

EICKEMEYER® NARKOVET ANAESTHETIC UNIT

USER MANUAL



Item no. 213062

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Eickemeyer®

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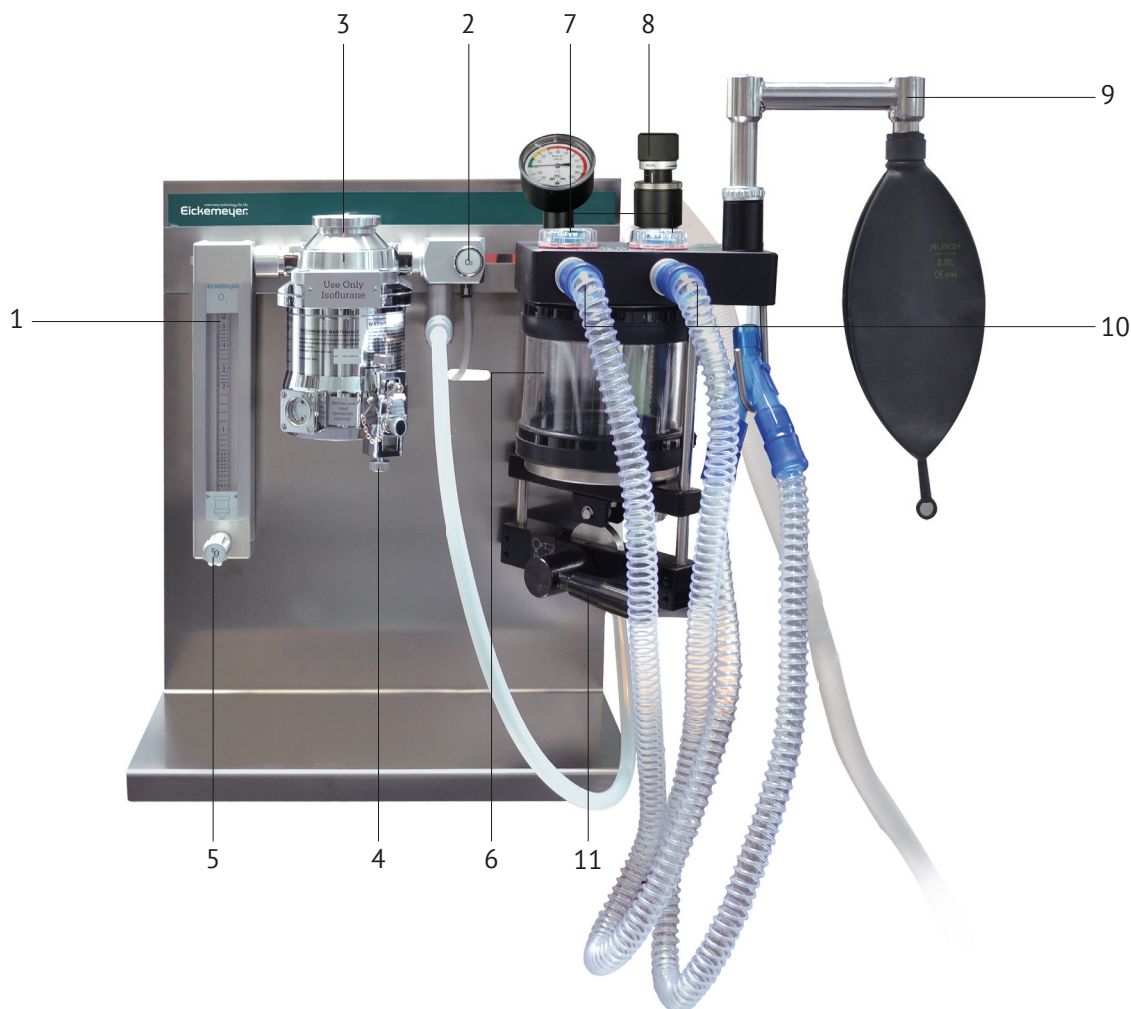
1. DESCRIPTION

The NarkoVet anaesthesia machine is a semi-closed loop system with partial rebreathing. The device is suitable for anaesthesia of small animals up to a body weight of 80 kg. For animals up to 5–7 kg it is recommended to use the included pendulum system (Ayre's T-Piece Breathing Circuit).

