dial to 5% and flush for 5 hours at 5 L/min Air or for 2 hours at 10 L/min Air. Ensure that inspiratory port, expiratory port, and manual bag port are occluded and that the gas scavenging system is functional and active.

5 Checks before Use

5.1 Checklist—checks before each use

5.2 Setting Checks

1. The filling level in the sight glass should be between the minimum and maximum marks.
2. Filling system:

   Quik-Fil: Put the filler cap in place and tighten it securely. Tighten the drainage screw securely.

   Key Filler: Close the filler control and tighten the locking knob securely.
3. Connector / Mounting system:

   Plug-in connector on anesthesia machine vaporizer mounting bar: Press the plug-in adapter level on the seals.

   Locking lever on vaporizer: Turn the locking lever clockwise. Ensure the vaporizer is secure and mounted properly on the anesthesia delivery device when viewed from front and side.

CAUTION

- **Check a e he ab ei e . If he ea e d e, f e h ga a da e he ic age a a ca e.**

4. If several vaporizers are connected at a time, check that the interlock systems on the vaporizers and anesthetic delivery system are of the same type.

   Check the interlock system of each vaporizer as follows:

   1) Switch off the fresh gas on the anesthesia system.

   2) Set one vaporizer to any concentration.

   3) Attempt to turn the control dials of all other in line vaporizers. Ensure all other vaporizers remain off and are impossible to turn on.

   4) Turn off the active vaporizer. Set the control dial to the “0” position.

   5) Repeat for all other in line vaporizers.

WARNING

- **I he ca e he ea a e he ic de i e e ha 3 i - i e a i e a ig ii , b he e 2 a i e a ed i adjace ca i , e e ha he i e ck i f c i a.**
- **Check a e he ab ei e . If he ea e d e, a i c ec c ce a i a be di a ed.**
- **A af c i i hei e ck e ca e da ge he a ie b e d i g i i g a e he ic age .**

6. Ensure that the vaporizer, connector, and fresh gas circuit are leak-tight (see Instructions for Use for Anesthetic delivery system).
7. Flush the breathing system with fresh gas before connecting a patient.

WARNING

- **D e a e he a i e i a check ha e bee cce f e f ed.**
- **A e ai be ca ied b a ified e ice e e.**

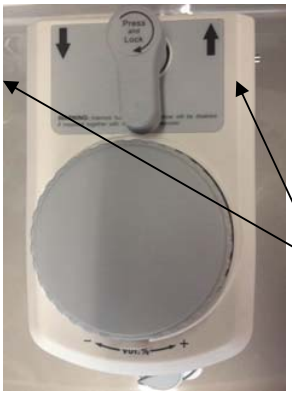
6 Basic Operations

CAUTION

- **Ha d e he a . i e i h ca e. Be ca ef . i d .**
- **S . i g he a . i e i / edia e if i ha bee i ed d ed.**
- **D . ca b he c . dia . cki g e e ha d e.**
- **Bef e e a i , check ha he . cki g e e i ca ab e f . cki g he a . i e ec e . he / a if d.**
- **O . e a e he ic a . i e i h a e he ic de i e . e/ ha a e i ab e acc di g . ISO 8835-4.**
- **If he Mi d a V60 a . i e i c . ec ed . a e he ic de i e . e/ f . / . he / a fac e , i i he e . ibi i . f he . e a . e e ha a ech ica . ecifica i . f he a . i e a d he a e he ic de i e . e/ a e / e .**

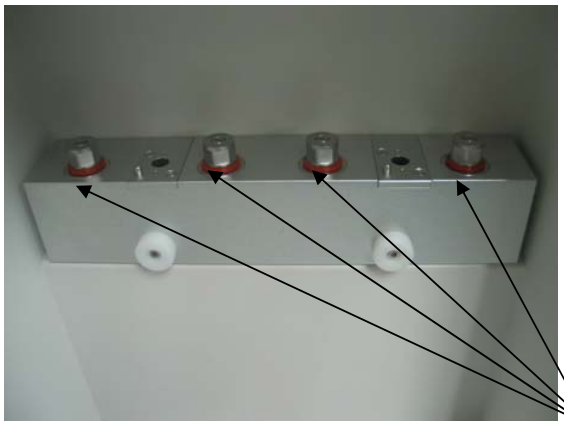
6.1 Connecting the Vaporizer

1. The interlock device must be in the original position.



Interlock device in the original position.

2. The sealing rings on the anesthesia machine plug-in connector must be undamaged. There should be no foreign bodies on the plug-in connector or manifold.



The sealing rings are undamaged.

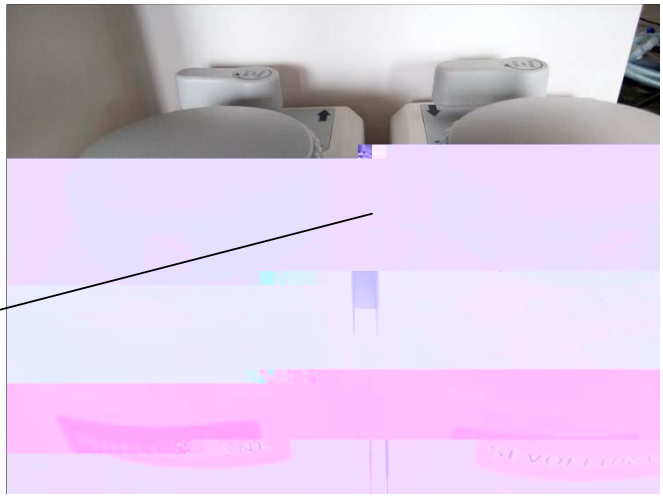
3. Switch the vaporizers off when one or more than one vaporizers have been on the manifold of the anesthetic delivery system, before mounting additional vaporizers.
4. Set the control dial to the “0” position.

5. Hold the vaporizer in vertical position with both hands and lower gently onto the anesthesia machine plug-in connector.

6. Depress the handle for locking lever and turn it 90° clockwise. The vaporizer is now secured and cannot be removed.

7. Connect additional vaporizers on the anesthetic delivery system as needed:

- For a 2 vaporizer anesthesia delivery system, ensure the interlock pins of both vaporizers are in direct contact with each other.



- For 3 vaporizer anesthesia delivery systems, check if there is an interlock function between nonadjacent connectors. Otherwise, vaporizers are recommended to be connected right next to each other..

