

A7

Anesthesia system

Fusion for Safety



As clinical technology advances, the use of anesthesia continues to expand. Various patients and surgeries require high-quality anesthesia. Moreover, the current shortage of medical resources demands greater operation efficiency. Mindray's new A7 anesthesia system addresses the trend towards diversified anesthesia, offering an integrated solution that provides precise anesthesia and lean management. This helps improve the safety and efficiency of anesthesia.



Integrated Anesthesia Solution,
Together and Stronger



Diversified Ventilation,
Professional Care



More Flexible,
More Reliable



Stay Connected for
Greater Efficiency



Compact yet powerful



- 18.5-inch capacitive touchscreen with 360-degree rotation
- Electronic flowmeter with traditional ease-to-use knobs, supporting multiple setting methods
- Optimizer for precise fresh gas flow settings
- Integrated breathing circuit with classic panel design
- Plug-and-play monitoring modules compatible with Mindray modular patient monitor
- Smaller footprint, bigger workspace

Integrated Solution, Together and Stronger



Combined intravenous-inhalational anesthesia (CIVIA) typically involves the use of multiple anesthetic drugs to achieve a balanced anesthesia state while reducing the dosage of any single drug and its potential adverse reactions. However, this method faces several challenges in anesthetic practice:



Multiple devices in scattered locations

Intravenous anesthetics are delivered via pumps, while inhalational anesthetics are delivered via anesthesia machines. Anesthesiologists must walk back and forth for observation and operation.



Vital signs on different interfaces

Due to patient variability, anesthesiologists need to closely monitor vital signs. However, this information is dispersed across different devices, making it hard to assess.

Lack of a combined drug effect indicator

Anesthesiologists need to understand the pharmacokinetics and pharmacodynamics of each anesthetic drug and consider the interaction between drugs, relying heavily on their experience.

AnaeSight™

AnaeSight™ is an integrated solution for combined intravenous-inhalational anesthesia that connects anesthesia machines, patient monitors, and pumps. This brings greater convenience to operation and more confidential decision-making, significantly improving the safety and efficiency of anesthesia.



Centralized control

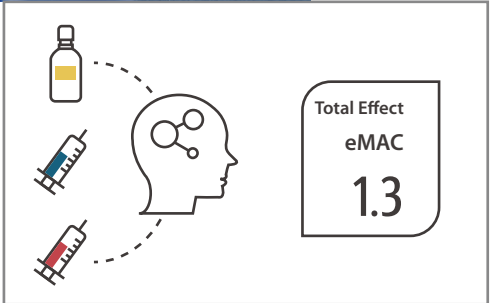
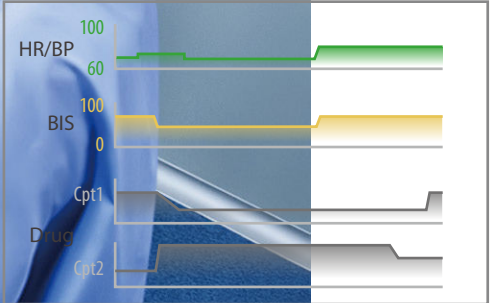
Anesthesiologists can remotely control the pumps through the anesthesia machine, adjusting intravenous and inhalational anesthetics on the same interface.

Integrated assessments

Vital sign parameters from the anesthesia machine and patient monitor, as well as historical medication from pumps, can be displayed on the same window, making it convenient to comprehensively assess the patient's status.

Combined drug effect

An innovative indicator of the combined drug effect of multiple anesthetics called eMAC™ is included in AnaeSight. This indicator is based on published pharmacokinetics and pharmacodynamics models, assisting with the administration of anesthetic drugs.

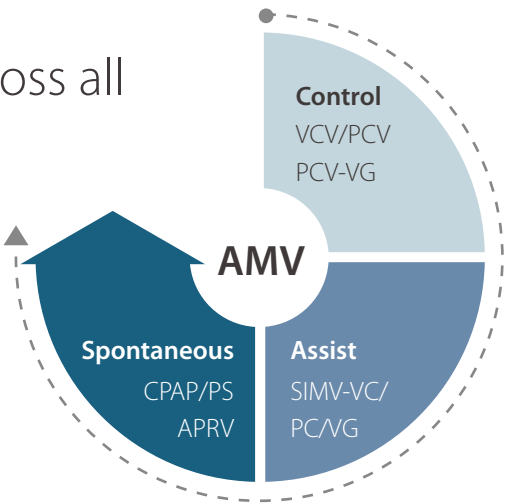


Diversified Ventilation, Professional Care

As the population ages and issues like obesity become more prevalent, optimizing ventilation management for patients during the perioperative period has become an important concern for anesthesiologists. A7 offers a range of ventilation methods, including both intubated and non-intubated anesthesia, to meet the needs of all patients.

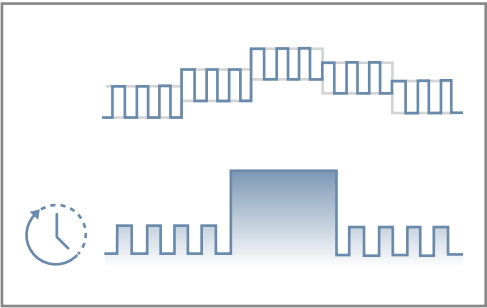
Experience optimal performance across all stages of anesthesia

A full range of ventilation modes is available to meet the needs of patients of all ages, from adults to neonates. This enables precise ventilation care throughout the entire anesthesia process.



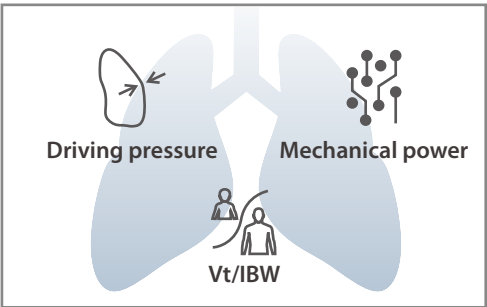
Powerful Lung Recruitment Tool

- Two optional maneuvers: stepwise PEEP or sustained inflation
- A scheduled recruitment maneuver can be performed automatically



Advanced monitoring parameters

- Vt/IBW: clear guidance on lower tidal volume settings to avoid barotrauma
- Driving pressure: individualized guidance on ventilation parameter settings
- Mechanical power: precise assessment of perioperative lung injury and outcomes



High Flow Nasal Cannula **HFNC**

High flow nasal cannula (HFNC) plays an important role in maintaining safe oxygen saturation of patients as it extends the safe apnoeic oxygenation especially for patients with poor oxygen saturation such as bariatric, pediatric, critical ill or difficult airway.

- Direct setting of total flow and O₂ concentration with maximum flow up to 100L/min
- Built-in design with no additional gas or power source required, saving space and minimizing clutter



Jet ventilation **HFJV**

Jet ventilation can be used in shared airway surgeries, difficult airway cases, and more. It can improve patient safety by maintaining oxygenation while creating a better surgical field.

- Improved safety: superimposed jet ventilation to maintain patient oxygenation while avoiding CO₂ retention
- Smoother operation: quickly switch between jet and conventional ventilation
- More environmentally friendly: compact design, space-saving without cluster



More Flexible, More Reliable

The operating room environment is complex due to the presence of numerous equipment. Anesthesiologists face heavy, fast-paced, and intense work every day. The new A7 anesthesia system is equipped with a flexible design, intuitive interaction, and reliable performance. It helps anesthesiologists deal with daily work easily in various anesthesia environments.

Flexible for daily work



18.5-inch capacitive touchscreen



1920x1080 HD



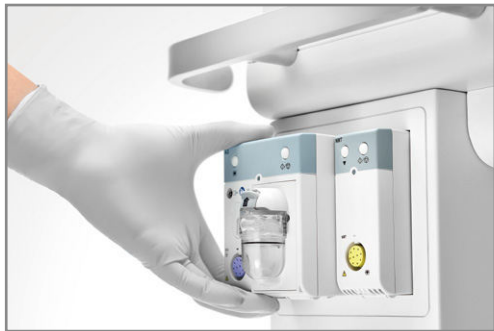
10 customized profiles



Graphical instruction



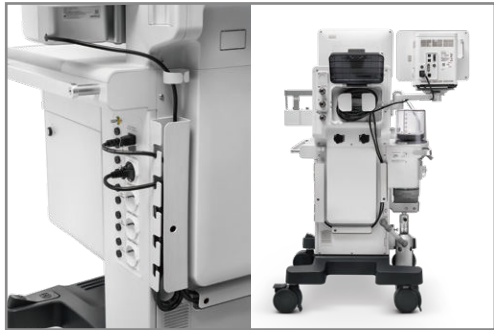
Rotatable screen with 360-degree angle of view



Plug-and-Play monitoring modules



Optional flip-up work table for more working space



Neat cable management, clean and tangle-free



Easy for maintenance

- Integrated breathing system with heating module to reduce condensation
- Compatible with both reusable and disposable soda lime canisters, ease to replace the absorbent
- All parts are autoclavable, preventing cross-infection
- FlowSecure™ ensures the flow sensors maintain accuracy while extending their life span



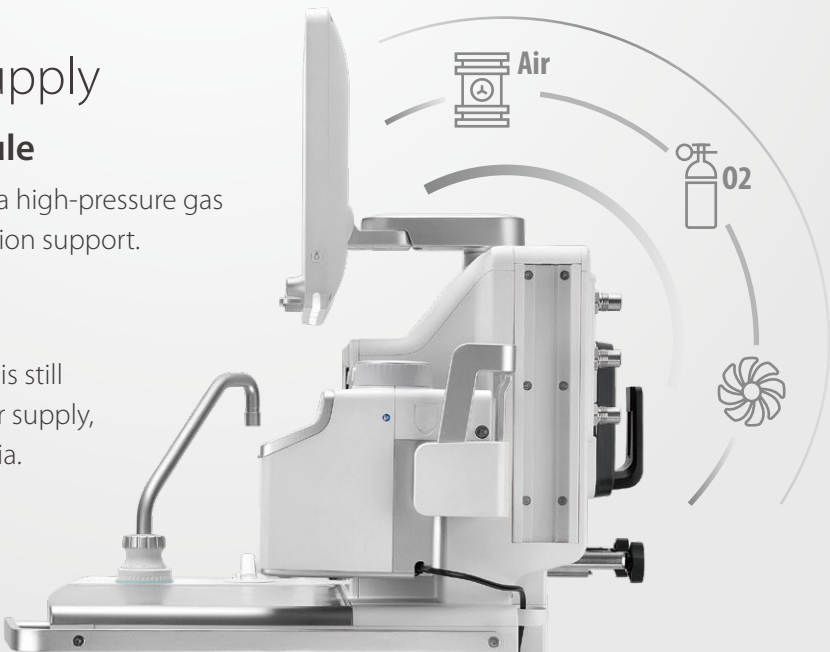
More options for gas supply

Optional built-in turbine module

The ventilator can work normally without a high-pressure gas supply, providing non-interrupted ventilation support.

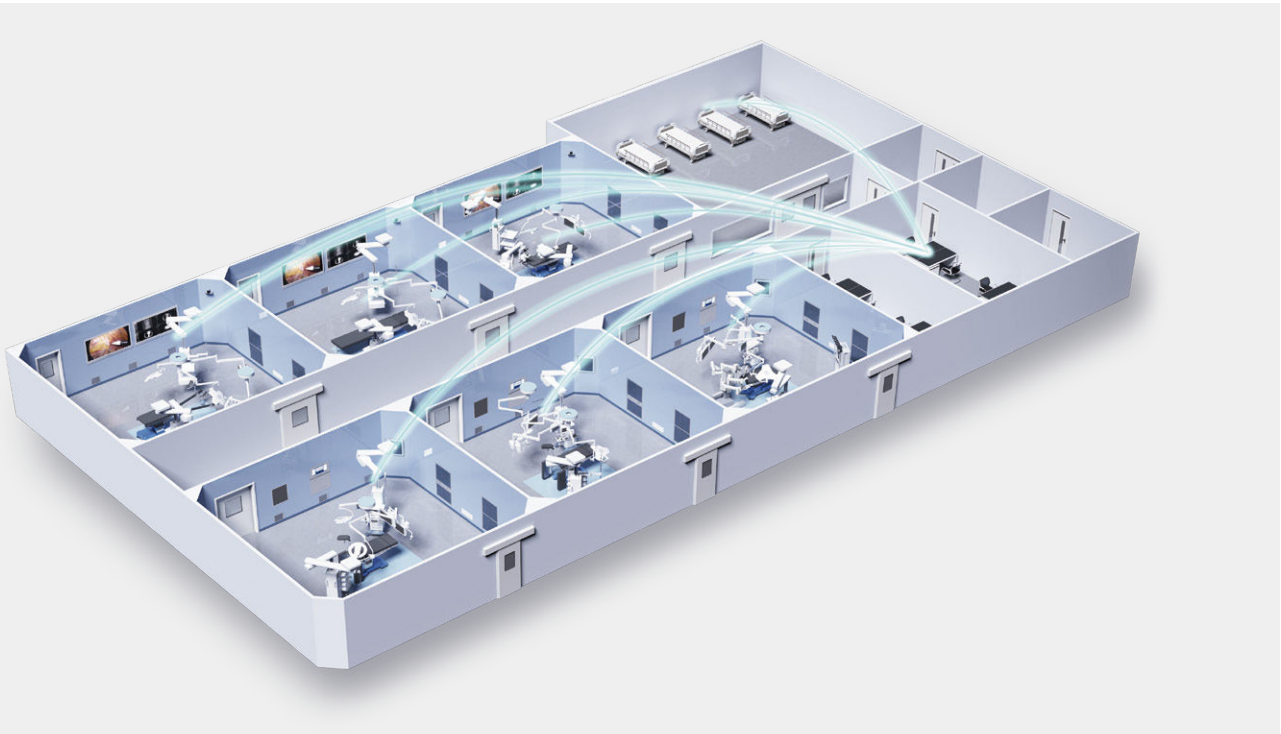
Optional internal air supply

Delivering fresh gas of air-oxygen mixture is still possible in the case of no high-pressure air supply, avoiding prolonged exposures to hyperoxia.



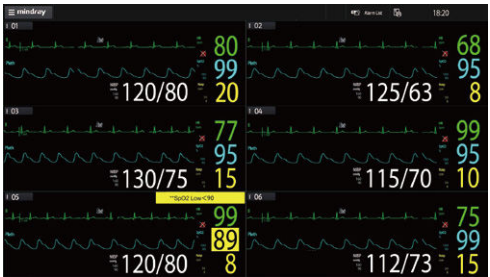
Stay Connected for Greater Efficiency

Comprehensively improve the operating efficiency of departments through information technology, make complicated work orderly, help clinical workers easily cope with various challenges, comprehensively improve the quality of medical services centered on patients, and realize lean management of all departments.



Overview of patient status in each operating room

- Monitor patient vital signs in real-time across all operating rooms
- Conveniently review the complete surgical process information of patients



Overview of the operational status of devices

- Overview of anesthesia machine distribution and utilization
- Summary of anesthesia machine self-test results
- Statistics of anesthetic gas consumption



Remote control solution in DSA room

A remote control solution in DSA room relies on the perioperative ecological system. This allows anesthesiologists to remotely control the anesthesia machine, patient monitor, and pumps in the operating room from the DSA control room, thus ensuring the safety of patients and anesthesiologists.