Further advantages of NarkoVet are:

- Respiratory valves that are large and easy to see
- A soda lime container that is easy to refill and install with a capacity up to 10 hours of anaesthesia
- Pipes for fresh gas that are easy to adapt and which can also be used for anaesthesia boxes
- Flow meter that is easy to adjust and read with a gas flow from 0.2 to 4.2 l/min
- Flush button for the oxygen bypass

2. OVERVIEW OF THE DEVICE



- | | |
|----------------------------|--|
| 1. Precision Flow Meter | 7. Direction Valves (In- and Exhalation Valve) |
| 2. Oxygen Bypass | 8. Pressure Relief Valve |
| 3. Evaporator | 9. Connection for the Breathing Bag |
| 4. Safety Filling Device | 10. Tube Connection for the Patient |
| 5. O ₂ Adjustor | 11. Absorbent Container Lock Lever |
| 6. Absorbent Container | |

3. STARTUP PROCEDURE

1. Connect the oxygen supply tube on the back side of the input flowmeter for the oxygen supply.

This can be done either through

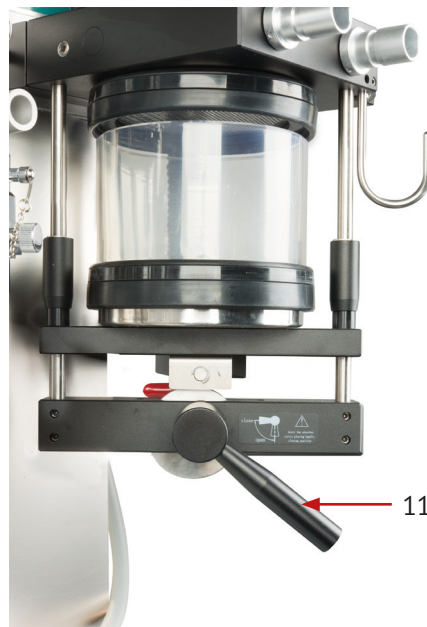
- Oxygen cylinder and pressure reducer (Item no. 212704)
- Oxygen concentrator (Item no. 213175 or 213177)
- Air connector with male connector for oxygen (Item no. 212503)

The input pressure should be about 3 bar. When using an oxygen concentrator the inlet pressure is lower due to the type of construction. Thus, the filling time of the breathing bag is extended when operating the flush button (oxygen bypass [2]). The flow meter, however, always displays the correct oxygen flow.