WARNING

- **The g-i ada e be e e a d ab e he ea i g i g . O he i e, he e a be a f f e h ga , eak , c ce a i he i e ck de ice a ja . T e hi b e , di c ec he a i e fi (ee 6.4 Di c ec i g he Va i e) a d check he i i f cki g e e a d a i e a if d f he a e he ic de i e e . The e-c ec he a i e .**

NOTE

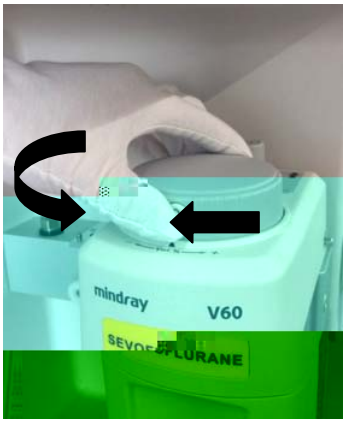
- **Take ca e he e i g he Va i e he g-i c ec .**

6.2 Adjusting the Concentration of Anesthetic Agent

WARNING

- **Bef e e a i , check ha he c dia a .**
- **D e he a i e i ed f a a g e f e ha 30 (fi ed i i). Ri k f i c ec c ce a i e ca e f a e he ic age a e .**

1. Set the flow of fresh gas on the anesthetic delivery system.
2. Press the “0” button.
3. Turn the control dial counter clockwise to the required concentration of anesthetic agent.



NOTE

- **If he c ce a i ca be e , d f ce he c dia . Check ha a he a i e c ec ed a e i 0 i i a d ha he i e ck de ice i e a i a .**
- **S e f he a i e if he c dia e i da aged.**

During use, check the filling level in the sight glass regularly. If the filling level is not visible between the minimum and maximum marks then do not use the vaporizer. When the vaporizer is empty or overfilled then the output concentration may be incorrect. When the minimum mark is reached, fill the vaporizer as required (see).

1. If the anesthetic agent monitor shows implausible values, ensure the vaporizer is properly filled and check the monitor for incorrect agent setting (If necessary, refer to the agent monitor instruction for use).

NOTE

- **D i g ged e a i i h b h a high f e h ga f a e a d a high dia ed age c ce a i , he c ce a i ad i i e ed a dec ea e. See .**

CAUTION

- **Je k e e i i g a a a g e f e ha 30° ca ca e i c ec c ce a i .**
- **E e a a e he ic ga ca e gi g e i c ia ce i h ISO8835-3 i i ed.**

2. If it is necessary to change to another vaporizer:
   (1) Set the vaporizer being used to the “0” position.
   (2) Disconnect the vaporizer being replaced (see 6.4 Disconnecting the Vaporizer).
   (3) Switch the anesthetic agent monitor to the new anesthetic agent (If necessary, refer to the agent monitor instruction for use).
   (4) Connect the new vaporizer (see 6.1 Connecting the Vaporizer).

6.3 Switching off the Vaporizer

1. Turn the control dial clockwise until the “0” button pops out to prevent it from being switched on accidentally.
2. If required, turn off the fresh gas flow on the anesthetic delivery system.

WARNING

- **The a i e e be ef i ched i h f e h ga f . O he i e a e he ic age a a a high c ce a i ca ge i he achi e ci c i a d a bie ai .**

3

6.4 Disconnecting the Vaporizer

CAUTION

- **Take ca e d he a i e. D e he a i e if i ha bee d ed. Da age a ca e i c ec c ce a i . D ca b he c dia cki g e e ha de a id he i k fi j .**
- **Di c ec he a i e he he c dia i e 0 a id he i k f i c ec c ce a i a d fa e he ic age e ca i g.**
- **P ace a i e fi e e face ha g ab e b acke .**

1. Turn the control dial clockwise back to the “0” position.
2. Turn the handle for locking lever counter clockwise for 90° until it springs up automatically.
3. Use both hands to lift the vaporizer off the anesthesia machine.

6.5 Moving when Filled

This operation is only to be done as part of normal operation, not for storage and transport.

1. The anesthetic delivery system can be moved at the workplace with the vaporizer switched on.

NOTE

- **Je k e e i i ga a a ge f e ha 30° ca ca e i c ec c ce a i .**

2. The anesthetic delivery system with securely fastened vaporizers can be moved with control dial set at “0”, if there is no risk of tilting by more than 30° .

WARNING

- **Whe i ed a a ge f e ha 30° :**
  The a e he ic age a e f he he c dia i e a 0 .
  Whe he c dia i e ab e 0 , he a e he ic age a eak a d ge i he f c e a d ca e ce i e high c ce a i he he a i e i ed e i e.

3. When the vaporizer is detached from the anesthetic delivery system and transported separately, the control dial must remain at the “0” position.

7 Cleaning and Disinfecting

WARNING

- **Obe a icab e afe eca i .**
- **Read he a e ia afe da a hee f each c ea i g age .**
- **Read he e a i a d e ice a a bef e di i fec i g he a e he ic a i e .**
- **Wea g e a d afe g a e .**

NOTE

- **T he e e da age, efe he a fac e ' da a if ha e e i ab a c ea i g age .**
- **D e i i id g i he a e he ic a i e h i g .**

7.1 Cleaning

1. Clean the surface of the vaporizer housing with a damp cloth soaked in water, or approved cleaning solutions (The pH value is 7.0 to 10.5)
2. After cleaning the housing, remove the remaining cleaning solutions by wiping with a dry lint free cloth.

WARNING

- **D i e he a e he ic a i e he fi i g ada e i c ea i g i .**
- **The c ea i g i be a ed ge de he c dia .**
- **D a he c ea i g i ge i he ga i e , ga e , fi i g e .**

CAUTION

- **Li id he ha he a e he ic age ecified f he a i e ge i he a i e , a ca e i j he a ie .**

7.2 Disinfecting

Approved surface disinfectants include:

- 75% of alcohol
- 70% of isopropyl alcohol
- 2% of glutaraldehyde (neutral)
- Sodium hypochlorite solution (10% available chlorine)
- Super Sani-Cloth (0.5% Quaternary ammonium chloride and 55% Isopropyl alcohol)

WARNING

- **D e i i e he a i e a d acce ie . Thi a da age he a i e a d a ca e i c ec c ce a i .**

8 User Maintenance

8.1 Repair Policy

WARNING

- **D . dif di a e b e he a i e . A cha ge f he a i e a ca e i c ec c ce a i .**

Stop using the vaporizer immediately if it has been found to need repair. Contact trained service personnel for repair. After repair, test the vaporizer to ensure that it is functioning properly, in accordance with the specifications.