The remote observation and control feature allows for immediate intervention, ensuring patient safety and reducing the time for radiation exposure in the DSA operating room, thus reducing occupational injuries.

Not all features are for sale in all countries.

Anesthesia system

Physical Specifications

Dimensions and Weight

Height	1495 mm
Width	763 mm
Depth	766 mm
Weight	≤140 kg (with 3 yokes, without vaporizers and gas cylinders)

Work Surface

Height	830 mm
Width	462 mm
Depth	352 mm
Weight limit	30 kg

Flip-up Work Surface

Length	379 mm
Width	303 mm
Weight limit	15 kg

Drawer (2 or 3 drawers, Internal Dimension)

Height	123 mm/ 72 mm
Width	275 mm
Depth	340 mm
Weight limit	5 kg

Bag Arm

Height	1108 mm
Length	510 mm
Swiveling angle	±90 degrees

Casters

Diameter	125 mm
Brake	Centre brake with Lock / Unlock icons
Cable pusher	Cable pusher for each caster

Work Light

Settings	OFF, Low, High
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Main Screen

Display size	18.5 inch
Display type	Capacitive touch screen
Resolution	1920 x 1080
Rotated	-60° to 60°
Tilted	-15° to +45°
Display parameters	All setting and alarm parameters (including Breath rate, I/E ratio, Tidal volume, Minute volume, PEEP, MEAN, PEAK, PLAT, and O ₂ concentration, EtCO ₂ , N ₂ O, Aesthesia gas concentration, BIS)
Graphic waveforms	Pressure, Flow, Volume, CO ₂ , O ₂ , Anesthetic gas, N ₂ O, BIS Up to 5 waveforms display simultaneously
Spirometry loops	Pressure-Volume, Flow-Volume and Pressure-Flow
Timer	Display on screen timer

System Status Display

Display size	5.5 inch
Display type	Color LCD
Display content	Gas supply pressure, Airway Pressure, Tidal volume

Ventilator Specifications

Modes of Ventilation

Manual/Spontaneous ventilation/CPB
Volume Control Ventilation (VCV) with PLV function
Pressure Control Ventilation (PCV)
Pressure Control Ventilation with volume guarantee (PCV-VG)



Continuous Positive Airway Pressure/Pressure Support Ventilation with apnea backup (CPAP/PS)

Pressure Support Ventilation (PS) with apnea backup

Synchronized Intermittent Mandatory Ventilation (SIMV-Volume Controlled and SIMV-Pressure Controlled)

Synchronized Intermittent Mandatory Ventilation Volume Guarantee (SIMV-VG)

Airway Pressure Release Ventilation (APRV)

Adaptive Minute Ventilation (AMV)

Compensation

Circuit gas leakage compensation and automatic compliance compensation

Ventilation Parameters Range

Tidal volume	10 to 1500 mL (VCV, SIMV-VC) 5 to 1500 mL (PCV-VG, SIMV-VG) With TV/IBW indicator
Pinsp	3 to 80 cmH ₂ O
Plimit	10 to 100 cmH ₂ O
ΔPsupp	0, 3 to 60 cmH ₂ O (CPAP/PS)
Respiration rate	2 to 100 bpm
I:E	4:1 to 1:10
Tpause	OFF, 5% to 60%
Tinsp	0.2 to 10.0 s
Trigger window	5% to 90%
Flow trigger	0.2 to 15 L/min
Pressure trigger	-20 to -1 cmH ₂ O
Exp%	5% to 80%
Min rate	2 to 60 bpm
Tslope	0.0 to 2.0 s
Apnea I: E	4:1 to 1:10
ΔPapnea	3 to 60 cmH ₂ O
Phigh	3 to 80 cmH ₂ O
Plow	OFF, 2 to 50 cmH ₂ O
Thigh	0.2 to 10.0 s
Tlow	0.2 to 10.0 s
Thigh:Tlow (I:E)	50:1 to 1:50
MV%	25% to 350%

Positive End Expiratory Pressure (PEEP)

Type	Integrated, electronic controlled
Range	OFF, 2 to 50 cmH ₂ O

Monitoring Parameters

Tidal volume	0 to 3000 ml
Minute volume	0 to 100 L/min
Peak pressure	-20 to 120 cmH ₂ O
Mean pressure	-20 to 120 cmH ₂ O
Plateau pressure	-20 to 120 cmH ₂ O
I:E	50:1 to 1:50
Rate	0 to 150 bpm
PEEP	0 to 70 cmH ₂ O
Delta Tidal volume	0 to 3000 ml
Minute volume leakage	0 to 10.0 L/min
Driving Pressure	0 to 120 cmH ₂ O
Resistance (R)	0 to 600 cmH ₂ O/(L/s)
Compliance (C)	0 to 300 ml/cmH ₂ O

Elastance (E)	0.003 to 10 cmH ₂ O /mL
Mechanical Power	0.00 to 100.00 J/min
Inspired oxygen (FiO ₂)	18% to 100%
Control Accuracy	
Volume delivery	≤60 ml: ± 10 ml >60 ml and ≤ 210 ml: ±15 ml >210 ml: ±7 % of the set value
Pressure delivery	± 2.5 cmH ₂ O or ± 7% of the set value, whichever is greater
PEEP	± 2.0 cmH ₂ O or ± 7% of the set value, whichever is greater
Rate	± 1bpm or ± 10% of the reading, whichever is greater

Monitoring Accuracy

Volume monitoring	≤60 mL: ± 10 mL >60 and ≤210 mL: ± 15 mL >210 mL: ± 7% of the reading
Pressure monitoring	± 2.0 cmH ₂ O or ± 4% of the reading, whichever is greater
Rate	± 1bpm or ± 5% of the reading, whichever is greater
MV	± 0.1L/min or ± 8% of the reading, whichever is greater

Alarm Setting

Paw High	2 to 100 cmH ₂ O
Paw Low	0 to 98 cmH ₂ O
TV High	5 to 1600 mL
TV Low	OFF, 0 to 1595 mL
MV High	0.2 to 100 L/min
MV Low	0 to 99 L/min
Rate High	4 to 100 bpm, OFF
Rate Low	OFF, 2 to 98 bpm
FiO ₂ High	20% to 100%, OFF
FiO ₂ Low	18% to 98 %
Apnea alarm	No breath has been detected within the apnea time.
Apnea delay time	5 to 60 s (by volume or pressure) 10 to 40 s (by CO ₂ waveform)

Data Storage and Recording

Configuration storage	up to 10 customized profiles
Log storage	10000 entries of alarm and activity logs
History trend	48 hours of continuous trend data
Screenshot	up to 50

Lung Recruitment Tool

Multi-step recruitment	(Increasing PEEP progressively)
Control parameters	a maximum of 7 steps ΔP _{supp} , PEEP, Breaths, I:E, Rate PEEP on exit
Preset procedure	up to 5
One-step recruitment	(sustain inflation)
Control parameters	Pressure Hold, Hold Time, PEEP on exit
Cycle Interval	OFF, 1 - 180 min

Insp Hold & Exp Hold

Insp Hold Measurement	Cstat, Pplat, Ri
Exp Hold Measurement	PEEPi, PEEPtot

Jet Ventilation

Jet pressure (HF)	10 to 200 kPa (0.1 to 2 bar)
Jet pressure (NF)	10 to 350 kPa (0.1 to 3.5 bar)
Jet Frequency (HF)	50 to 1500 bpm
Jet Frequency (NF)	1 to 100 bpm
I:E	3:1 to 1:5
FiO ₂	21 to 100 %
Laser safety mode	ON, OFF
Pressure monitoring	0 to 120 cmH ₂ O
PEEP monitoring	0 to 70 cmH ₂ O

Pneumatic Specifications

Pipeline Supply

Gas type	O ₂ , N ₂ O and Air
Pipeline input range	280 to 600 kPa (40 to 87 psi)
Pipeline connections	DISS or NIST

Pipeline Supply Pressure Monitoring

Display type	Electronic
Ranges	0 to 1000kPa (0 to 140 psi)
Accuracy	± (4% of the full scale reading + 8% of the actual reading)

Cylinder Supply

Cylinder supply	E Cylinder (American style or UK style)
O ₂ input range	6.9 to 20 MPa (1000 to 2900 psi)
N ₂ O input range	4.2 to 6 MPa (600 to 870 psi)
Air input range	6.9 to 20 MPa (1000 to 2900 psi)
Cylinder connections	Pin-Index Safety System (PISS)
Yoke configuration	O ₂ , N ₂ O, Air

Cylinder Supply Pressure Gauges

Display type	Mechanical or Electronic
Air range	0 to 25 MPa (0 to 3500 psi)
O ₂ range	0 to 25 MPa (0 to 3500 psi)
N ₂ O range	0 to 10 MPa (0 to 1400 psi)
Accuracy	± (4% of the full scale reading+8% of the actual reading)

Ventilator Performance

Peak gas flow	180 L/min + Fresh Gas Flow
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O₂ Controls

Supply failure alarm	≤ 220 kPa
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ACGO (Auxiliary Common Gas Outlet)

Control type	Mechanical
Safety pressure	A relief valve limits fresh gas pressure at ACGO outlet port to not more than 12.5 kPa

O₂ Flush

Flow rate	25 to 75 L/min
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Auxiliary Flowmeter (3 options)

Auxiliary O ₂ Flowmeter	Range	0 to 15 L/min
	Indicator	Flow tube
Auxiliary O ₂ &Air Flowmeter	Flow range	0 to 15 L/min
	Oxygen concentration	21 % to 100 %
	Indicator	Glass tube and LED
High Flow Nasal Cannula	Flow range	2 to 100 L/min
	Oxygen concentration	21 to 100 %
	Indicator	Glass tube and LED

Anesthetic Gas Scavenging System (AGSS)

Type of disposal system	Passive Active: High-flow or low-flow
Pump rate	75 to 105 L/min (High-flow) 25 to 50 L/min (Low-flow)

Venturi Suction Regulator

Supply	Air, from system gas source
Gas supply range	280 to 600 kPa
Maximum vacuum	≥50 kPa
Maximum flow	≥25 L/min

Continuous Suction Regulator

Supply	External vacuum
Gas supply range	-72 to -40 kPa
Maximum vacuum	≥ 65 kPa with external vacuum applied of 72 kPa
Maximum flow	≥ 40 L/min with external vacuum applied of 72 kPa

Electronic Flow control system (Electronic Mixer)

Direct Flow Control Mode

O ₂ flow range	0, 0.2 to 15 L/min
Air flow range	0 to 15 L/min
N ₂ O flow range	0 to 12 L/min
O ₂ flow accuracy	± 50 ml/min or ± 5% of setting value, whichever is greater

Balance gas (Air/N₂O) flow accuracy
± 50 ml/min or ± 5% of setting value, whichever is greater

O₂ concentration in O₂/ N₂O mixture ≥ 25%

Total Flow Control Mode

Total flow range	0, 0.2 to 20 L/min
Total flow accuracy	± 100 ml/min or ± 5% of setting value, whichever is greater

O ₂ concentration	
Range	21% to 100% (The balance gas is Air) 26% to 100% (The balance gas is N ₂ O)
Accuracy	± 5% V/V for flows < 1 L/min ± 5% of setting for flows ≥ 1 L/min

Optimizer

Available when CO₂ or AG module is loaded

Flow Pause

The fresh gas flow and ventilation will be paused for 1 minute at default. (Maximum 2 minutes)

Backup Flow Control System

Control Type

Mechanical (Control needle valve and knob)

Flow Range

Control range (O ₂)	1 to 15 L/min
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Total flow meter

Range	0 to 15 L/min
Indicator	Flow tube
Indicator accuracy	± 10% of the indicated value for flows (between 10% and 100% of full scale with oxygen)

Breathing System Specification

Breathing system volume

Automatic ventilation	1800 ml
Manual ventilation	1950 ml

CO₂ Absorber Assembly

Absorber capacity	1500 ml
Absorber type	1 Pre-Pak canister or Loose fill absorbent

Inspiratory Airway Pressure Gauge

Range	-20 to 100 cmH ₂ O
Accuracy	± (2% of the full scale reading + 4% of the actual reading)

Flow Sensor

Type	Variable orifice flow sensor
Location	Inspiratory and expiratory port

Oxygen Sensor

Type	Galvanic fuel cell
FiO ₂ displayed	18% to 100%
Accuracy	± (volume fraction of 2.5 % + 2.5 % gas level)
Response time	< 20 seconds

Breathing System Connectors

Exhalation	22 mm OD / 15 mm ID conical
Inhalation	22 mm OD / 15 mm ID conical
Manual bag port	22 mm OD / 15 mm ID conical

Bag-to-Ventilator Switch

Type	Bi-stable
Control	Switch between manual and mechanical ventilation

Adjustable Pressure Limiting (APL) Valve

Type	Manually control with quick relief function
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Range	Approximately 0 (SP), 5 to 70 cmH ₂ O
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Tactile knob indication ≥ 30 cmH₂O

Breathing Circuit Parameters

System compliance	≤ 2 mL/cmH ₂ O in manual ventilation Automatically compensates for compression losses within the breathing circuit in automatic ventilation mode
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Expiration resistance < 6.0 cm H₂O @60 L/min

Inspiration resistance < 6.0 cm H₂O @60 L/min

Leakage ≤ 50 mL @ 3 kPa

System safety pressure on patient circuit 110 ± 10 cmH₂O

Breathing System Temperature Controller

Breathing system temperature maintained at least 31°C typical at 20°C ambient temperature in normal condition

Materials

All materials in contact with exhaled patient gases are autoclavable up to a maximum temperature of 134°C, except O₂ sensor and mechanical pressure gauge.

All materials in contact with patient gas are latex free.