2. Fill the evaporator with Isoflurane (see chapter 4).

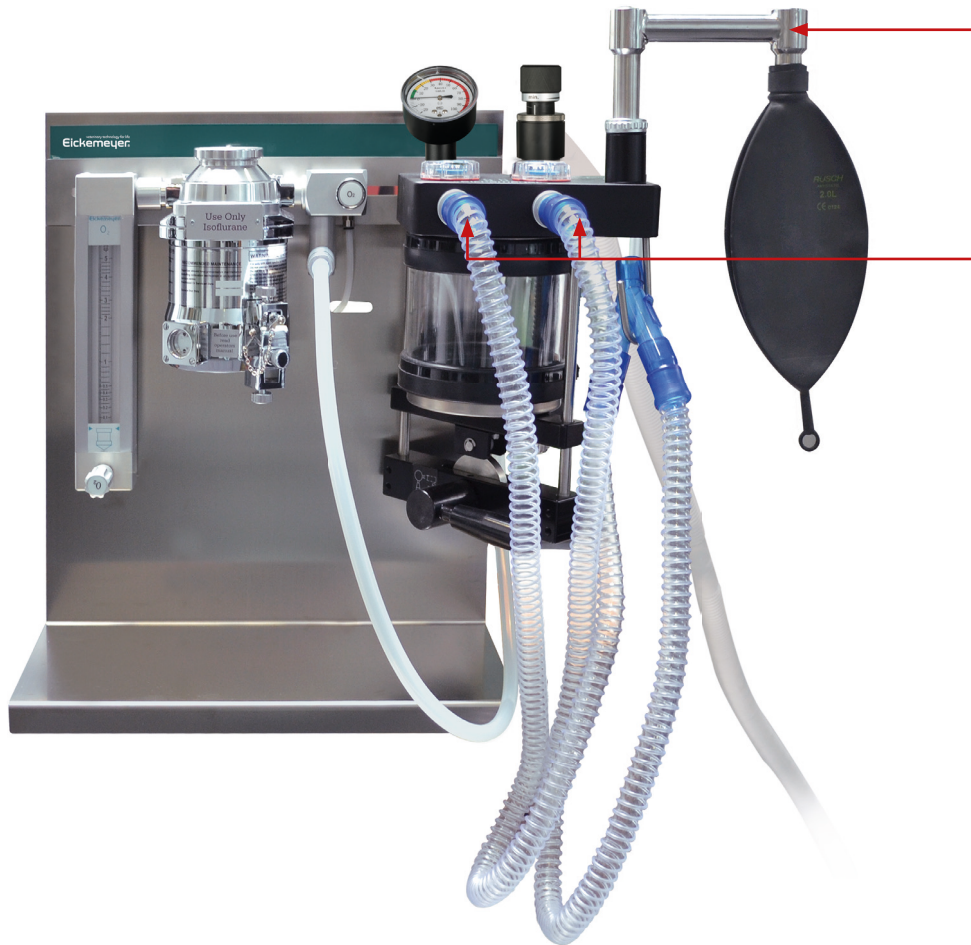
3. Filling the soda lime:

Turn the lock lever of the absorbent container (11) counter-clockwise. Remove the soda lime.



Fill the container with soda lime. The max. filling line must not be exceeded. Insert the container and lock it by turning the lock lever clockwise.

4. Plug-in the patient circuit and the breathing bag.



5. Connect an exhaust pipe to the pressure relief valve.



4. DESCRIPTION OF INDIVIDUAL PARTS

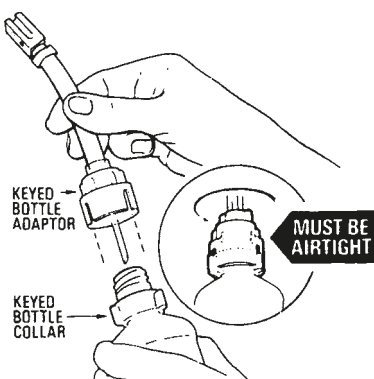
Isoflurane Vaporizer

Filling and Drain

- Fill the vaporizer with the anaesthetic indicated on the label on the front panel. The evaporator is designed only for this anaesthetic. Any other anaesthetic may be dangerous to the patient.
- To fill, turn the setting scale to the „OFF“ position.
- When refilling, do not turn the setting scale to the „ON“ position and do not fill above the „FULL“ mark.
- Run anaesthetic only in a properly labelled container.
- Check the level at regular intervals. The evaporator must be refilled at appropriate intervals. As long as anaesthetic is visible in the sight glass, it works satisfactorily.
- Fill evaporator in upright position and use. Small deviations from the upright position do not affect his performance and safety; However, since the anaesthetic agent height in relation to the diameter of the evaporator chamber is low, the anaesthetic level must be checked more often with small deviations from the upright position, otherwise false ideas about the amount of anaesthetic in the evaporator could arise.
- If the level is low, it is recommended to empty the remaining anaesthetic and remove it. At regular intervals – ideally at least every two weeks – the anaesthetic is discharged at a low level into a suitably marked container and destroyed. For anaesthetics without additives or stabilizers also longer drain intervals are permitted.

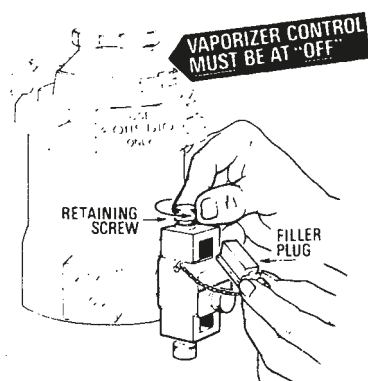
To Fill

1. Remove cap and seal from anaesthetic bottle. Check anaesthetic bottle neck is not chipped or damaged. Match keyed bottle adaptor to keyed bottle collar and screw together until airtight. The bottle is then ready for filling vaporizer.