NOTE

- **A e ai be ca ied b a ified e ice e e .**
- **Re ace da aged a i h c e a fac ed d b Mi d a . Af e e ai , e he i ake e ha i c ie i h he a fac e ' b i hed ecifica i .**
- **C ac Mi d a f e ice a i a ce.**

8.2 Maintenance Schedule

Testing should occur after service of the anesthetic delivery system or vaporizer, after prolonged shutdown and at least every six months.

Mi i f e e c	**Mai e a ce**
Daily	The control dial can be turned to the “0” position. Turn the control dial counter-clockwise to reach highest concentration mark and return to "0".
Weekly	Clean the external surfaces. Check the concentration weekly when continuous monitoring is not available (see section).
Biweekly	Inspect vaporizer for damage or loose parts.
During filling and draining	Check the filling system. See section .
During cleaning and installation	Check the anesthesia machine plug-in connectors. See section . Ensure gas inlet and outlets are clean and free of debris.
Semi-annual and after service	Complete all maintenance checks as identified in Section 8 User Maintenance should be performed by trained service personnel.

CAUTION

- **D a e a ceai g i i he a i e .**

8.3 Checking the Concentration

Check the vaporizer output concentration weekly when continuous monitoring (use of a gas bench within the patient monitor or within the anesthesia delivery device) is not available

1. Preparation
   (1) Fill the vaporizer—at least half full between minimum and maximum marks.
   (2) Use a valid anesthetic agent monitor.
   (3) Connect the monitor to the common gas outlet of the anesthesia machine. Make sure that the connections are leak-tight. Reference the anesthesia delivery device operator or service manual for more information on common gas outlet.
   (4) Connect the waste gas scavenging system and start operation.
   (5) Set the monitor to anesthetic agent being used and to continuous measurement.
   (6) Set air flow of 2 L/min on the anesthesia machine. Use O_2 if Air is not available.

2. Measuring
   (1) Check the output concentration at "0" position, 0.4, 1, 2, 3, 5, and MAX in ascending order.
   (2) Correct measured values, according to the carrier gas..

   Air check: no correction.

   O_2 check: reduce the measured values as follows:

Mea ed a e %	C ec i
<1%	-0.05
1.0-2.0	-0.10
2.0-4.0	-0.20
5.0-8.0	-0.30

If the data displayed is in % partial pressure, no correction is made. If it is in vol.%, it needs to be converted to partial pressure. The formula is:

$$\text{Concentration (\% partial pressure)} = \frac{\text{Measured value (vol.\%) x atmospheric pressure (kPa)}}{\text{101.3 kPa}}$$

3. Determine the accuracy range.

Ra ge f c ce a i acc ac (a i a ea a a ie)		
O e a i g e i e	15 35℃ 0.2 10 L/ i	10 15℃ 35 40℃ 10 15 L/ i
Set concentration ≤6%	±0.20 vol.% or ±20% rel., whichever is greater	+0.30/-0.20 vol.% or +25/-20% rel., whichever is greater
Set concentration > 6%	±0.25 vol.% or ±20% rel., whichever is greater	+0.35/-0.25 vol.% or +30/-20% rel., whichever is greater

4. Test result

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

CAUTION

- **If he c ec ed ea ed a e i i hi he e i ib e a ge f c ce a i , d e he a i e . Ha e he a i e checked b ai ed e ice e e .**

5. After test
   (1) Switch off the vaporizer. Set the control dial to the “0” position.
   (2) Switch off Air or O_2 flow on the anesthesia machine.

8.4 Checking the Filling System

Verify the following:

■ Key Filler system

1. The sealing cushion for filling device is in good condition.
2. Only the correct filling adapter fits into the filling system.
3. The filler control can be opened and closed smoothly.
4. The sight glass shows normal liquid level.

■ Quik-Fil system

1. The sealing ring for filler cap is in good condition.
2. The filling opening is clean.
3. The valve core inside the filling opening can be depressed and retracts smoothly.
4. The sight glass shows normal liquid level.

8.5 Checking the Plug-in Adapter

Verify the following:

1. Depress and turn the locking lever clockwise. When released, ensure it automatically returns back to unlocked position.
2. The locking lever is undamaged and not buckled.
3. The interlock device is undamaged, guides easily and cannot be removed.
4. Two interlock pins are present.
5. Seals are undamaged.
6. Manufacturer’s plate on the back of the vaporizer is present and secure.

FOR YOUR NOTES

9 Troubleshooting

9.1 Operation Related Faults and Remedies

Fa	Ca e	Re ed
No concentration delivered or concentration excessively high/low	The vaporizer liquid level is below the minimum mark.	Fill the vaporizer.
	The control dial is set to “0”.	Set the control dial to ≥0.2 vol.%.
	No vaporizer is connected; Or several vaporizers are connected, but unintended vaporizer is switched on.	Connect the vaporizer; Or switch off the unintended vaporizer.
	The vaporizer is tilted during or before operation when the control dial is not at “0”. If this has happened, liquid anesthetic agent may have entered the flow control system.	Before operation: flush the vaporizer with fresh gas. See sections and . Then check the concentration. See section .
	Leak, for example, plug-in adapter is not fitted flush on seals.	Disconnect the vaporizer. Check plug-in adapter safety locking device and sealing rings. Have vaporizer repaired by trained service personnel if damage is found.
	Valves in the anesthesia machine plug-in connectors are damaged.	Repair by trained service personnel.
	The vaporizer temperature is outside the specified application range, such as filled with very cold anesthetic agent, or operated with both high flow and concentration high over a prolonged period.	Allow the vaporizer to reach normal temperature, allowing at least 15 min per ℃ deviation from the specified range. See section . Refill with anesthetic agent at room temperature.
	The vaporizer is operated with carrier gas other than air.	Change the concentration because of carrier gas. See section
	The monitor displays volume percentage, not partial pressure.	Convert the measured value to partial pressure. See section .
	The vaporizer or anesthetic monitor is defective.	Check with another vaporizer to establish whether the vaporizer or anesthetic monitor is faulty. Repair by trained service personnel if the vaporizer is defective.
	The vaporizer is incorrectly installed or the plug-in adapter is damaged.	If necessary, re-install the vaporizer or have it repaired by trained service personnel.