Vaporizers

Anesthetic agent delivery

Vaporizer	Mindray V60/V80 Anesthetic Vaporizer
Support agents	Halothane, Isoflurane, Sevoflurane, Desflurane
Position	Max.3 positisons (2 active, 1 inactive)
Mounting mode	Selectatec®, with interlocking function

Monitor Modules

Side-stream CO₂ Module

CO ₂ Measurement range	0 ~ 152 mmHg (0 to 20%)
CO ₂ Accuracy	± 2 mmHg (0 ~ 40 mmHg) ± 5% of the real reading (41 ~ 76 mmHg) ± 10% of the real reading (77 ~ 152 mmHg)
CO ₂ Resolution	1 mmHg
O ₂ Measurement range	0 to 100%
O ₂ Accuracy	± 1% (V/V) (0 ~ 25%) ± 2% (V/V) (25 ~ 80%) ± 3% (V/V) (80 ~ 100%)
O ₂ Resolution	1%
Pump rate	Neonatal: 100 mL/min or 120 mL/min Adult/Pediatric: 120 mL/min or 150 mL/min
Response time	< 4.5 s @ 100 mL/min; < 4.5 s @ 120 mL/min < 5 s @ 120 mL/min; < 5 s @ 150 mL/min

Main-stream CO₂ Module

Measurement range	0 to 150 mmHg (0 to 20%)
Accuracy	± 2 mmHg (0 ~ 40 mmHg) ± 5% of the reading (41 ~ 70 mmHg) ± 8% of the reading (71 ~ 100 mmHg) ± 10% of the reading (101 ~ 150 mmHg)
Resolution	1 mmHg
Response time	< 2 s
Alarm limit	EtCO ₂ High: OFF, (low limit + 2) to 99 mmHg EtCO ₂ Low: OFF, 0 to (high limit - 2) mmHg FiCO ₂ High: OFF, 1 to 99 mmHg

Anesthesia Gas (AG) Module

Measurement mode	Infrared absorption, side-stream
Monitor gases	CO ₂ , O ₂ (Paramagnetic O ₂ module), N ₂ O, and any of the five anesthetic agents: DES, ISO, ENF, SEV and HAL
Warm-up time	< 45 s (ISO accuracy mode) < 10 min (full accuracy mode)
Sample rate	Adu/Ped: 150, 180, 200 ml/min Neo: 100, 110, 120 ml/min
Monitoring range	CO ₂ : 0 to 30% (0.0 to 226 mmHg) O ₂ /N ₂ O: 0 to 100%

HAL, ISO, ENF: 0 to 30%

SEV: 0 to 30%

DES: 0 to 30%

BIS/BISx4 Module

Measured parameters	EEG
BIS, BIS L/ BIS R	0 to 100
Sweep speed	6.25 mm/s, 12.5 mm/s, 25 mm/s or 50 mm/s
Alarm limit	BIS high: (BIS low +2) to 100 BIS low: 0 to (BIS high -2)
Calculated parameters	SQI/SQI L, SQI R; EMG/EMG L, EMG R; SR/SR L, SR R; SEF/SEF L, SEF R; TP/TP L, TP R; BC/BC L, BC R; sBIS L, sBIS R; sEMG L, sEMG R; ASYM

NMT Module

Stimulation output	
Pulse width:	100, 200, or 300 μ s;
Stimulation current range:	0 to 60 mA in increments of 5 mA
Maximum skin resistance:	3 k Ω @ 60 mA, 5 k Ω @ 40 mA
Block recovery	OFF, 1, 2, 3, 4, 5 %, 10 %, 20 %, 30 %, 40 %, 50 %, 60 %, 70 %, 80 %, 90 %, 100 %
TOF (Train of Four) mode	
TOF-Ratio (response percentage):	5 % to 160 %
TOF-Count (number of responses):	0 to 4
TOF-T1% (response to the first stimulus as percentage of the reference value):	0 % to 200 %
ST (Single Twitch) mode	
ST-Ratio (response percentage):	0 % to 200 %
DBS (Double-Burst Stimulation) 3.2/3.3 mode	
DBS-Ratio (response percentage):	5 % to 160 %
DBS-Count (number of responses):	0 to 2
PTC (Post-Tetanic Count) mode	
PTC-Count (number of responses):	0 to 20

Anesthesia Function

Agent Consumption Calculation

Usage speed range	HAL, ISO: 0 mL/h ~ 250 mL/h SEV: 0 mL/h ~ 450 mL/h DES: 0 mL/h ~ 900 mL/h
Accuracy	$\pm$ 2 mL/h, or $\pm$ 15% of the reading, whichever is larger
Total usage range	0 to 3000 ml
Accuracy	$\pm$ 2 mL, or $\pm$ 15% of the reading, whichever is larger

Anesthetic Prediction

Patient type	Height: 150 to 200 cm Weight: 40 to 140 kg Age: 18 to 90 years old
Anesthetic agents	Desflurane, Isoflurane, Sevoflurane and Halothane
Prediction trend and waveform	Dynamic short trend waveforms of FiAA, EtAA, FiO ₂ and EtO ₂ in the last 10 min and prediction trend waveforms of FiAA, EtAA, FiO ₂ and EtO ₂ in the next 20 min.
Prediction deviation	EtAA=0: less than volume fraction of 0.05 % EtAA $\neq$ 0: - 20 % to 30 % of the measured EtAA, or - 5 % to 7.5 % of the vaporizer maximum setting, whichever is greater EtO ₂ : - 10 % to 15 % of the measured EtO ₂ , or volume fraction of - 5 % to 7.5 %, whichever is greater

AnaeSight™

Remote operation of the Infusion Pump/Syringe Pump eMAC™	Indication of the combined drug effect of the following drugs
Anesthetic agents	Sevoflurane, Desflurane, Isoflurane
Intravenous drugs	Propofol, Remifentanyl, Alfentanil, Sufentanil
Patient type	Height: 150 to 200 cm Weight: 40 to 140 kg Age: 18 to 90 years old

Electrical Specifications

Main Electrical Power

Power input	220-240 V~, 50/60 Hz, 8A max 100-240 V~, 50/60 Hz, 8A max 100-120 V~, 50/60 Hz, 8A max
Power consumption	OFF mode: <8W Standby mode: <65W Active mode: <80W (under typical condition) Maximum: <120W
Power cord	5 m (length)
Battery Power	
Battery type	Li-ion, 14.4 VDC, 6.6Ah per battery
Run-time	One new battery: minimum 90 minutes under typical operating conditions Two new batteries: minimum 180 minutes under typical operating conditions
Battery charge time	$\leq$ 8 hours
Time to shut down from the first Lower Battery Alarm	5 minutes minimum (new fully-charged battery)
Safety feature	in case of electricity and battery failure, manual ventilation, gas delivery and agent delivery are possible

Auxiliary Electrical Outlets

Number of outlets	3 or 4
Output current	3 A max. for each outlet, 5 A max. for total

Communication Port

Communication port	RS-232 compatible serial interface
LAN port	RJ-45 network port
USB port	2 USB ports
Video signal port	HDMI port

Environmental Specifications

Operating

Temperature	10 to 40°C
Relative humidity	15 to 95% (noncondensing)
Barometric	70 to 106.7 kPa

Storage

Temperature	-20 to 60°C for main unit, -20 to 50°C for O ₂ sensor
Relative humidity	10 to 95% (noncondensing)
Barometric	50 to 106.7 kPa

Resistance to Ingress of Fluids

Complies with the requirements of clause 11.6.3 in IEC 60601-1 and also the requirements in IEC 60529 for protection against vertically falling water drops equipment (IPX1)

Not all features are for sale in all countries.

Please contact your local Mindray sales representative for the most current information.

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V60 Anesthetic Vaporizer

Operator's Manual

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- the product is used in accordance with the instructions for use.



WARNING

- **This Anesthetic Vaporizer must be operated by skilled/trained clinical professionals.**
 - **It is important for the hospital or organization that uses this equipment perform a reasonable service/maintenance plan. Neglecting this may result in machine breakdown or personal injury.**
-

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Customer Service Department

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

EC-Representative:	Shanghai International Holding Corp. GmbH (Europe)
Address:	Eiffestraße 80, 20537 Hamburg, GERMANY
Tel:	0049-40-2513175
Fax:	0049-40-255726

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FOR YOUR NOTES

1 Safety

1.1 Safety Information

WARNING

- Indicates a potential hazard or unsafe practice that, if not avoided, could result in death or serious injury.
-

CAUTION

- Indicates a potential hazard or unsafe practice that, if not avoided, could result in minor personal injury or product/property damage.
-

NOTE

- Provides application tips or other useful information to ensure that you get the most from your product.
-

1.1.1 Warnings

WARNING

- Do not operate the Anesthetic Vaporizer before reading this manual.
 - The user of the Anesthetic Vaporizer must fully understand and strictly follow the instructions for use.
 - Before putting the system into operation, the user must verify that the Anesthetic Vaporizer is in correct working order and operating condition.
 - Do not use the Anesthetic Vaporizer in the environment outside the specified temperature and pressure ranges.
 - To avoid explosion hazard, do not use the Anesthetic Vaporizer in the presence of flammable anesthetic agent, vapors or liquids.
 - Dispose of the package material, observing the applicable waste control regulations and keep them out of children's reach.
 - To avoid explosion hazard, use only specified non-combustible anesthetic agent in compliance with the requirement of ISO80601-2-13.
 - Any unauthorized organization or untrained person must not change or disassemble the Anesthetic Vaporizer.
 - This Anesthetic Vaporizer may not be modified without the manufacturer's permission.
 - The medical device must be inspected and serviced regularly by service personnel.
 - Before use, check that the shipping package is intact.
 - The Anesthetic Vaporizer shall not be serviced or maintained while in use with a patient.
 - Do not use the Anesthetic Vaporizer when there is an anesthetic agent leak..
 - The vaporizer is designed for use only with the specific anesthetic agent named on the filler block (and further indicated by labels of different colors). Do not use the vaporizer if the vaporizer is filled with any agent other than the agent specified on the front label.
 - This Anesthetic Vaporizer is not suitable for use in an MRI environment.
-

1.1.2 Cautions

CAUTION

- Use only accessories specified in this manual.
 - At the end of its service life, the Anesthetic Vaporizer, as well as its accessories, must be disposed of in compliance with the guidelines regulating the disposal of such products.
 - The Anesthetic Vaporizer may become unstable if the unit is tilted beyond 10 degrees.
 - Always install or carry the Anesthetic Vaporizer properly to avoid damage caused by drop, impact, strong vibration or other mechanical force. Do not carry by the control dial or the handle for locking lever.
-

1.1.3 Notes

NOTE

- Keep this manual close to the Anesthetic Vaporizer so that it can be obtained conveniently when needed.
 - This manual describes all features and options. Your Anesthetic Vaporizer may not have all of them.
 - This product is latex free.
-

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
	Caution
	MR Unsafe – do not subject to magnetic resonance imaging (MRI)
EAC	Unified circulation mark indicates that products marked them passed all specified in the technical regulations of the Customs Union of the procedure for the assessment (confirmation) of conformity and complies with the requirements applicable to all the products technical regulations of the Customs Union.

2 The Basics

2.1 Product Description

This vaporizer is an unheated, calibrated anaesthetic vaporizer outside the circuit. It is used jointly with the fresh gas delivery system and provides accurate concentration of anaesthetic agent through the control dial.

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 provides the function of temperature, air pressure and flow compensations. 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 ISO80601-2-13.

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 ISO80601-2-13 to minimize atmospheric pollution in the operating room.

WARNING

- **Do not use the Anesthetic Vaporizer in mobile vehicles, aeroplanes, helicopters and ships.**
-

2.2 Intended Use

V60 anesthetic 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.

It is available in Isoflurane, Sevoflurane, Enflurane and Halothane variants.

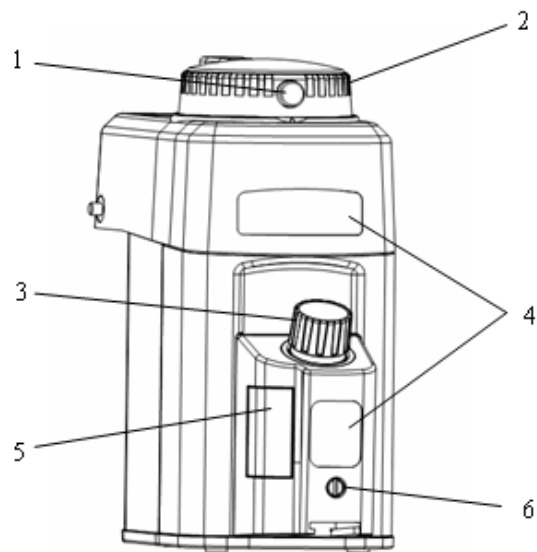
WARNING

- **The Anesthetic Vaporizer is intended to be operated only by licensed clinicians and qualified anesthesia personnel who have received adequate training in its use. Anyone unauthorized or untrained must not perform any operation on the Anesthetic Vaporizer.**
 - **This Anesthetic Vaporizer is not suitable for use in an MRI environment.**
-

2.3 Anesthetic Vaporizer Appearance

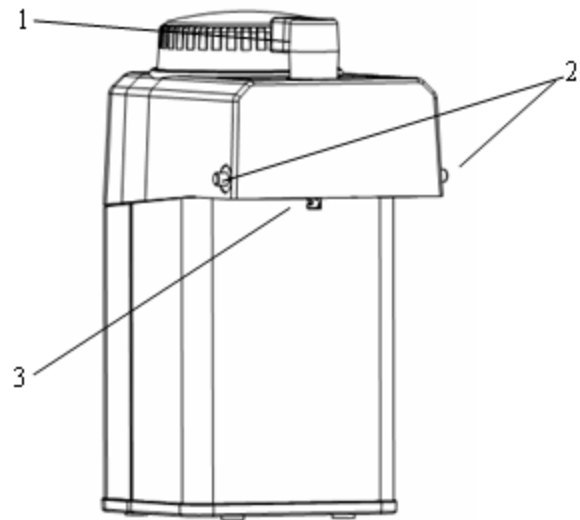
2.3.1 Front View

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



2.3.2 Rear View

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



2.4 Configuration Differences

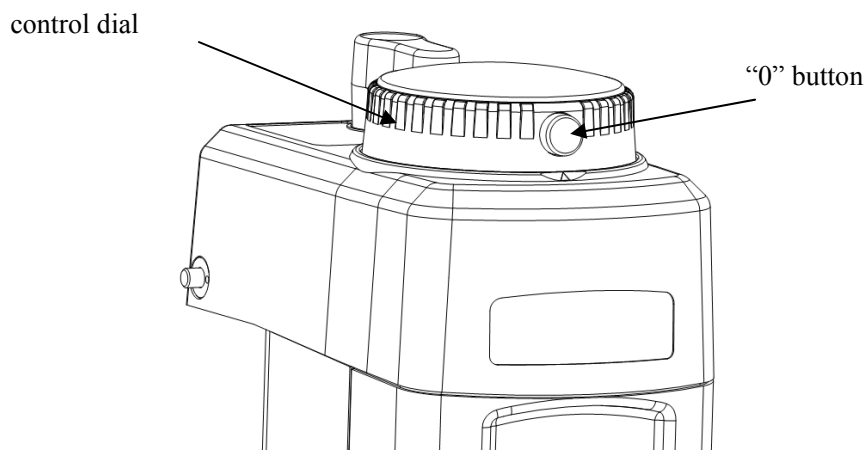
Model	Anesthetic agent	Filling system	Accessory
Sevoflurane Key Filler Vaporizer	Sevoflurane	Key Filler system	Sevoflurane Key Filler filling adapter
Isoflurane Key Filler Vaporizer	Isoflurane	Key Filler system	Isoflurane Key Filler filling adapter
Sevoflurane Quik-Fil Vaporizer	Sevoflurane	Quik-Fil system	Sevoflurane Quik-Fil filling adapter Sevoflurane Quik-Fil drainage funnel
Sevoflurane Pour Fill Vaporizer	Sevoflurane	Pour Fill system	/
Enflurane Key Filler Vaporizer	Enflurane	Key Filler system	/
Enflurane Pour Fill Vaporizer	Enflurane	Pour Fill system	Enflurane Key Filler filling adapter
Halothane Key Filler Vaporizer	Halothane	Key Filler system	/
Halothane Pour Fill Vaporizer	Halothane	Pour Fill system	Halothane Key Filler filling adapter
Sevoflurane Key Filler Vaporizer	Sevoflurane	Key Filler system	/

3 Method of Operation

3.1 Control Dial

The control dial is used to set the output concentration of the anesthetic agent. The control dial is marked with output concentration of the anesthetic agent from the vaporizer. The graduation to which the dial is turned indicates the output concentration.