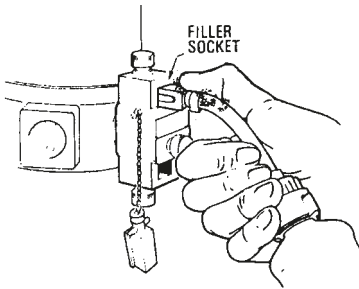


2. Ensure that the vaporizer control is set in the "OFF" position. Turn top retaining screw on **vaporizer filler unit** counter-clockwise and withdraw filler plug.

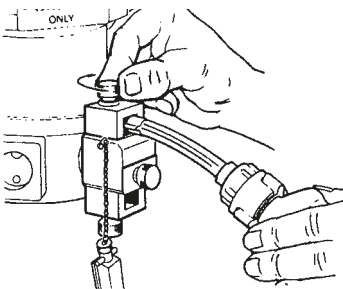
Note: Turn screw slowly if vaporizer is pressurised.



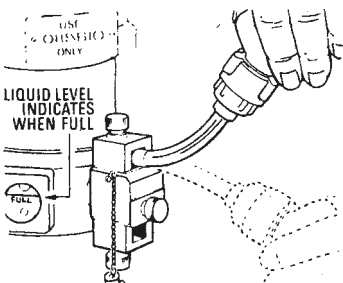
3. Grasp the keyed bottle adaptor and bottle, by the plastic tubing with the thumb on top of adaptor at the keyway – with the two holes DOWNWARDS for filling. Fit into the filler socket normally sealed by the filler plug. ONLY the correct adaptor will fit into this matching filler socket. Take care to bend tube slightly, so bottle is below inlet level to prevent spillage.



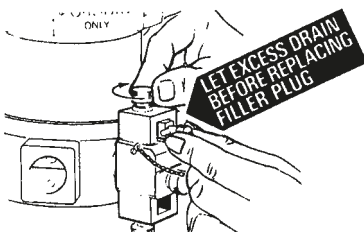
4. After insertion, turn the retaining screw clockwise and tighten to seal filler adaptor in the filler socket.



5. Raise bottle above level of filler socket, but avoid kinking tube. A steady stream of air bubbles should emerge from the inner tube within 2 seconds. If this does not occur perform procedures for clearing air locks.

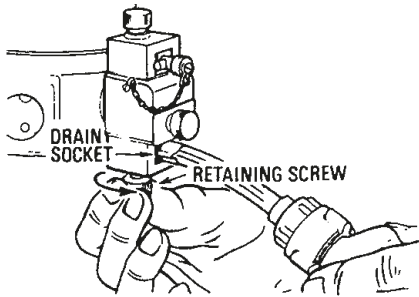


6. When vaporizer is filled to the FULL level, lower bottle. Remove bottle adaptor. If any excess liquid drains from the filler socket, allow this to escape completely before inserting and tightening filler plug. (BE SURE to replace and tighten plug or gas will escape through filler). The vaporizer is ready for use.

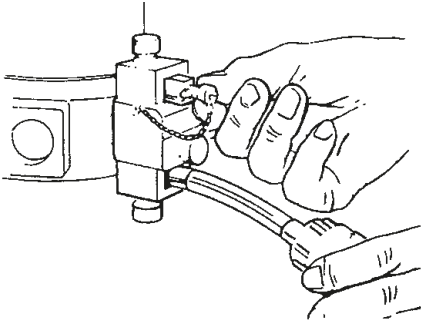


To Drain

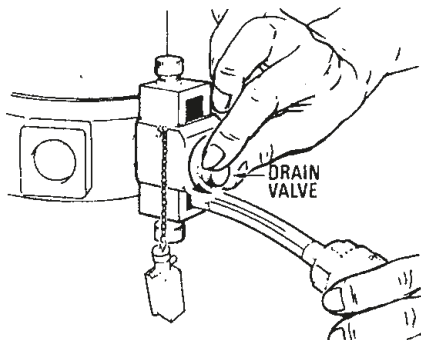
1. Insert the bottle adaptor in drain (lower) socket, with the two holes UP, and tighten retaining screw.
ONLY the correct adaptor will fit into the matching drain socket.