Fa	Ca e	Re ed
The vaporizer detection system on anesthetic delivery system displays anesthetic agent which is different from the vaporizer.	A different anesthetic agent has just been used and high concentrations of it are still present in the breathing system.	Flush the breathing system or wait for gas to change.
	The monitor settings have not been changed after anesthetic agent has been changed.	Change monitor settings if the monitor does not have automatic agent identification.
The control dial cannot be set to concentration.	Interlock jams or another vaporizer is still switched on.	Switch off other vaporizer. For interlock fault, have it repaired by trained service personnel.
	The “0” button is not pressed.	Press the “0” button.
	The control dial is jammed.	Repair by trained service personnel.
The concentration can be adjusted without pressing the “0” button.	The “0” button is defective.	Repair by trained service personnel.
Anesthetic agent vapor has leaked during use.	The plug-in adapter is not fitted flush.	Check the anesthesia machine plug-in connector sealing rings and sealing surfaces. Check that the locking lever is not buckled.
	The filler cap is not tightened or the sealing ring is defective.	Tighten the filler cap. Repair by trained service personnel if the sealing ring is defective.
	Drainage screw is not closed.	Tighten the drainage screw.
Filling level cannot be read in the sight glass or incorrect filling level is shown in the sight glass.	The vaporizer is completely empty.	Refill the vaporizer.
	The vaporizer is overfilled.	Drain the vaporizer to the maximum mark and check the concentration.
	Sight glass display is faulty.	Repair by trained service personnel.

9.2 Filling and Draining Related Faults and Remedies

Fa	Ca e	Re ed
Anesthetic agent leaks from the drainage outlet.	The drainage screw is not closed.	Close the drainage screw.
Anesthetic agent leaks from the filling system.	Seal on the filling system is damaged.	Repair by trained service personnel.
Anesthetic agent leaks from overflow.	The vaporizer is filled above the maximum mark.	Drain the vaporizer to the maximum mark and check the concentration.
Anesthetic agent does not flow out when drained.	The filler cap is not opened or the drainage outlet is blocked.	Open the filler cap or repair by trained service personnel.
Anethetic agent does not flow into anesthetic vaporizer by Key Filler adapter	The inner tube is blocked by liquid	Close the filler control. Unplug the keyed end of filling adapter from the opening of the filling system. And then let the liquid in the inner tube draining into the bottle.

9.3 Plug-in Adapter Related Faults and Remedies

Fa	Ca e	Re ed
The vaporizer cannot be disconnected.	The interlock device is still engaged.	Disengage the interlock device.
The plug-in adapter is not fitted flush on anesthesia machine plug-in connector seals.	Engagement mechanism on the plug-in adapter or plug-in connector is damaged.	Excessive force used may lead to jamming when disconnecting the vaporizer. Contact us immediately.
	There is foreign body between the plug-in connector and plug-in adapter.	Remove foreign body.

FOR YOUR NOTES

10 Storage and Transport

10.1 Storage

Storage for longer than 6 months:

1. Drain and blow off the vaporizer (See 4.3 Draining the Vaporizer and 4.4 Blowing off the Vaporizer).
2. Turn the control dial to the “0” position. Ensure that the vaporizer handle for locking lever and interlock device are in their original positions.
3. If packing is necessary, see 10.2 Transport.
4. Observe storage temperature. See . If storage temperature range is exceeded, internal damage may occur which could cause incorrect output concentration. Before putting into operation again, carry out all-round inspection first.

NOTE

- **Whe he a e he ic a .i□e i . i e f a g e i d f i□e, e he g ha ca□e i h. igi a acki g□a e ia . b. ck he ga i e a d e .**
- **If he a e he ic a .i□e i . ed i high e□ e a e a d he ed, he c ce a i . f he de i e ed a e he ic age □a be high. T e ab e e e e ai□a i , a a he c . dia . 1% af e c ec i g he a e he ic . k a i , a d ai f a ea 15 ec d .**

10.2 Transport

1. Turn the control dial to “0”
2. Disconnect the vaporizer from the anesthetic delivery system.
3. Drain the vaporizer completely.
4. Then clean and disinfect the vaporizer.
5. Each vaporizer must be packed separately with care. Use original packing when possible.

   If original packing is not available, use strong packing with at least 5 cm of impact-resistant material around each vaporizer. Fasten packing securely.

WARNING

- **D . a . he a .i□e i h a e he ic age fi ed, i □a ca e i c ec . c ce a i .**

NOTE

- **Li id a e he ic age a d fi ed a .i□e a e bjec . Ha□a d G . d Reg a i . The e eg a i d a . he e id e . f a e he ic age ef i he ick af e d ai i g.**

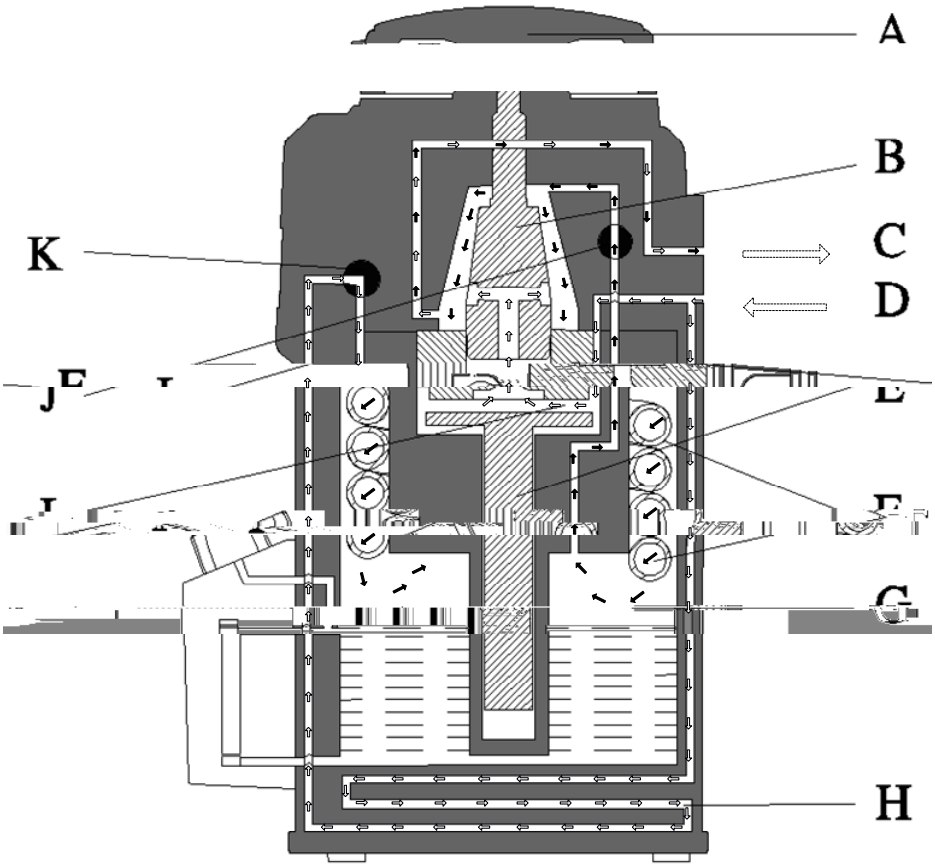
FOR YOUR NOTES

11 Theory of Operation

11.1 Operating Principle

The following image illustrates the operating principle of the vaporizer.