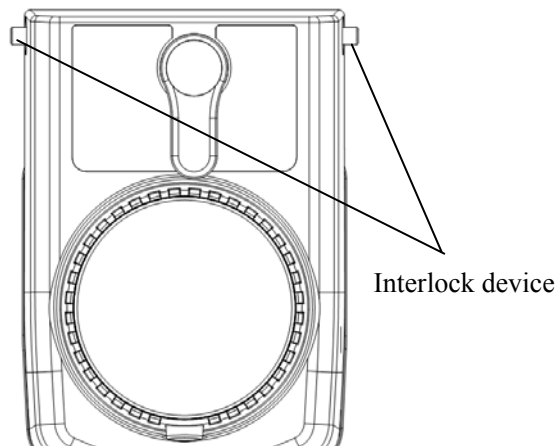
The “0” button on the vaporizer has locking function. Press this button first before turning the control dial.



If the vapour is stored in high temperature and then used, the concentration of the delivered anesthetic agent may be high. To enable pressure equalization, always turn the control dial to 1% after connecting the anesthetic workstation, and wait for at least 15 seconds.

3.2 Connecting and Interlock System

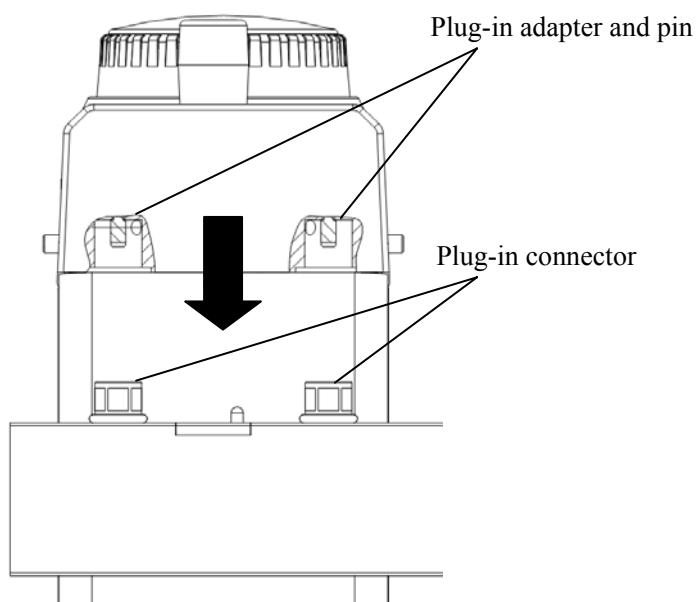
When the anesthetic delivery system is connected to multiple vaporizers, the interlock systems of the vaporizers ensure that only one vaporizer can be switched on at any one time while the others are switched off and blocked.



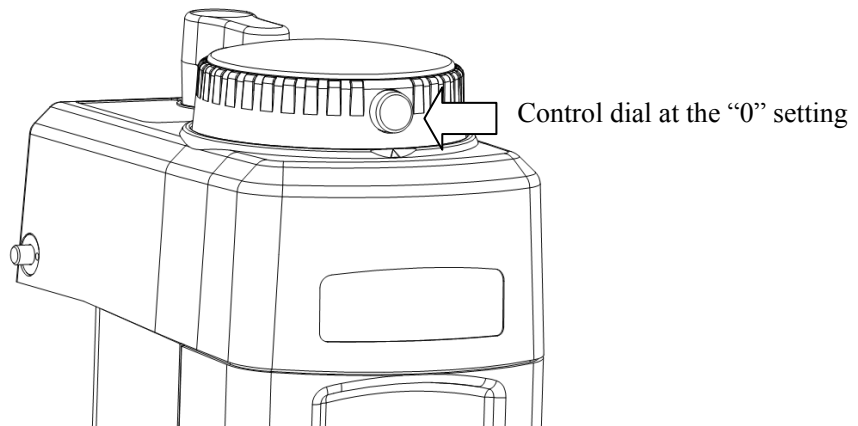
3.2.1 Plug-in Adapter/Plug-in Connector

The vaporizer is applicable to anesthetic delivery systems with plug-in connectors with an Ohmeda Selectatec® compatible manifold system.

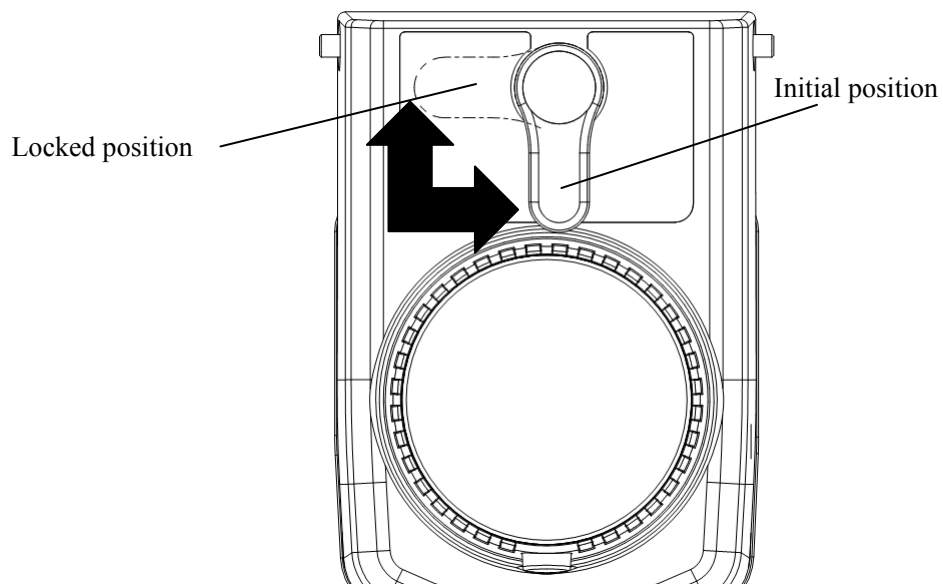
The holes in the plug-in adapter on the vaporizer fit onto the pins on the plug-in connector on the anesthetic delivery system.



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

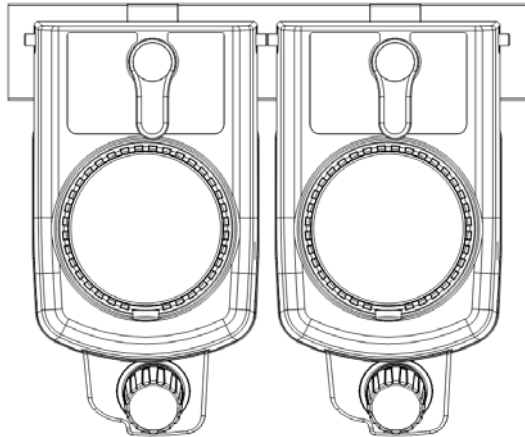


Press the handle for locking lever and turn the handle clockwise for 90° to lock the vaporizer and counter clockwise for 90° to release locking.



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

- Before operation, check if the interlock device is fully functional..
 - A malfunction in the interlock system can endanger the patient by overdosing or mixing anesthetic agents.
-

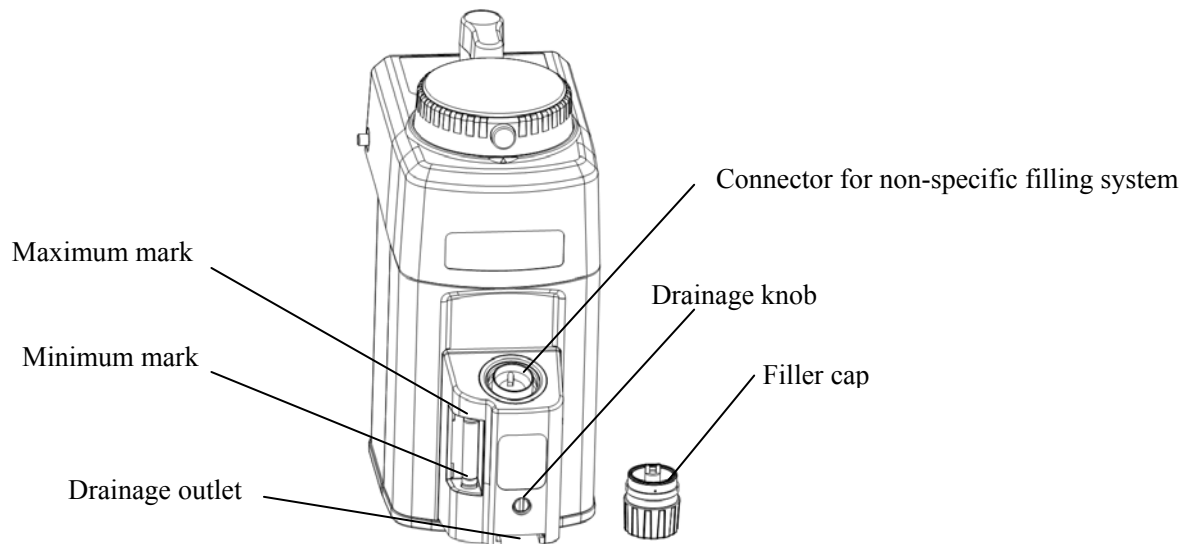
NOTE

- To ensure the normal operation of the vaporizer, connect the vaporizer in the correct flow direction corresponding with the arrows on the Anesthetic Vaporizer.
 - When the anesthetic delivery system has three and more than three groups of plug-in connectors, check if there is an interlock function between nonadjacent connectors. Otherwise, vaporizers are recommended to be connected right next to each other.
-

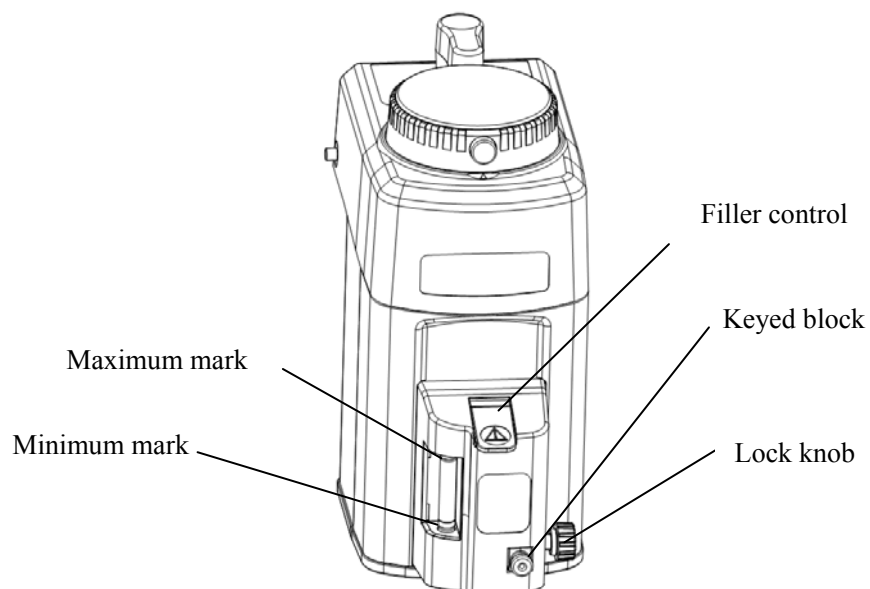
3.3 Filling System

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.

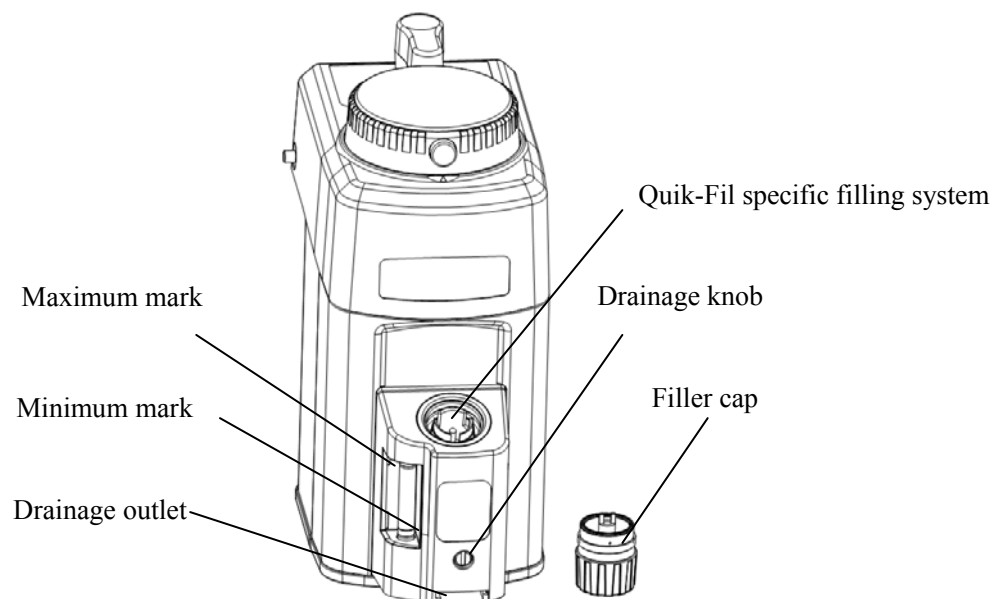
■ Pour Fill system



■ Key Filler system



■ Quik-Fil system



4 Filling and Draining

4.1 Checks before Filling

1. Check the vaporizer for damage.
2. Set the control dial to “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 geometry, 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 Anesthetic Vaporizer may only be used on the anesthetic delivery system after the operating organization has checked all technical specifications of the Vapor and the anesthesia system are met. Any deviations might result in incorrect concentrations being delivered.

4.2 Filling the Vaporizer



WARNING

- Only fill the vaporizer with the anesthetic agent specified on it.



CAUTION

- Take care not to spill anesthetic agent. Inhaling anesthetic agent vapor endangers health.

NOTE

- **Mindray recommends the use of Key Filler or Quik-Fil filling systems to prevent incorrect filling and to reduce the volume of anesthetic agent vapor released during the filling process.**
 - **Ensure adequate ambient ventilation when filling the vaporizer.**
-

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.

Enflurane	Orange
Isoflurane	Purple
Sevoflurane	Yellow
Halothane	Red

From a technical viewpoint, the same anesthetic 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 in combination in the vaporizer and monitored with anesthetic agent monitor.



WARNING

- **Stop using a vaporizer immediately which has been filled or partly filled with the wrong anesthetic agent or other substance to prevent danger to health. If this occurs, mark the vaporizer for incorrect filling and call the distributor for repair.**
 - **Use anesthetic agent monitors in compliance with ISO80601-2-55. Many anesthetic agent monitors do not identify mixtures of anesthetic agents and/or detect that the anesthetic 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 the vaporizer and call the distributor for repair.**
-
-

CAUTION

- Make sure that the drainage knob is closed when filling the vaporizer as anesthetic agent may escape from the drainage outlet if it is not closed.
 - Keep the vaporizer 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.
 - During disconnection of Key Filler and Quik-Fil filling adaptor from the vaporizer and the bottle adaptor from the bottle, small amounts of anesthetic agent will escape to the environment.
-

4.2.1 Pour Fill System

The filling steps of V60 Isoflurane Pour Fill Vaporizer and V60 Sevoflurane Pour Fill Vaporizer are the same.

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 “0” position until the “0” button pops up.