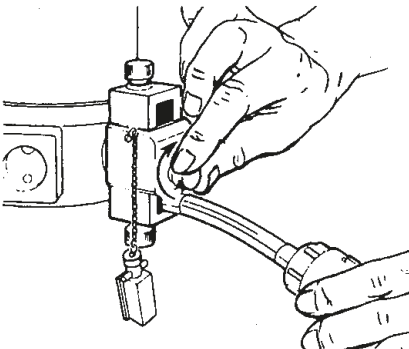
2. To let air vent from bottle and draining to occur, remove filler plug. Hold bottle slightly downward without kinking tube.



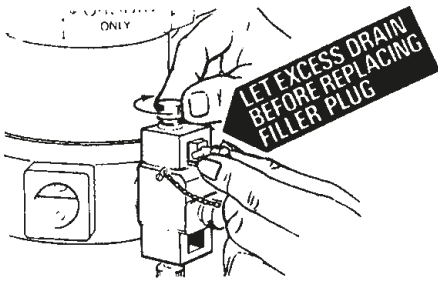
3. Open drain valve on front counter-clockwise and vaporizer will drain.



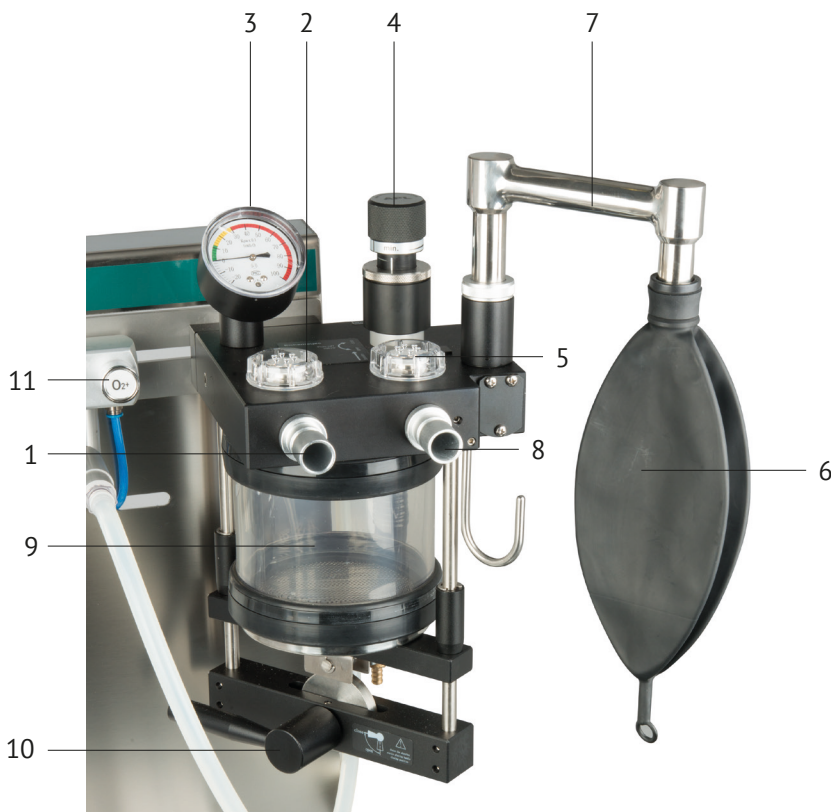
4. At completion of draining close drain valve (clockwise).



5. Remove the bottle and replace the filler plug in the filler socket. Tighten all retaining screws (clockwise).



Absorber



1. Inspiration Interface
2. Inspiration Air Valve
3. Manometer
4. APL Valve (Pressure Relief Valve)
5. Expiration Air Valve
6. Breathing Bag
7. Manual Breathing Bag Interface
8. Expiration Interface
9. Soda Lime Container
10. Lock Lever
11. O₂ Flush Device

Inspiration Interface

Inspiration gas of the patient is supplied by this interface. The machine is equipped with special patient-end tubes. The end of any one of two coarse screwed pipes among special tubes is connected to this interface. The end of another pipe is connected to expiration interface.