Control dial position above 0--Vaporizer switched on:



Fresh gas

Fresh gas mixed with anesthetic gas

The fresh gas is routed through valves J and K, which are linked to the control dial A, and through the vaporizing chamber G.

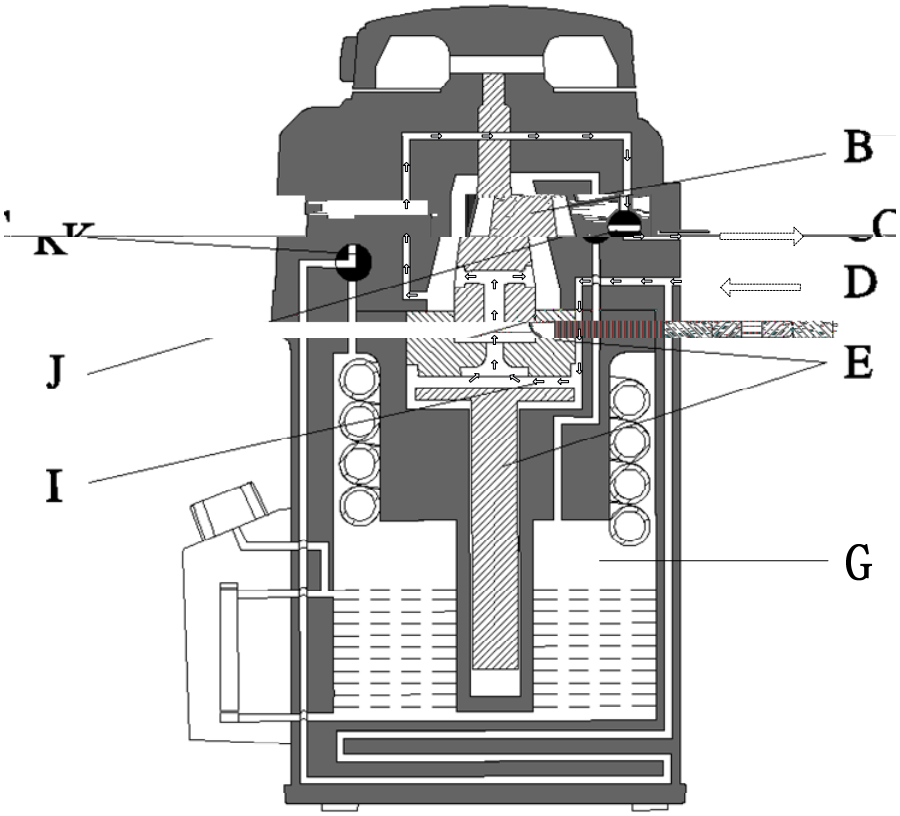
Fresh gas enters by the inlet D. Some of the fresh gas is routed through the vaporizing chamber G, and charged with anesthetic agent in soaked wick F. The rest of the fresh gas is routed past the airway I and through the temperature compensator E.

The two flows are mixed in the space behind the two flow controls (cone valve B), and routed to the outlet C.

The output concentration control of anesthetic agent vapor is important.

1. The concentration is influenced by the temperature compensator E, which makes use of the thermal expansion characteristics of different materials to expand or contract, based on heating or cooling, the airway I. This process compensates for the influence of temperature on the situation concentration.
2. The pressure compensating system H effectively reduces the pumping effect.

Control dial position at 0—Vaporizer switched off



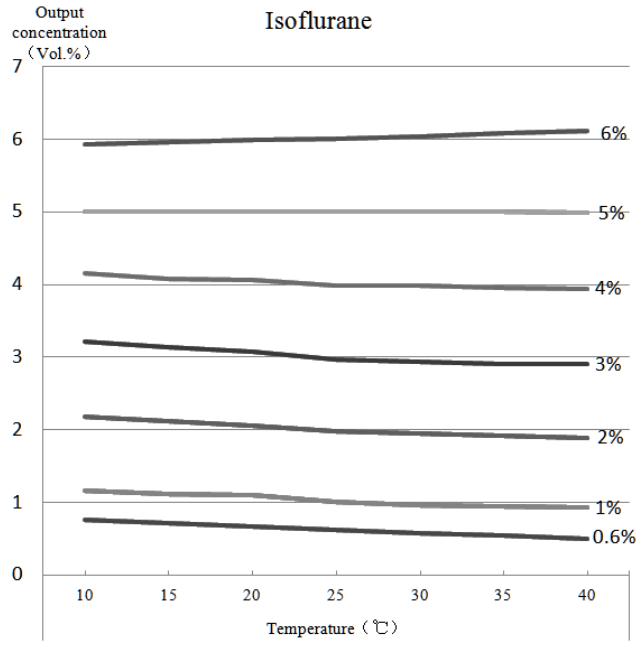
Fresh gas flows from the inlet D to the airway I, and then passes the temperature compensator E and the cone valve B, finally flows out from the outlet C.

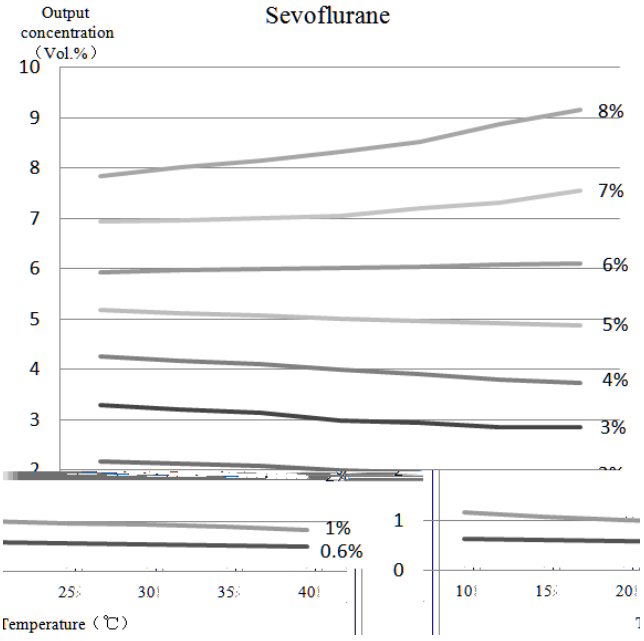
The vaporizing chamber G is completely shut off from the gas flow by valves J and K. No

11.2 Calibration

When the vaporizer is being operated with a high gas flow or a high concentration, the anesthetic agent inside will cool down gradually which results in drop in the output concentration (see).