Turn the control dial back to
“0” position

WARNING

- Significant quantities of anesthetic agent vapor may escape if the control dial does not return to “0” position.
-

CAUTION

- It is necessary to wait at least 5 seconds after setting the control dial to the 0 position before opening the vaporizer. This allows the pressure to balance and prevents fresh gas and anesthetic agent vapor from escaping out of the vaporizer.
-

2. Unscrew the filler cap slowly, so that any pressure in the vaporizer can escape slowly.



3. Check if the names of anesthetic agent and color mark on the vaporizer and the anesthetic agent bottle correspond. If the correct agent is being used, unscrew the cap from the anesthetic agent bottle. Pour anesthetic agent slowly into the filler receiver.

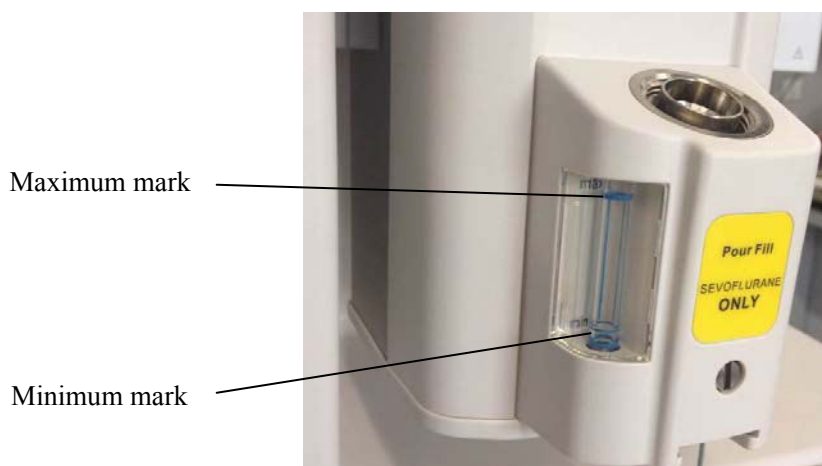


CAUTION

- Take care not to spill anesthetic agent. Inhaling anesthetic agent vapor endangers health.
-

-
4. Check the filling level on the sight glass during filling. The vaporizer must be hanged vertical or stand upright during this check.

During the filling process, the filling level must not exceed the maximum mark, or there is a risk of incorrect output concentration. If the maximum mark has been exceeded, the agent will flow out .Please drain the excess liquid (see 4.3 Draining the Vaporizer) until the level drops below the maximum mark.



5. When the maximum mark is reached, stop pouring agent. If the vaporizer is filled above the maximum mark by a few millimeters, the anesthetic agent will start to overflow through the overflow hole.

CAUTION

- **When the anesthetic vaporizer is overflowed, the anesthetic agent will escape to the environment.**
-

6. Tighten the filler cap clockwise. If this is not done properly, fresh gas and anesthetic agent may escape when the vaporizer is switched on next time.



7. Tighten the cap of the anesthetic agent bottle even if it is completely empty.

WARNING

- When the filling level of the anesthetic agent is outside the maximum or minimum mark, incorrect output concentration may occur.
 - Before use, check the filling level of the anesthetic agent.
-
-

CAUTION

- Anesthetic agent vapor will escape into ambient atmosphere if filling operations are not done properly.
-
-

4.2.2 Key Filler System

The filling steps of V60 Isoflurane Key Filler Vaporizer and V60 Sevoflurane Pour Fill Vaporizer are the same.

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 “0” position until the “0” button pops up.

Turn the control dial back to “0” position



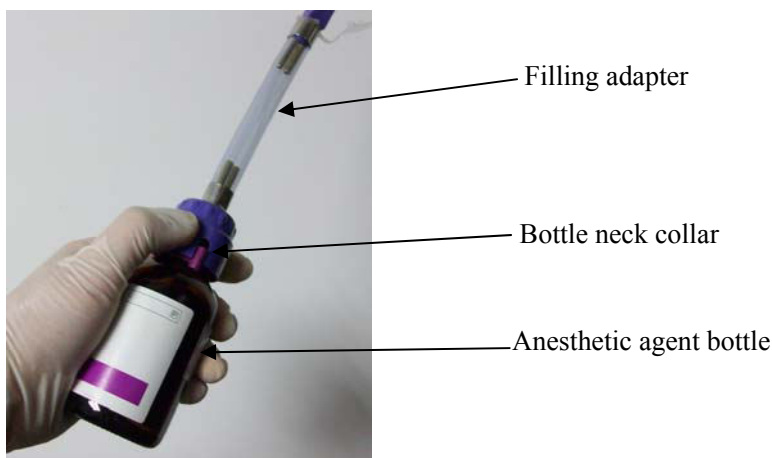
WARNING

- Significant quantities of anesthetic agent vapor may escape if the control dial does not return to “0” position.
-
-

CAUTION

- It is necessary to wait at least 5 seconds after setting the control dial to the 0 position before opening the vaporizer. This allows the pressure to balance and prevents fresh gas and anesthetic agent vapor from escaping from the vaporizer.
-

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 must correspond to the anesthetic agent used.



WARNING

- Do not use a damaged filling adapter or an anesthetic agent bottle without collar. If a bottle without collar is used, specific filling adapter cannot be identified, underlying the risk of filling a wrong anesthetic agent.
-

CAUTION

- If the connection between the filling adapter and anesthetic agent bottle is not leak-tight, anesthetic agent may escape.
-

NOTE

- If a new anesthetic agent bottle is partly empty, there may be a leak.
-

-
3. Turn the lock 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 cannot move.



-
6. Tighten the lock knob clockwise.



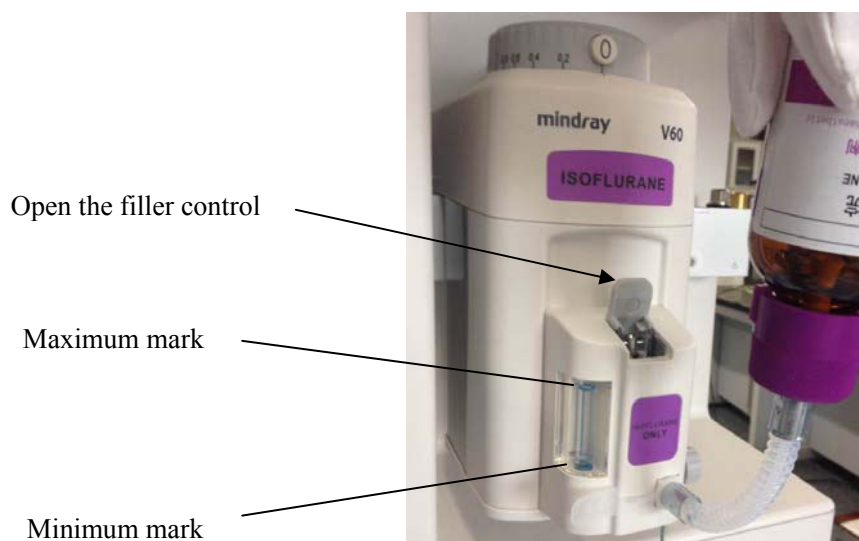
 CAUTION

- If the connection between the filling adapter and filling system is not leak-tight, anesthetic agent may escape.
-

7. Raise the anesthetic agent bottle upside down slowly.



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



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

CAUTION

- **If the connection between the filling adapter and anesthetic agent bottle or that between the filling adapter and filling system is not leak-tight, anesthetic agent may continue to flow into the vaporizer.**
-

10. Close the filler control.
11. Put down the anesthetic agent bottle slowly.
12. Unscrew the lock 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 lock knob.
16. Unscrew the filling adapter.
17. Tighten the cap of the anesthetic agent bottle even if it is completely empty.

CAUTION

- **If the connection between the keyed block and filling system is not leak-tight, anesthetic agent may escape, endangering health.**
-

NOTE

- Anesthetic agent bottle must not be stored with filling adapter connected, otherwise anesthetic agent will escape.
 - During disconnection of the male adaptor from the vaporizer and the bottle adaptor from the bottle, small amounts of anesthetic agent will escape to the environment.
-

4.2.3 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 “0” position until the “0” button pops up.



WARNING

- Significant quantities of anesthetic agent vapor may escape if the control dial does not return to “0” position.
-



CAUTION

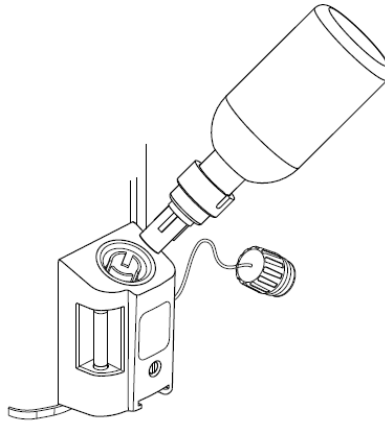
- It is necessary to wait at least 5 seconds after setting the control dial to the 0 position before opening the vaporizer. This allows the pressure to balance and prevents fresh gas and anesthetic agent vapor from escaping from the vaporizer.
-
2. Select the correct filling adapter and anesthetic agent bottle. Remove cap from the anesthetic agent bottle, checking that the bottle and filler mechanism are not damaged. Screw the Quik-Fil adapter firmly into the anesthetic agent bottle.
 3. Remove the cap from the anesthetic agent bottle, checking that the bottle and filler mechanism are not damaged.
 4. Screw the Quik-Fil adapter firmly into the anesthetic agent bottle.
-



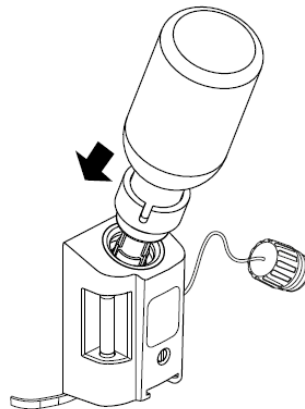
CAUTION

- If the connection between the filling adapter and anesthetic agent bottle is not leak-tight, anesthetic agent may escape.
 - Agent-specific filling cannot be assured when bottles without collars used.
-

-
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. Press the bottle until the liquid begins to flow into the vaporizer.



⚠ CAUTION

- **If the connection between the filling adapter and anesthetic agent bottle is not leak-tight, anesthetic agent may escape.**

-
7. Check the filling level in sight glass during filling. When the maximum mark is reached, stop pressing the bottle. And pull out the bottle slowly. If the vaporizer is filled above the maximum mark by a few millimeters, the anesthetic agent will start to overflow through the overflow hole.

-
8. Check that the sealing ring on the filler cap is not damaged, and screw the filler cap.

CAUTION

- **Tighten the filler cap. Failure to do so may cause fresh gas and anesthetic agent to escape when the vaporizer is switched on next time.**
-

9. Unscrew the filling adapter.
10. Tighten the cap of the anesthetic agent bottle even if it is completely empty.

4.3 Draining the Vaporizer

WARNING

- **Anesthetic agent which has been drained off must be handled, stored or disposed of as medicament. If this is not done, there will be a risk of administering incorrect anesthetic agents.**
-

CAUTION

- **Take care not to spill anesthetic agent. Do not inhale anesthetic agent vapor which endangers health.**
-

NOTE

- **Do not drain liquid anesthetic agent into an open container or significant quantities of anesthetic agent vapor will escape.**
 - **Do not reuse the anesthetic agent drained from the vaporizer.**
-

4.3.1 Pour Fill System

The draining steps of V60 Isoflurane Pour Fill Vaporizer and V60 Sevoflurane Pour Fill Vaporizer are the same.

Place the vaporizer upright or suspend so that all the anesthetic agent can drain out.

1. Turn the control dial clockwise back to “0” position until the “0” button pops up.
2. Hold the correct bottle for the anesthetic agent being drained below the drainage outlet at the bottom of the vaporizer.



3. Unscrew the filler cap counter clockwise slowly.



-
4. Rotate the drainage knob counter clockwise for three to four turns. Drain until no more anesthetic agent can be seen in the sight glass and no more anesthetic agent runs into the bottle. If necessary, close the drainage knob quickly and continue the drainage process with a new bottle. If the anesthetic agent has to be removed from the wick, see **4.4 Blowing off the Vaporizer**.



NOTE

-
- **Do not fill the bottle to the very top. This can lead to escape of anesthetic agent.**
-

5. When the vaporizer has been completely drained, close the drainage knob clockwise.
6. Tighten the cap of the anesthetic agent bottle even if it is completely empty.
7. Tighten the filler cap.



WARNING

-
- **Tighten the filler cap and drainage knob after draining the vaporizer is completed. Failure to do so may cause anesthetic agent to escape.**
-

4.3.2 Key Filler System

The draining steps of V60 Isoflurane Key Filler Vaporizer and V60 Sevoflurane Pour Fill Vaporizer are the same.

Place the vaporizer upright or suspend so that all the anesthetic agent can drain out.

1. Turn the control dial clockwise back to “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 the connection between the filling adapter and anesthetic agent bottle is not leak-tight, anesthetic agent may escape, endangering health.**
-

5. Turn the lock knob counter clockwise.



-
6. Remove the keyed block.



7. Push the keyed end of the filling adapter into the opening of the filling system until it cannot move.



8. Tighten the lock knob clockwise.



 CAUTION

- If the connection between the filling adapter and filling system is not leak-tight, anesthetic agent may escape.

-
9. Keep the anesthetic agent bottle below the vaporizer. Open the filler control to drain until no more anesthetic agent can be seen in the sight glass and no more anesthetic agent runs into the bottle. If anesthetic agent bottle should 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 lock 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 lock knob.
15. Unscrew the filling adapter.
16. Tighten the cap of the anesthetic agent bottle even if it is completely empty.

WARNING

- **Close the filler control and tighten the lock knob after draining the vaporizer is completed. Failure to do so may cause anesthetic agent to escape.**

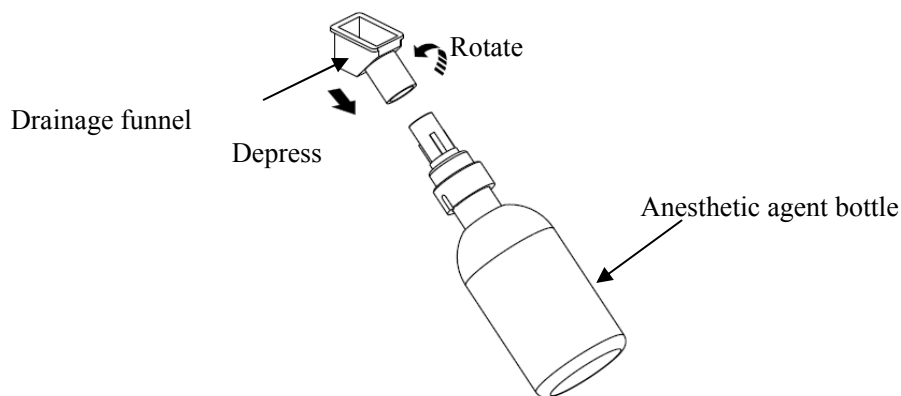
NOTE

- **Anesthetic agent bottle must not be stored with filling adapter connected, or anesthetic agent will escape.**
 - **During disconnection of the male adaptor from the vaporizer and the bottle adaptor from the bottle, small amounts of anesthetic agent will escape to the environment.**
-

4.3.3 Quik-Fil System

Place the vaporizer upright or suspend so that all the anesthetic agent can drain out.