Inspiration Air Valve

Inspiration gas of the patient passes through this air valve, in this way, this air valve will move to raise when the patient inspires. The air valve can be cleaned and disinfected after opening it by counter-clockwise rotating transparent cover. One mica sheet in the cover is brittle, please pay attention to handle with care.

APL Valve (Pressure Relief Valve)

Clockwise direction to close, counter-clockwise direction to open, blow off pressure can be adjusted with the limits of 0~60 cmH₂O in accordance with the requirement of anaesthesia method.

Expiration Interface

Expiration gas of the patient enters into breathing circuit by this interface. The machine is equipped with special patient-end tubes. The end of any one of two coarse screwed pipes among special tubes is connected to this interface by flow sensor. The end of another pipe is connected to inspiration interface.

Expiration Air Valve

Expiration gas of the patient enters into breathing circuit by passing through this air valve, in this way, this air valve will move to raise when the patient expires. The air valve can be cleaned and disinfected after opening it by counter-clockwise rotating transparent cover. One mica sheet in the cover is brittle, please pay attention to handle with care.

Manometer

Show gas circuit pressure in real-time.



Attention!

The maximum inspiratory pressure is to be considered.

Manual Breathing Bag Interface

Manual breathing bag which is used for manually controlling breath is connected to this interface.

Soda Lime Container

The Soda lime is used to absorb Carbon dioxide from Patient exhaled gas, and its content is 2,000 mL.

Note

- To lock the soda lime container, turn the soda lime container lock lever clockwise and check the soda lime container lock as if it were properly closed, there could be a leakage problem.
- Inspiration-/Expiration air valve, manometer, APL valves and breathing bag should be properly tight, otherwise there may be a leakage problem.

O₂ Flush Device

Leak Test

1. Turn off the pressure relief valve completely
2. Close evaporator (set to "0")
3. Set the flow on the flowmeter to 3 l/min
4. Closed the Y-piece on the patient tube with your thumbs
5. Wait until the pressure gauge reaches 30 cmH₂O
6. Close flowmeter
7. Observe the display on the manometer. Pressure must remain constant for 15 seconds
8. When the pressure is increases in the Manometer, there is a leakage in the O₂ flush valve

APL Valve (Pressure Relief Valve)

The elimination of excess respiratory gas in the system is controlled by the pressure relief valve. Relief adjustable, depending on the device and type of valve different. The opening degree of the pop-off valve changes the flow rate and how full the reservoir bag is. If the breathing bag is unintentionally widened very quickly, there is a leak or a defect in the pressure relief valve.

5. OPERATION OF THE PENDULUM SYSTEM (AYRE'S T-PIECE BREATHING CIRCUIT)

The Ayre's T-Piece Breathing Circuit supplements the basic unit perfectly for anaesthesia of smaller patients. It contains no breathing valves. The anaesthetic gas is transported directly from the evaporator via the fresh gas pipe to the patient. This ensures quicker wash-in and wash-out even with a smaller minute volume. The exhalation takes place into the breathing bag, and in the case of overpressure air is transferred via the open valve in the exhaust pipe. The pressure relief valve should always be fully opened during spontaneous breathing (against clockwise direction). A re-breathing of exhaled carbon dioxide is prevented by the influx of fresh gas into the breathing bag (open system).

Recommended quantity of fresh gas for wash-in: 800 ml – 1.000 ml/min

Concentration of Isoflurane: 2.5 % – 3.5 %

Maintenance values as required, but at least 500 ml/min fresh gas (depending on evaporator).



Please pay attention to the correct assembly of the anaesthesia system, as shown in the picture above.

6. PREPARING THE DEVICE BEFORE ANAESTHESIA

Check the oxygen supply (pressure and access to sufficient oxygen).