The diagrams show typical temperature dependence when operating with a 2 L/min flow of Air. If temperature is not within this range, the deviations are shown as following figures, despite continuing compensation:



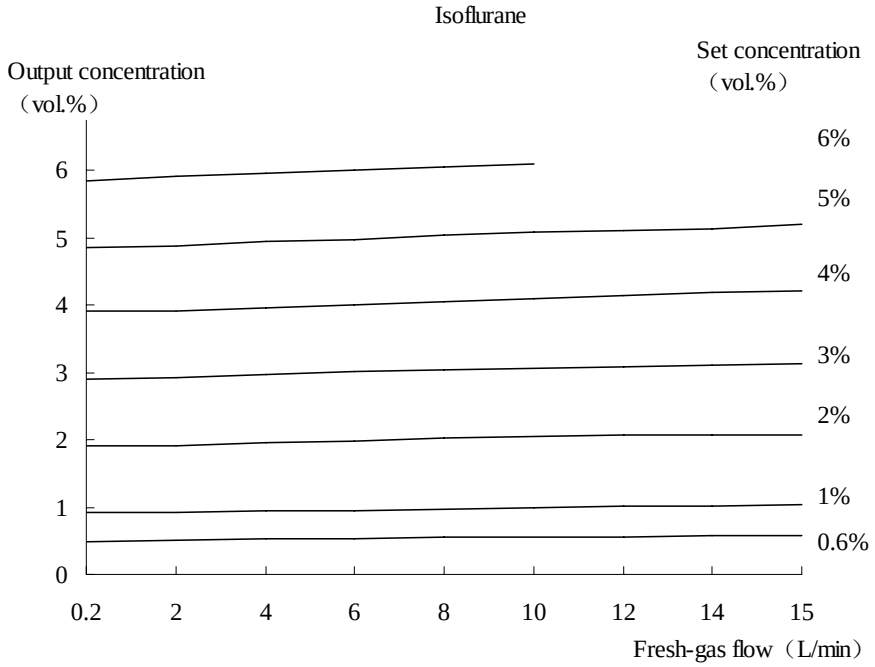


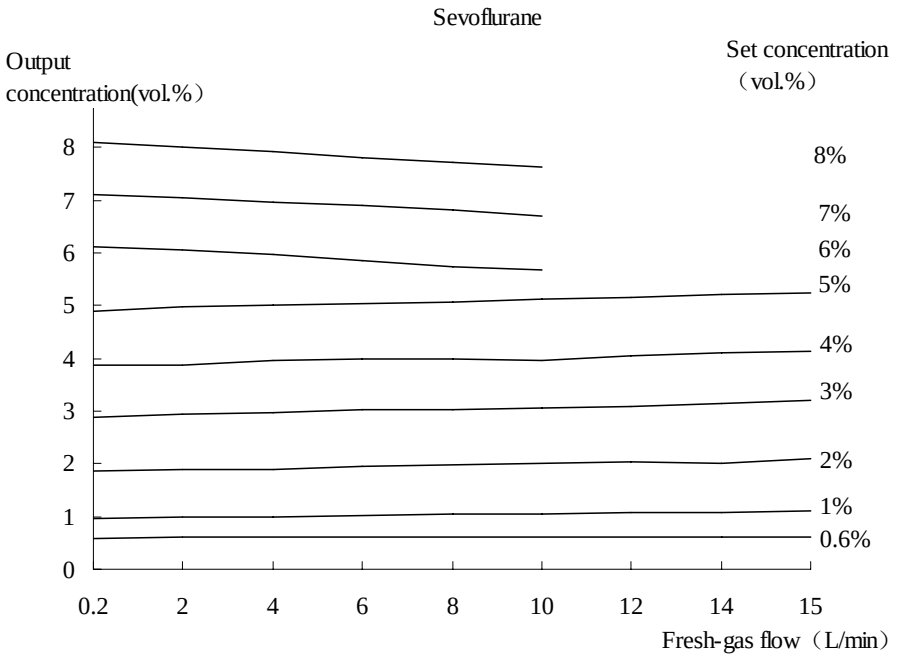
11.4 Influence of Flow

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

In case of high fresh gas flow or high concentration, full compensation is not made for the cooling of the anesthetic agent because total saturation of the gas flowing through the liquid vaporizing system does not occur and the output concentration is reduced slightly (see
).

The diagrams show the influence of flow on the concentration delivered after 1 minute at 22℃, 101.3 kPa when operating with Air.





11.5 Influence of Gas Composition

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

When 100% O_2 is used, the output concentration compared with Air rises by 10% of the set value and by not more than 0.5vol.%.
When a mixture of 30% O_2 and 70% N_2O is used, the concentration falls by 10% of the set value at most, and by not more than 0.5vol.%.

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

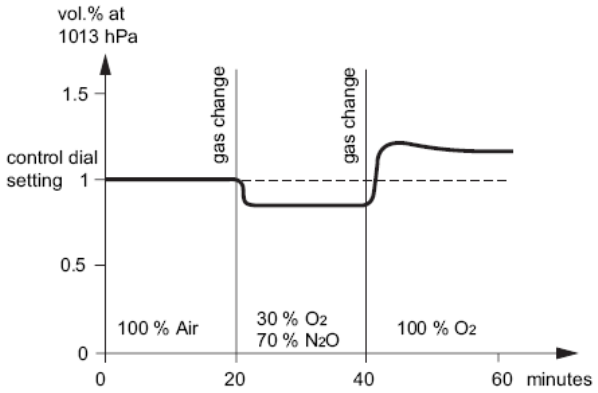
When changing from one gas mixture to another, an additional dynamic effect can occur which may result in a further deviation in concentration until any earlier fresh gas is flushed out of the vaporizer.