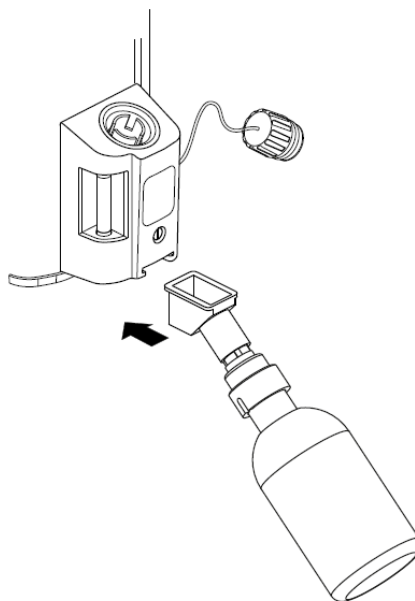
1. Turn the control dial clockwise back to “0” position until the “0” button pops up.
2. Remove the cap from an empty Sevoflurane anesthetic agent bottle. Screw the Quik-Fil adapter firmly into the anesthetic agent bottle. Insert the drainage funnel. Depress the drainage funnel and rotate the bottle simultaneously until it cannot move.



CAUTION

- **If the connection between the filling adapter and anesthetic agent bottle is not leak-tight, anesthetic agent may escape, endangering health.**
-

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

-
- **Do not fill the bottle to the very top. This can lead to escape of anesthetic agent.**
-

5. Rotate the drainage knob counter clockwise for three to four turns by the filler cap or the key of drainage funnel. Drain until no more anesthetic agent can be seen in the sight glass and no more anesthetic agent runs into the bottle. If necessary, close the drainage knob in good time and continue the drainage process with a new bottle.
6. Close the drainage knob clockwise.
7. Tighten the filler cap.
8. If the anesthetic agent has also to be removed from the wick, see *4.4 Blowing off the Vaporizer*.



WARNING

-
- **Tighten the filler cap and drainage knob after draining the vaporizer is completed. Failure to do so may cause anesthetic agent to escape when the vaporizer is switched on next time.**
-

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 has also to be removed from the wick after draining, set the control dial to 5% and flush for 5 hours at 5 L/min Air or for 2 hours at 10 L/min Air to allow gas to flow into the waste gas scavenging system.

5 Checks before Use

5.1 Checklist—checks before each use

Use the vaporizer within the specified operating range.

WARNING

- Under no circumstances should the vaporizer ever be used at atmospheric pressure and temperature at which the anesthetic agent could start to boil, as the concentration delivered will rise and be uncontrolled. For more information, see 11.3 Influence of Temperature.
 - This Anesthetic Vaporizer is not suitable for use in an MRI environment.
-

Prepare the anesthetic delivery system in accordance with Instructions for Use and connect the waste gas scavenging system. Switch on the anesthetic agent monitor. Set the correct anesthetic agent and alarm limits. Switch on the oxygen and CO₂ monitor and set the alarm limits.

WARNING

- The Anesthetic Vaporizer may become unstable if the unit is tilted beyond 10 degrees.
 - If a vaporizer is operated at an angle of more than 30° (fixed position), uncontrolled concentrations may occur. 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 the vaporizer is used at an angle. This may lead to overfilling.
-

NOTE

- We recommend using monitors which can differentiate between different anesthetic agents for continuous monitoring to prevent deviations in concentration, leaks or incorrect filling from injuring the patient.
 - When using Low Flow and Minimal Flow, the concentration of the anesthetic agent may deviate significantly from the vaporizer setting. For this reason, measurement of inspiratory and/or expiratory anesthetic agent concentration is essential.
 - We recommend monitoring oxygen concentration continuously and setting at least a low alarm limit to detect insufficient oxygen supply.
-

5.2 Setting Checks

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

Pour Fill/Quik-Fil: Put the filler cap in place and tighten it securely. Tighten the drainage knob securely.

Key Filler: Close the filler control and tighten the lock knob securely.
3. Connector system:

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

Handle for locking lever: Swing the handle for locking lever counter clockwise. Check if the vaporizer is secure and is hanging vertical on the machine, when viewed from front and side.

Other connectors: The vaporizer is connected firmly and securely on the anesthetic delivery system.

CAUTION

- Check as per the above items. If these are not done, fresh gas and anesthetic agent vapor may escape endangering health.
-
4. If several vaporizers are connected at a time, check that the interlock systems on the vaporizers and anesthetic delivery system are of same type.

Check the interlock system of each vaporizer as follows:

 - 1) Switch off fresh gas.

-
- 2) Set one vaporizer to any concentration.
 - 3) Turn the control dials of other vaporizers. All other vaporizers must be switched off and impossible to switch on.
 - 4) Switch off the vaporizer. Set the control dial to “0” position.

 WARNING

- **When the anesthetic delivery system has three and more than three groups of plug-in connectors, check if there is an interlock function between nonadjacent connectors. Otherwise, vaporizers are recommended to be connected right next to each other.**
 - **Check as per the above items. If these are not done, an incorrect concentration may be displayed.**
 - **Interlock device malfunction may cause several vaporizers to be switched on simultaneously which endangers the patient by resulting in overdosing or a mixture of anesthetic agents.**
-

6. Check 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

- **Do not operate the vaporizer until all checks have been carried out and the results meet the requirements.**
 - **All repairs must be carried out by qualified service personnel.**
-

FOR YOUR NOTES

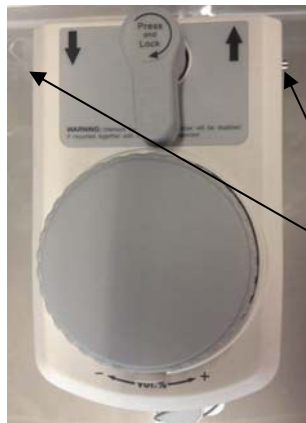
6 Basic Operations

CAUTION

- Handle the vaporizer with care. Be careful not to tilt or drop.
 - Stop using the vaporizer immediately if it has been tilted or dropped.
 - Do not carry by the control dial or locking lever handle.
 - Before operation, check that the locking lever is capable of locking the vaporizer securely onto the manifold.
 - Only use Anesthetic Vaporizer with anesthetic delivery systems that are suitable according to ISO80601-2-13.
 - If the Anesthetic Vaporizer is connected to anesthetic delivery systems from other manufacturers, it is the responsibility of the operator to ensure that all technical specifications of the Anesthetic Vaporizer and the anesthetic delivery systems are met.
-

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.



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 hanging on another vaporizer.
4. Set the control dial to "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 for 90° clockwise. The vaporizer is then secured and cannot be removed.



Locking lever in locked position



7. Connect two or more than two vaporizers on the anesthetic delivery system:
- If the anesthetic delivery system has two groups of plug-in connectors, the interlock pins of the two connected vaporizers must be contact directly.

Direct contact



-
- When the anesthetic delivery system has three and more than three groups of plug-in connectors, check if there is an interlock function between nonadjacent connectors. Otherwise, vaporizers are recommended to be connected right next to each other.
-

WARNING

- The plug-in adapter must be level and stable on the sealing rings. Otherwise, there may be a loss of fresh gas, leaks, excessively low output concentrations or the interlock device may jam. To solve this problem, disconnect the vaporizer first (see 6.4 Disconnecting the Vaporizer) and check the positions of locking lever and vaporizer manifold of the anesthetic delivery system. Then re-connect the vaporizer.
-

NOTE

- Take care when lowering the Vaporizer onto the plug-in connector
-

6.2 Adjusting the Concentration of Anesthetic Agent

WARNING

- Before operation, check that the control dial turns normally.
 - Do not use the vaporizer tilted for an angle of more than 30°(fixed position). Risk of incorrect output concentration or escape of anesthetic agent may result otherwise.
-

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 the concentration cannot be set, do not force the control dial. Check that all other vaporizers connected are in “0” position and that the interlock device is operational.
 - Stop use of the vaporizer if the control dial gets loose or falls off.
-

During use, check the filling level in the sight glass regularly. 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 can be incorrect. When the minimum mark is reached, fill the vaporizer (see *4.2 Filling the Vaporizer*).

1. If the anesthetic agent monitor shows implausible values, check the vaporizer for incorrect filling and check the monitor for incorrect setting.

NOTE

- During prolonged operation with both a high flow of fresh gas and a high concentration, the concentration administered may decrease. See *11.8 Influence of Running Time*.
-

CAUTION

- Jerky movements or tilting at an angle of more than 30° can cause incorrect output concentration.
 - Equip with anesthetic gas scavenging system which complies with ISO80601-2-13 to purify the air of the operating room.
-

2. If it is necessary to change to another vaporizer:
 - (1) Set the vaporizer being used to “0”.
 - (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 vaporizer must never be left switched on without fresh gas flow. Otherwise anesthetic agent vapor at a high concentration can get into the machine circuit and ambient air and harm people and materials.**
-
3. If the vaporizer is not going to be used for up to six months, then the anesthetic agent inside the vaporizer should be drained.
 4. If the vaporizer remains on the anesthetic delivery system:
 - (1) The locking lever on the plug-in adapter should remain locked on.
 - (2) Keep within the permissible temperature and humidity range.
 - (3) Observe use-by date of the anesthetic agent.
 5. If the vaporizer has to be removed from the anesthetic delivery system, see **6.4 Disconnecting the Vaporizer** and **6.5 Moving when Filled**.

6.4 Disconnecting the Vaporizer

CAUTION

- **Take care not to drop the vaporizer. Do not use the vaporizer if it has been dropped. Damage may cause incorrect output concentration. Do not carry by the control dial or locking lever handle to avoid the risk of injury.**
 - **Disconnect the vaporizer only when the control dial is set to “0” to avoid the risk of incorrect output concentration and of anesthetic agent escaping.**
 - **Place vaporizers only on firm even surfaces or hang on stable brackets.**
-

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

NOTE

- **If there are no valves on the anesthesia machine plug-in connectors, fresh gas and anesthetic agent vapor may escape when the vaporizer is removed.**
-

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

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

- **When tilted at an angle of more than 30° :**
The anesthetic agent may overflow when the control dial is set at “0”, endangering health.
When the control dial is set above “0”, the anesthetic agent may leak and get into the flow control system and cause excessively high or low concentrations when the vaporizer is used next time.
-
-

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

FOR YOUR NOTES

7 Cleaning and Disinfecting

WARNING

- Obey applicable safety precautions.
 - Read the material safety data sheet for each cleaning agent.
 - Read the operation and service manual before disinfecting the Anesthetic Vaporizer.
 - Wear gloves and safety glasses.
-

NOTE

- To help prevent damage, refer to the manufacturer's data if you have questions about a cleaning agent.
 - Do not permit liquid to go into the Anesthetic Vaporizer housings.
-

7.1 Cleaning

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

WARNING

- Do not immerse the Anesthetic Vaporizer or the filling adapter in detergents.
 - The detergent must not be allowed to get under the control dial.
 - Do not allow the detergent to get into the gas inlet, gas outlet, or filling system.
-

CAUTION

- If liquids other than the anesthetic agents specified for the vaporizer get into the vaporizer, the patient may be injured.
-

7.2 Disinfecting

Use surface disinfectants for disinfection.

- ◆ 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

- **Do not sterilize the vaporizer and accessories. Damage inside may cause incorrect output concentration.**
-
-

8 User Maintenance

8.1 Repair Policy

WARNING

- **Do not modify or disassemble the vaporizer. Any change of the vaporizer may cause incorrect output concentration.**
-

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

- **All repairs must be carried out by qualified service personnel.**
 - **Replace damaged parts with components manufactured or sold by Mindray. After repair, test the unit to make sure that it complies with the manufacturer's published specifications.**
 - **Contact Mindray for service assistance.**
-

8.2 Maintenance Schedule

Test after care and service of the anesthetic delivery system or vaporizer, after prolonged shutdown and at least every six months.

Minimum frequency	Maintenance
Daily	The control dial can be turned to “0” position. After the “0” button is pressed, the control dial can be turned counter clockwise, close to the highest concentration mark.
Weekly	Clean the external surfaces. Check the concentration weekly when continuous monitoring is not available (see section 8.3 Checking the Concentration).
Biweekly	The vaporizer has no damage or loose parts.
During filling and draining	Check the filling system. See section 8.4 Checking the Filling System .
During cleaning and installation	Check the anesthesia machine plug-in connectors. See section 8.5 Checking the Plug-in Adapter . The gas inlet and outlet are not soiled.
Semiyearly and after service	All-round checks of 8 User Maintenance should be performed by trained service personnel.

CAUTION

- Do not pour water or any cleaning solutions into the vaporizer.
-

8.3 Checking the Concentration

Check the vaporizer output concentration weekly when continuous monitoring 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.
 - (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 O₂ 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.

O₂ check: reduce the measured values as follows:

Measured value vol%	Correction
<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:

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

3. Determine the accuracy range.

Range of concentration accuracy (maximum value always applies)		
Operating environment	15 to 35°C or 0.2 to 10 L/min	10 to 15°C or 35 to 40°C or 10 to 15 L/min
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 the corrected measured value is not within the permissible range of output concentration, do not use the vaporizer. Have the vaporizer checked by trained service personnel.
-

5. After test

- (1) Switch off the vaporizer. Set the control dial to “0” position.
- (2) Switch off Air or O₂ flow on the anesthesia machine.

8.4 Checking the Filling System

Verify the following:

■ Pour Fill system

1. The sealing ring for filler cap is in good condition.
2. The filling opening is clean.
3. The sight glass shows normal liquid level.

■ 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. When the Handle for locking lever is turned to locking position, turns back automatically.
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. Sealing areas are undamaged.
6. Manufacturer’s plate on the back of the vaporizer is present and secure.