Connect patient tube and breathing bag to the anaesthesia machine and close the pressure relief valve. Keep your thumb on the patient's end of the tube and inflate the breathing bag via the oxygen bypass until the breathing bag is bulging. Then check the function of the pressure relief valve by opening it so that the pointer on the manometer is in the green range (about 5 mmHg).

If the internal pressure is not adequately maintained, there is a leak in the system which has to be found before using the anaesthetic machine. Check the anaesthetic level of the evaporator.

In general, due to the built-in pressure compensation of the evaporator a loss of anaesthetic agent up to 0.5 cm³ per day.

7. LEAK TEST

1. Turn off the APL valve completely.
2. Close evaporator (set to "0").
3. Set the flow of the flowmeter to 3 l/min.
4. Closed the Y-piece of the patient tube with your thumbs.
5. Wait until the Manometer reaches 30 cmH₂O.
6. Close flowmeter.
7. Observe the display on the flowmeter. Pressure must remain constant for 15 seconds.

8. ANAESTHETIC PROCEDURE

Typically in a semi-closed system a fresh gas flow of 2 l/min at a selected **concentration of 3.0 vol%** at the evaporator is sufficient for a quick wash-in. The depth of anaesthesia needs to be monitored and the concentration to be changed if necessary.

To maintain the anaesthesia, generally it is sufficient to follow the guidelines of the MAC values + 15 % inspiratory add as per the package leaflet at minimum 500 ml/min oxygen inflow (watch status of anaesthesia and breathing continuously).

The MAC values are

Dog:	1.28 %
Cat:	1.63 %
Birds:	1.45 %
Small mammals:	1.34 %
Rat:	2.4 %

Pay attention to the decreased wash-in and wash-out times of an Isoflurane-only anaesthesia in comparison to halothane or mixed anaesthesia. In general, the evaporator should be closed just at the time of the final suture (5 min before the intended end of the surgery).

9. CLEANING AND MAINTENANCE OF ANAESTHESIA EQUIPMENT

Remove breathing bag, the patient tube and other tubes from the device and dry them (if necessary, clean with detergent).

Unscrew the lids of the breathing valves and let them dry too. If you remove the valve plates, it will speed up the drying process. But please make sure to insert these plates again before the next anaesthetic, otherwise proper gas exchange is no longer guaranteed.



Approximately every 10 hours, please change the absorbent, even if the indicator change did not take place.

Please check every 20 hours of anaesthesia all exposed sealing rings for wear and tear and lubricate with silicon vaseline.

Once a year, the evaporator should be subjected to a technical inspection to ensure proper functioning. In this case, please contact the EICKEMEYER® Customer Service.

Precautions for handling Isoflurane

Isoflurane is a highly volatile anaesthetic. Therefore, when used in closed spaces ensure that a suction tube is properly connected to the pressure relief valve or the Ayre's T-Piece Breathing Circuit. If ventilation of gases is not possible into the open air, we recommend an anaesthetic gas filter (Item no. 213488 or 21348801).

10. TROUBLESHOOTING

Fault	Possible Cause	Possible Solution
Filling process in the evaporator with isoflurane is not working/too slow	<ul style="list-style-type: none"> Filling hose worn/defective (Item no. 213246) Flow channels blocked No venting 	<ul style="list-style-type: none"> Try with another filling hose Set the dosing scale to 4/5 % before filling
Animals are sleeping too slowly	<ul style="list-style-type: none"> Isoflurane concentration lower than set Leakage 	<ul style="list-style-type: none"> Check hose connections
Higher anaesthetic consumption	<ul style="list-style-type: none"> Leakage filling system/ evaporator or the entire system 	<ul style="list-style-type: none"> If necessary, replace porous hoses Equipment maintenance required
Breathing bag fills up more and more (Patients cannot exhale by themselves)	<ul style="list-style-type: none"> APL valve (pressure relief valve) does not open at all or too late 	<ul style="list-style-type: none"> Replace APL valves
When the flowmeter is closed, the breathing bag continues to inflate	<ul style="list-style-type: none"> O₂ flush valve leaks 	<ul style="list-style-type: none"> Device must be repaired by EICKEMEYER®

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