These deviations and their duration will all be greater under the following circumstances:

1. The lower the volume of anesthetic agent in the vaporizer;
2. The higher the concentration set;
3. The lower the gas flow;
4. 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 following diagram shows the influence of gas composition on output concentration when carrier gas is set to 1 vol.%.
If the humidity of gas is higher than that specified in appendix A “Product Specifications”, the output concentration will be affected slightly.



11.6 Influence of Atmospheric Pressure

The anesthetic agent partial pressure delivered by the vaporizer 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 70 to 106 kPa will only lead to small deviations within the accuracy specified. For this reason, the physiological effect within the specified anesthetic agent concentration of the vaporizer is independent of atmospheric pressure.

When measuring the output concentration of the vaporizer in partial pressure, there is no influence of ambient pressure. When measuring in volume percent, the measured values do, however, change with atmospheric pressure and the measured values rise, when atmospheric pressure falls below 101.3 kPa.

The following formula for conversion applies:

$$\text{Concentration (\% partial pressure)} = \frac{\text{Measured value (vol.\%) x atmospheric pressure (kPa)}}{\text{101.3 kPa}}$$

WARNING

- **U de ci c a ce h d he a i e e be ed a a a he ic e ea d / e a ea hich he a e he ic age c d a b i, a he c ce ai de i e ed i i ea d be c ed.**

11.7 Influence of Fluctuations in Pressure

During ventilation, pressure fluctuations on the anesthetic vaporizer can cause a higher concentration to be delivered than is shown on the control dial setting.

The vapor in the vaporizing chamber is compressed when pressure rises, and it expands when pressure falls. If this effect is strong enough, small quantities of saturated vapor will be pumped backwards through the inlet of the vaporizing chamber into the fresh gas. This is described as the pumping effect. The higher the ventilation pressure and ventilation frequency, the more rapid the fall in pressure during expiration. The lower the fresh gas flow, the smaller the quantity of anesthetic agent in the vaporizer, the more obvious the pumping effect. The compensation system of the vaporizer will reduce these effects.

11.8 Influence of Running Time

Evaporation of the anesthetic agent during operation cools the vaporizer slowly. The saturation concentration of the anesthetic agent in the vaporizer 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 anesthetic agent evaporates with time.

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

The accuracy given in applies as long as the temperature of the vaporizer does not fall outside the operating range.

The diagrams show typical concentration curves over 4 hours and 6 hours of running time respectively, measured at 22℃ and 101.3 kPa.

A. Fresh gas flow of 4 L/min, concentration set of 1%, running time of 4 hours.

B. Fresh gas flow of 10 L/min, concentration set of 1%, running time of 6 hours.

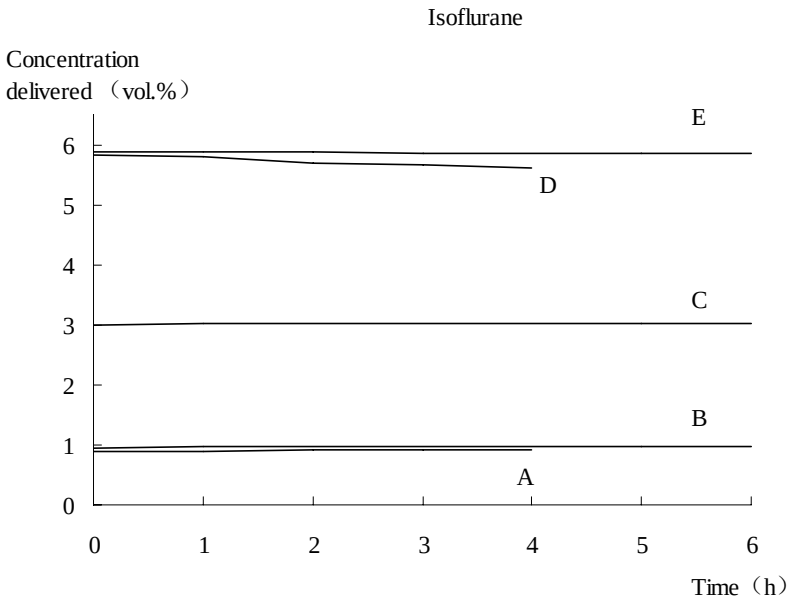
C. Fresh gas flow of 4 L/min, concentration set of 3%, running time of 6 hours.

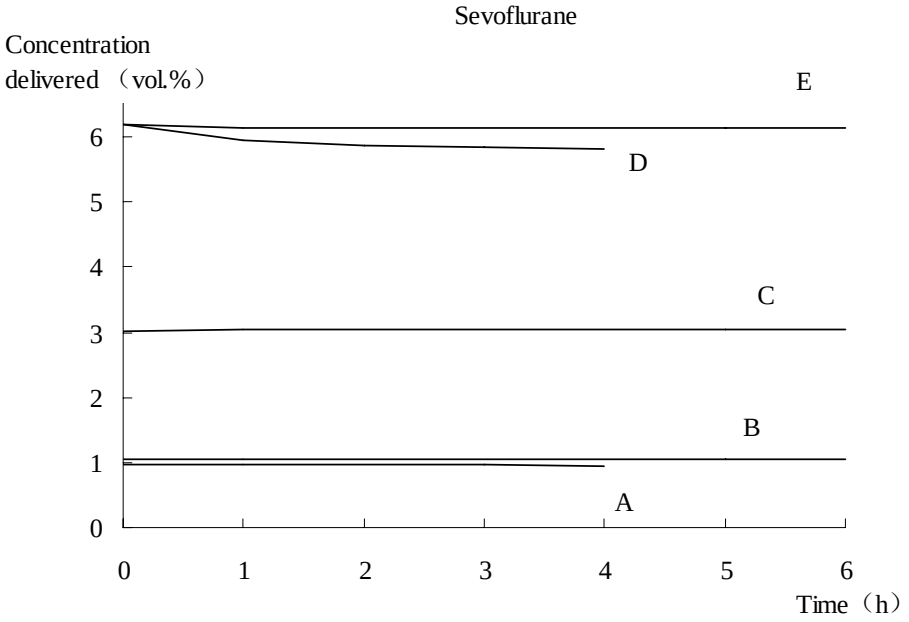
D. Fresh gas flow of 4 L/min, concentration set of 6%, running time of 4 hours;

E. Fresh gas flow of 1 L/min, concentration set of 6%, running time of 6 hours.

F. Fresh gas flow of 4 L/min, concentration set of 5%, running time of 4 hours.

G. Fresh gas flow of 1 L/min, concentration set of 5%, running time of 6 hours.





11.9 Anesthetic Agent Consumption

C i f a e he ic age (/h)	
Isoflurane	≈3.3 × fresh gas flow (L/min) × output concentration (vol.%)
Sevoflurane	≈3.5 × fresh gas flow (L/min) × output concentration (vol.%)

Note: The rate of consumption of anesthetic agent depends primarily on flowrate and vapor output concentration. The figures are approximate and are intended for general guidance only.