9 Troubleshooting

9.1 Operation Related Faults and Remedies

Fault	Cause	Remedy
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 4.3 Draining the Vaporizer and 4.4 Blowing off the Vaporizer . Then check the concentration. See section 8.3 Checking the Concentration .
	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 them 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 flow and concentration high over a prolonged period.	Allow the vaporizer to reach normal temperature, allowing at least 15 min per °C deviation from the specified range. See section 11.3 Influence of Temperature . 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 11.5 Influence of Gas Composition .
	The monitor displays volume percentage, not partial pressure.	Convert the measured value to partial pressure. See section 8.3 Checking the Concentration .
	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.
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.
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

Fault	Cause	Remedy
Anesthetic agent leaks from the drainage outlet.	The drainage knob is not closed.	Close the drainage knob.
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.
Anesthetic 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

Fault	Cause	Remedy
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 “0”. 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 *A Product Specifications*. 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

- When the anesthetic vaporizer is not in use for a long period of time, use the plug to block the gas inlet and outlet.
 - If the anesthetic vaporizer is stored in high temperature and then used, the concentration of the delivered anesthetic agent may be high. To enable pressure equalization, always turn the control dial to 1% after connecting the anesthetic workstation, and wait for at least 15 seconds.
-

10.2 Transport

1. Turn the control dial to “0”
2. Disconnect the vaporizer from the anesthetic delivery system.
3. Drain the vaporizer completely. Then clean and disinfect the vaporizer.
4. 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

- **Do not transport the vaporizer with anesthetic agent filled, or it may cause incorrect output concentration.**

NOTE

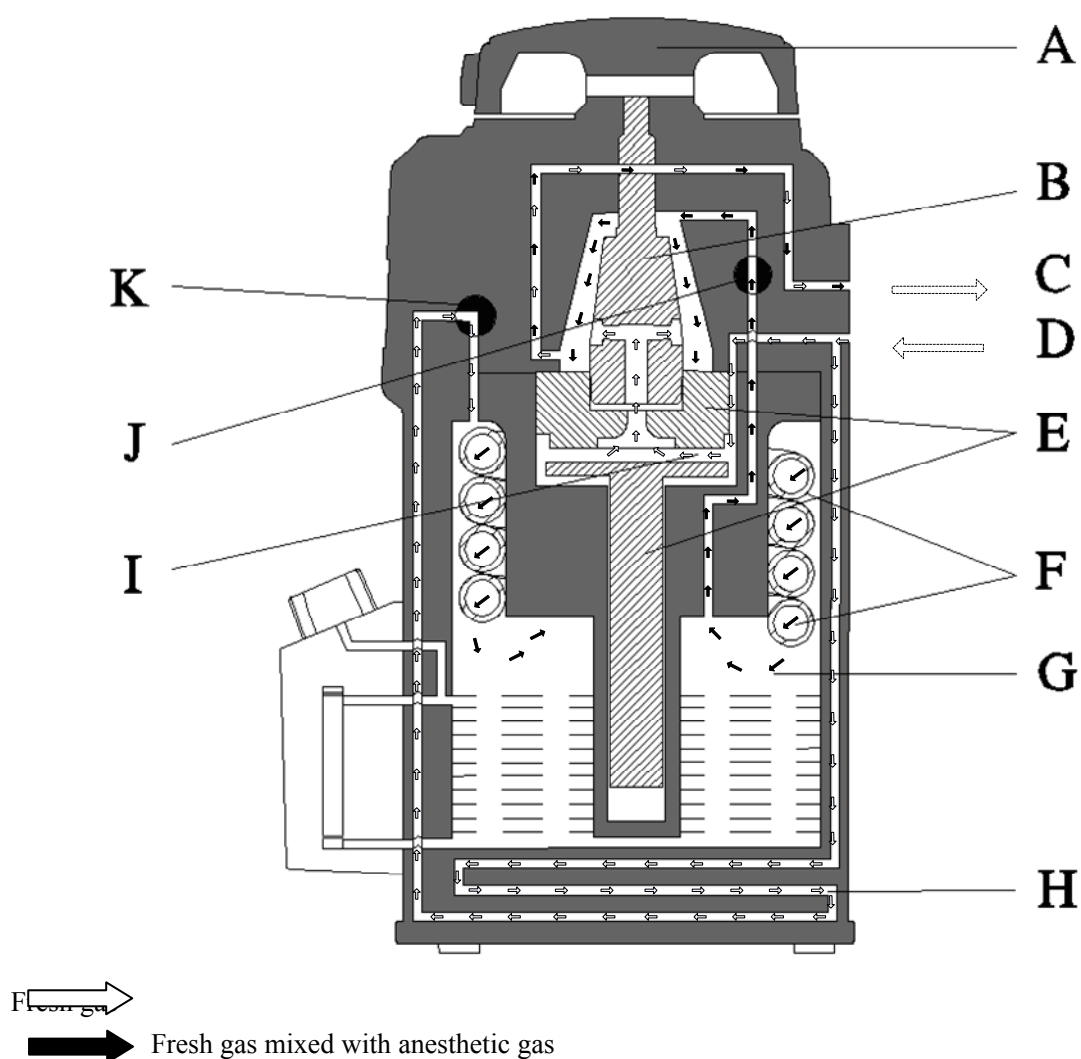
- **Liquid anesthetic agents and filled vaporizers are subject to Hazardous Goods Regulations. These regulations do not apply to the residues of anesthetic agents left in the wick after draining.**
-

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:



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

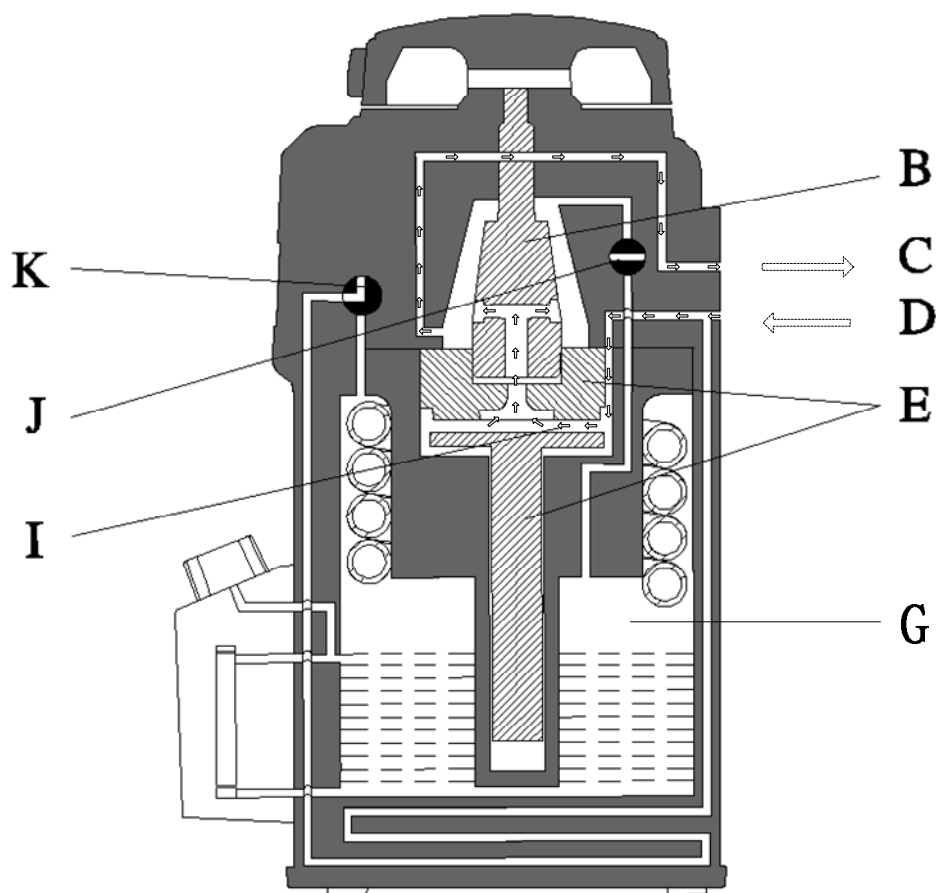
Fresh gas enters by the inlet D. Some of the fresh gas is routed through the vaporizing chamber G, and charged with anesthetic agent in soaked wick F. The rest of the fresh gas is routed past the airway I and through the temperature compensator E.

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 saturation 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 anesthetic-agent can escape from the vaporizing chamber G.

11.2 Calibration

Every vaporizer is individually set at 22°C and at a continuous air flow of 2 L/min without ventilation pressure, and tested at 22°C as well as 2 L/min.

Calibration is in % partial pressure as the depth of anesthesia depends on the patient's uptake which is itself determined by partial pressure. Concentration delivered in % partial pressure at normal pressure of 101.3 kPa is identical numerically with the output given in volume percent, so the scale values on the control dial of the vaporizer given in vol.%, shows the concentration delivered at 22°C with dry gases (see *A Product Specifications*).

The output in vol.% must be corrected for other atmospheric pressure values (see *11.6 Influence of Atmospheric Pressure*) but partial pressure always remains constant.

For simplicity, settings on the vaporizer and in the Operator's Manual are given in the abbreviated form of vol.%, which means vol.% at 101.3 kPa.

11.3 Influence of Temperature

The saturation concentration of the anesthetic agent rises as temperature rises. The concentration deviation is automatically compensated by routing a higher proportion of the gas flow through the vaporizer bypass system.

The linear change of the bypass valve changes the flow through the bypass in a non linear manner. For the full temperature range, the non linear manner does not match perfectly the non linear variation of the partial pressure, so that the vaporizer cannot fully compensate the concentration deviation resulting from changes in temperature and the concentration delivered remains slightly dependent on temperature.

WARNING

- **Under no circumstances should the vaporizer ever be used at atmospheric pressure and temperature at which the anesthetic agent could start to boil, as the concentration delivered will rise and be uncontrolled.**
-

As altitude increases, the boiling point falls.

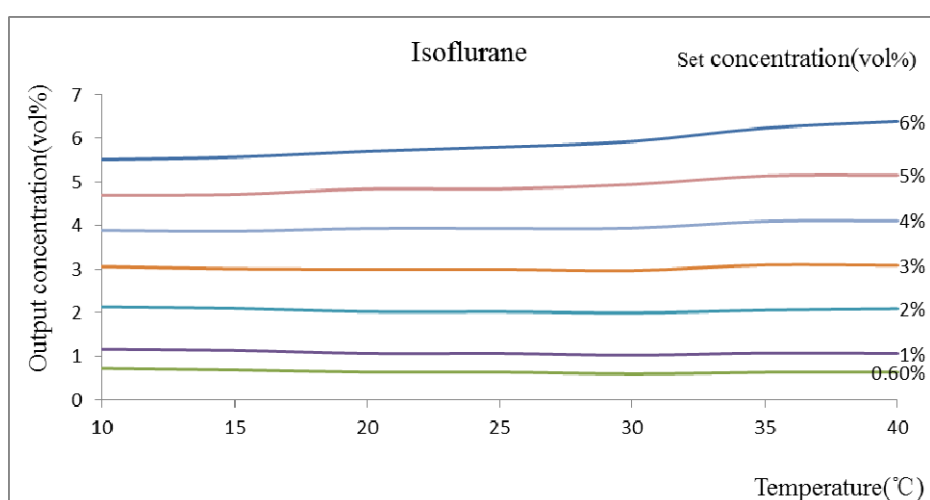
Atmospheric pressure/altitude	101.3 kPa 0 m	90 kPa 1000 m(≈3280 ft)	80 kPa 2000 m(≈ 6560 ft)	70 kPa 3000 m(≈9840 ft)
Isoflurane	48.5°C	45.4°C	*42.2°C	*38.9°C
Sevoflurane	58.6°C	53.4°C	52.1°C	48.7°C
Enflurane	56.5°C	53.4°C	50.3°C	46.8°C
Halothane	50.2°C	46.8°C	*43.4°C	*39.8°C

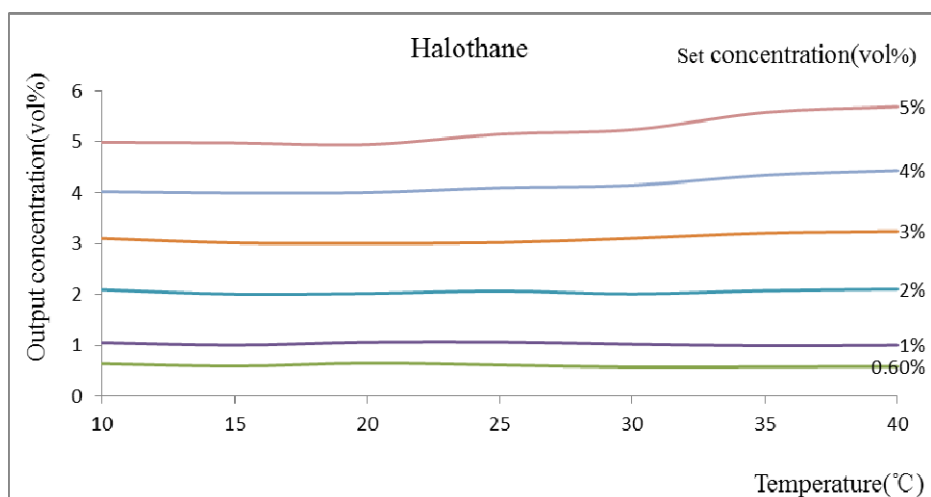
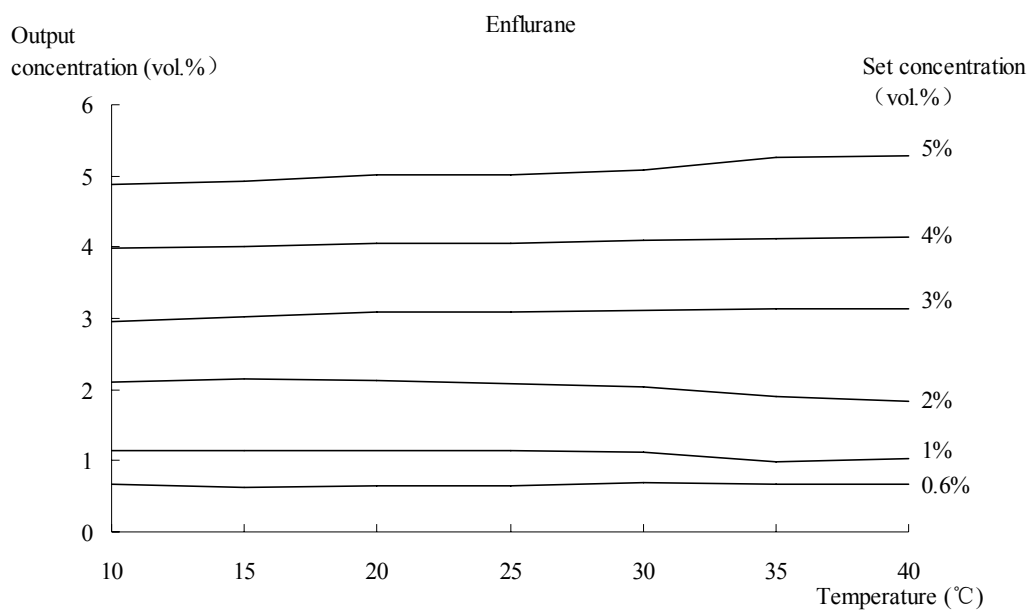
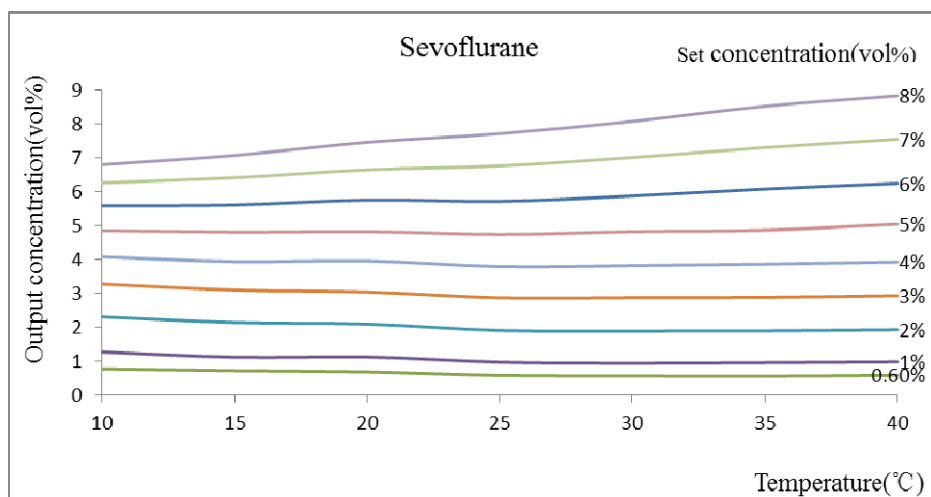
* Note: Isoflurane and halothane cannot be used under these conditions.