FOR YOUR NOTES

A Product Specifications

A.1 Standards Compliance

The anesthetic vaporizer is in compliance with the following industry standards.

ISO14971:2007	Medical devices - application of risk management to medical devices.
AAMI/ANSI ES60601-1:2005	Medical electrical equipment -- part 1: general requirements for basic safety and essential performance.
IEC62366:2014	Medical devices - application of usability engineering to medical devices.
ISO10993-1:2009	Biological evaluation of medical devices -- part 1: evaluation and testing within a risk management process.
ISO10993-5:2009	Biological evaluation of medical devices -- part 5: tests for in vitro cytotoxicity.
ISO 10993-10:2010	Biological evaluation of medical devices - part 10: tests for irritation and skin sensitization.
ISO15223-1:2012	Medical devices - symbols to be used with medical device labels, labelling and information to be supplied - part 1: general requirements.
IEC60601-2-13:2009	Medical electrical equipment - part 2-13: particular requirements for the safety and essential performance of anaesthetic systems.
ISO5360:2012	Anaesthetic vaporizers - agent specific filling systems.
ISO8835-4:2004	Inhalational anaesthesia systems - Part 4: Anaesthetic vapor delivery devices.
IEC60601-1-6:2010	Medical electrical equipment -- part 1-6: general requirements for basic safety and essential performance -- collateral standard: usability.
ISO10993-18:2005	Biological evaluation of medical devices -- Part 18: Chemical characterization of materials
CAN/CSA - C22.2 No.60601-1:2014	Medical electrical equipment - Part 1: General requirements for basic safety and essential performance

A.2 Physical Specifications

Weight	6 ± 0.5kg (empty)
Dimensions	Height:239 ±3 mm Width: 120 ±3 mm Depth: 210 ±10 mm
Filling volume	360 ml (dry wick) 300 ml (moist wick) 260 ml (between the minimum and maximum marks)

A.3 Operating Range

Te e a e	
During operation	10 to 40℃
During storage (empty)	-20 to 60℃
During transport (empty)	-20 to 60℃
H idi	
During operation	15 to 95%, non-condensing
During storage	10 to 95%, non-condensing
A he ic e e	
During operation and shut-down (filled, control dial at “0” position)	70 to 106 kPa
During storage (empty)	50 to 120 kPa
C ce a i a ge	
Isoflurane	0 to 6%
Sevoflurane	0 to 8%
Deg ee f ec i agai i g e f i id	
Degree of protection against ingress of liquids	Ordinary anesthetic vaporizer, without protection against ingress of liquids – IPX0 (IEC 60529)

A.4 Performance Specifications

Ra ge f c ce a i acc ac (a i a ea a a ie)		
O e a i g e i e	**15 35℃ 0.2 10 L/ i**	**10 15℃ 35 40℃ 10 15 L/ i**
Set concentration ≤6%	±0.20 vol.% or ±20% rel., whichever is greater	+0.30/-0.20 vol.% or +25/-20% rel., whichever is greater
Set concentration > 6%	±0.25 vol.% or ±20% rel., whichever is greater	+0.35/-0.25 vol.% or +30/-20% rel., whichever is greater
Ma i a ge f i		
Alone, freestanding		10º
During operation (fixed position)		30º
P e e diffe e ce		
Difference between pressure range and ambient pressure on the vaporizer outlet		-10 to 20 kPa

A.5 Product Configurations

Fi i g e		
	Ke Fi e	**Q ik-Fi**
Isoflurane vaporizer	Yes	No
Sevoflurane vaporizer	Yes	Yes

A.6 Flow Range

F Ra ge
0.2 to 15L/min 0.2 to 10L/min for concentrations >5 Vol.%

FOR YOUR NOTES

B Accessories List

The anesthetic vaporizer should work with the following accessories.

De c i i	PN
Fi i g ada e	
Key Filler filling adapter for isoflurane vaporizer	040-002707-00
Key Filler filling adapter for sevoflurane vaporizer	040-002708-00
Quik-Fil filling adapter for sevoflurane (0605)	115-026747-00
D ai i g ada e	
Quik-Fil drainage funnel for sevoflurane vaporizer	040-000067-00

FOR YOUR NOTES

C Symbols and Terminology

C.1 Symbols

Symbol	Description
-	minus
%	percent
/	per；divide；or
≈	about
～	to
^	power
＋	plus
＝	equal to
＜	less than
＞	greater than
≤	less than or equal to
≥	greater than or equal to
±	plus or minus
×	multiply
©	copyright

C.2 Terminology

Terminology	Description
Air	Medical compressed air
N_2O	Medical nitrous oxide
O_2	Medical oxygen
TM	Trademark
®	Registered trademark
Vol.%	Percentage by volume of anesthetic agent in fresh gas at outlet. Unit of output concentration.
%	Percentage
%rel	Relative deviation from value in %
℃	Degree Celsius, unit of temperature
°	Degree, unit of plane angle
kg	Kilogram, unit of mass
kPa	Kilopascal, unit of pressure
hPa	Hundred Pascal, unit of pressure
Pa	Pascal, unit of pressure

pH	Hydrogen ion concentration
ml	Milliliter, unit of volume
L/min	Liter per minute, unite of flow
min	Minute, unit of time
h	Hour, unit of time
m	Meter, unit of length
mm	Millimeter, unit of length
cmH_2O	Centimeter of water, unit of pressure
EN	European Norm
ISO	International Organization for Standardization
Iso	Isoflurane
Sev	Sevflurane
Key Filler	Adopt filling adapter and bottle neck collar to connect to the anesthetic agent bottle, to operate filling and draining anesthetic agent.
Quik-Fil	While filling, adopt filling adapter to connect the anesthetic agent bottle and filler together. While draining, turn on draining valve by specific key, and adopt draining adapter and drainage funnel to connect the anesthetic agent bottle and the anesthetic vaporizer to drain anesthetic agent.

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