Differences in temperature between the vaporizer and the atmosphere within the temperature range are compensated automatically so that the output concentrations are within the specified concentration accuracy. If the temperature of the vaporizer before use is outside 10 to 40°C, a time of 15 min/°C has to be allowed for temperature adjustment so that the concentration remains within the accuracy specified.

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 **11.8 Influence of Running Time**).

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:



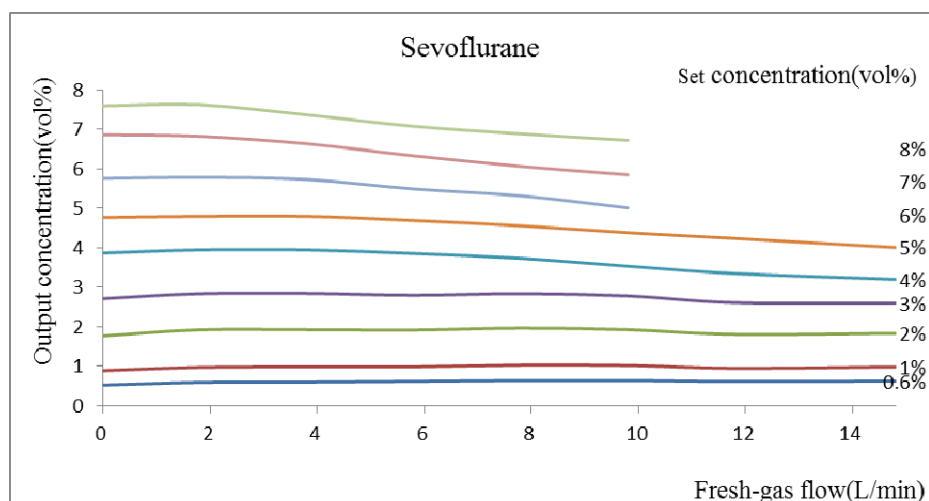
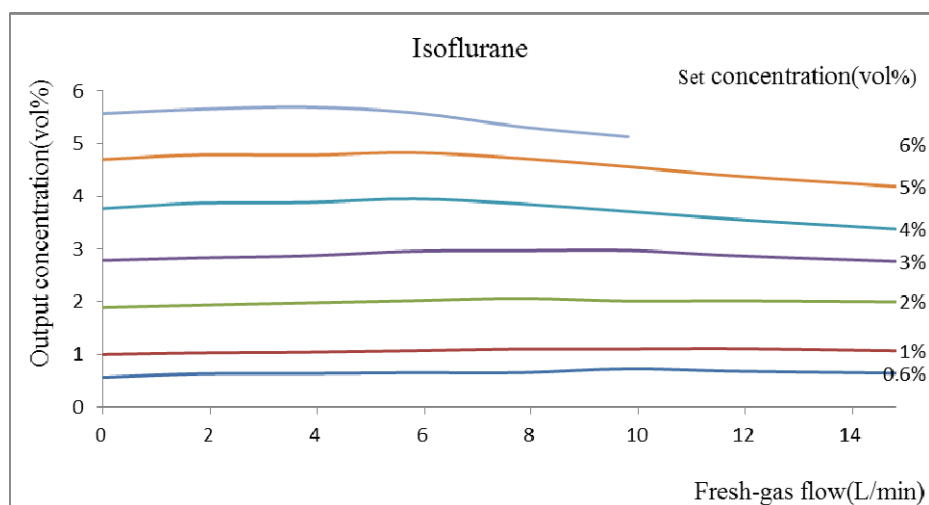


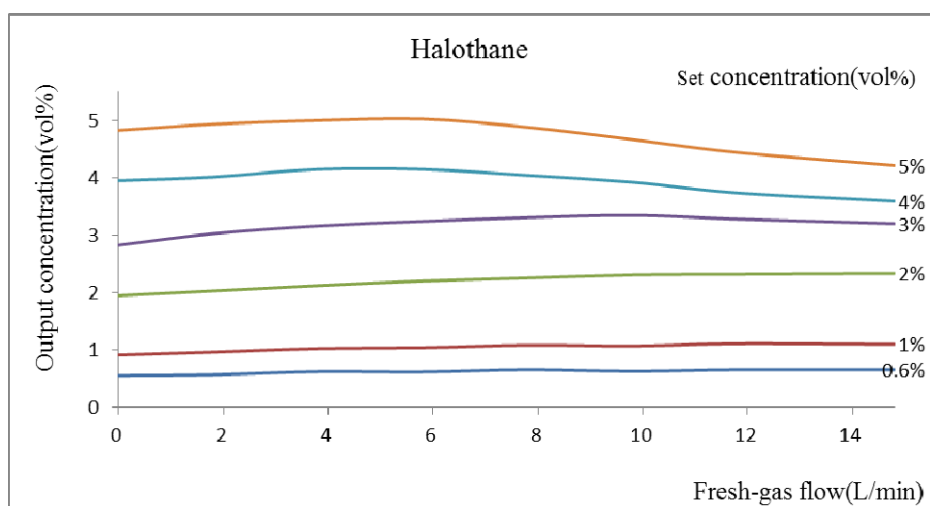
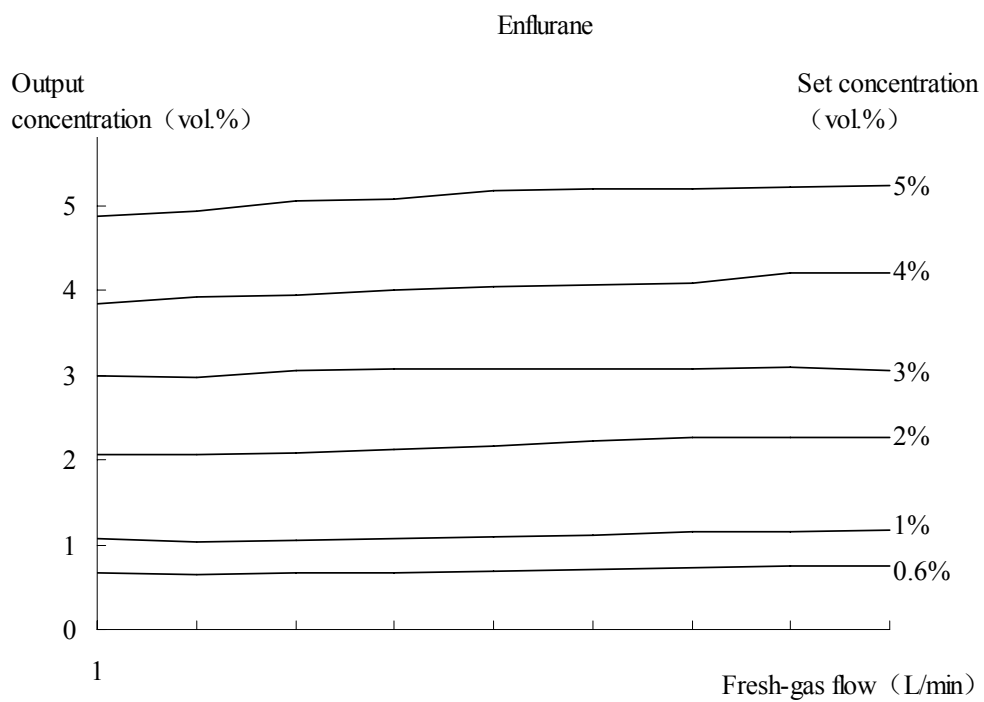
11.4 Influence of Flow

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 *11.8 Influence of Running Time*).

The diagrams show the influence of flow on the concentration delivered after 1 minute at 22°C, 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% O₂ 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% O₂ and 70% N₂O 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.

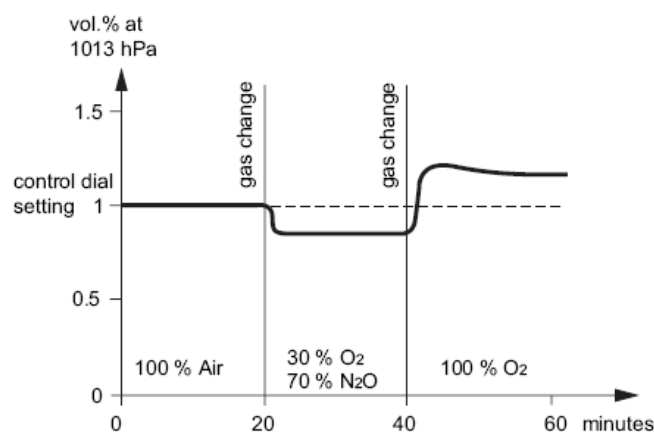
These deviations and their duration will all be greater under the following circumstances:

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:

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

WARNING

- **Under no circumstances should the vaporizer ever be used at atmospheric pressure and temperature at which the anesthetic agent could start to boil, as the concentration delivered will rise and be uncontrolled.**
-

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

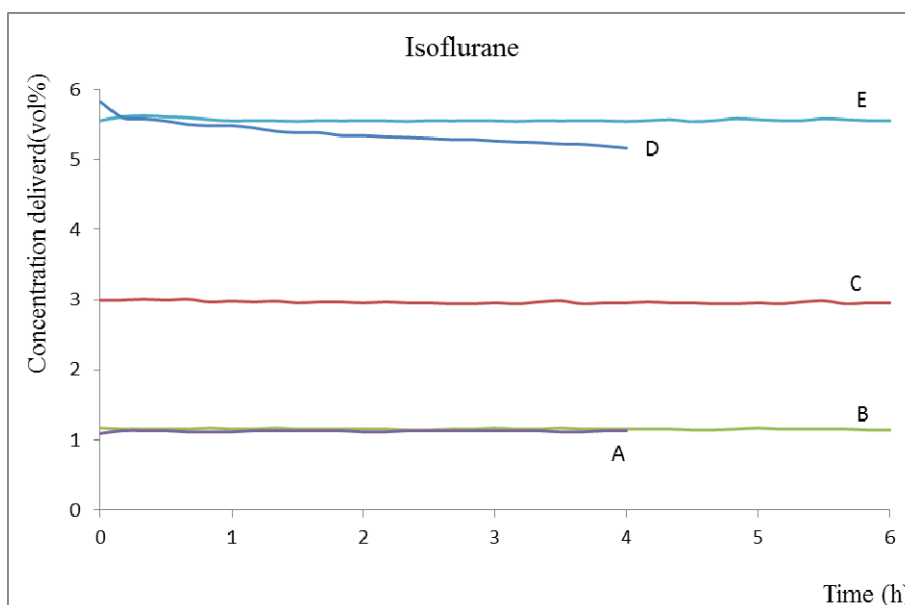
Evaporation of the anesthetic agent during operation cools the vaporizer slowly. The saturation concentration of the anesthetic agent in the vaporizer decreases more rapidly the longer the duration of operation, the higher the concentration set and the higher the fresh gas flow selected, i.e. when more anesthetic agent evaporates with time.

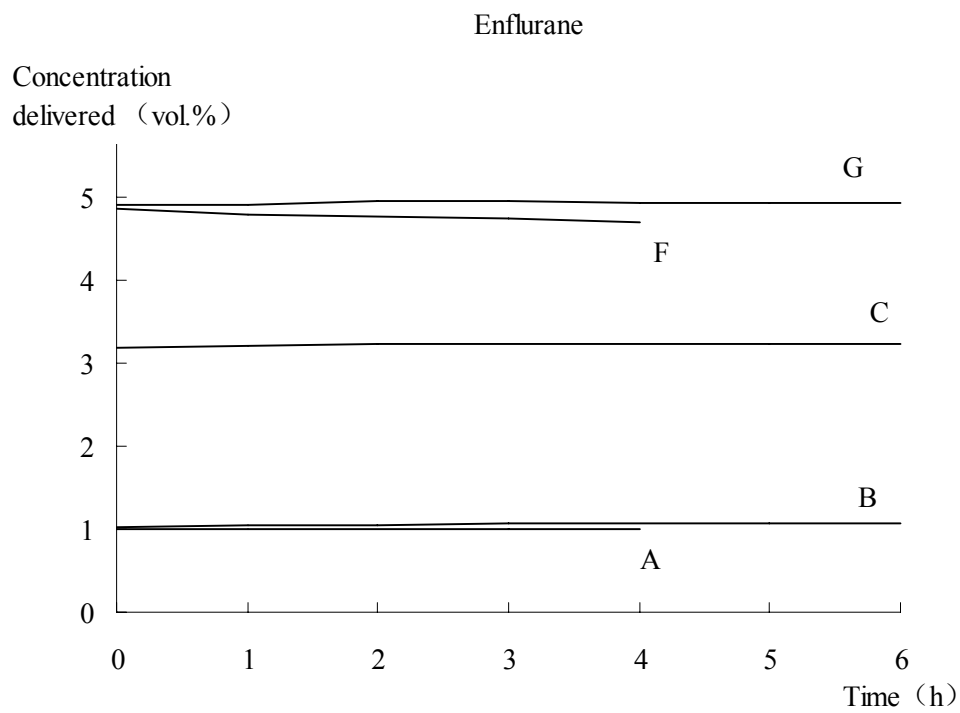
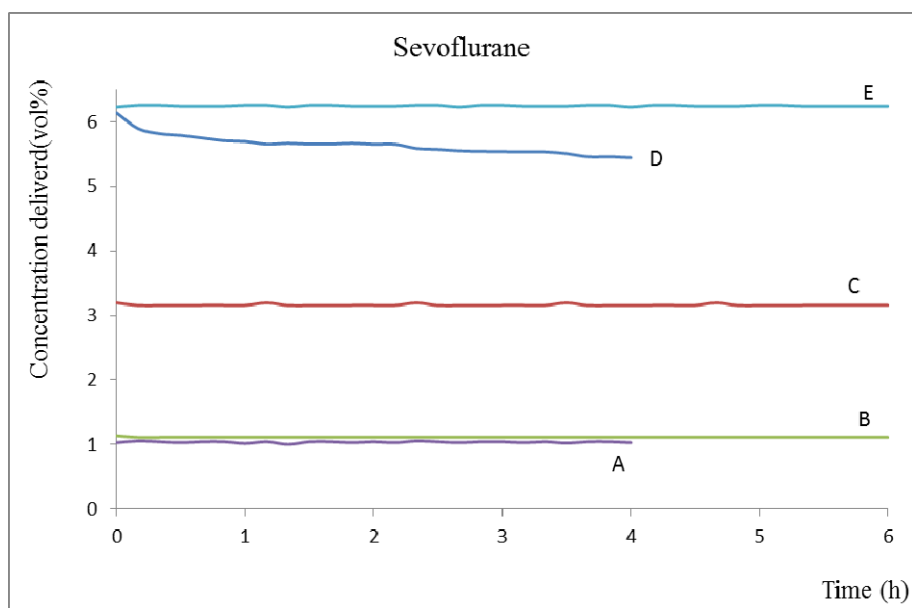
Temperature compensation counters this effectively and limits deviations in the concentration delivered. After a certain period of operation, the vaporizer stabilizes at a slightly lower temperature and an output concentration which is a slight deviation from the set value.

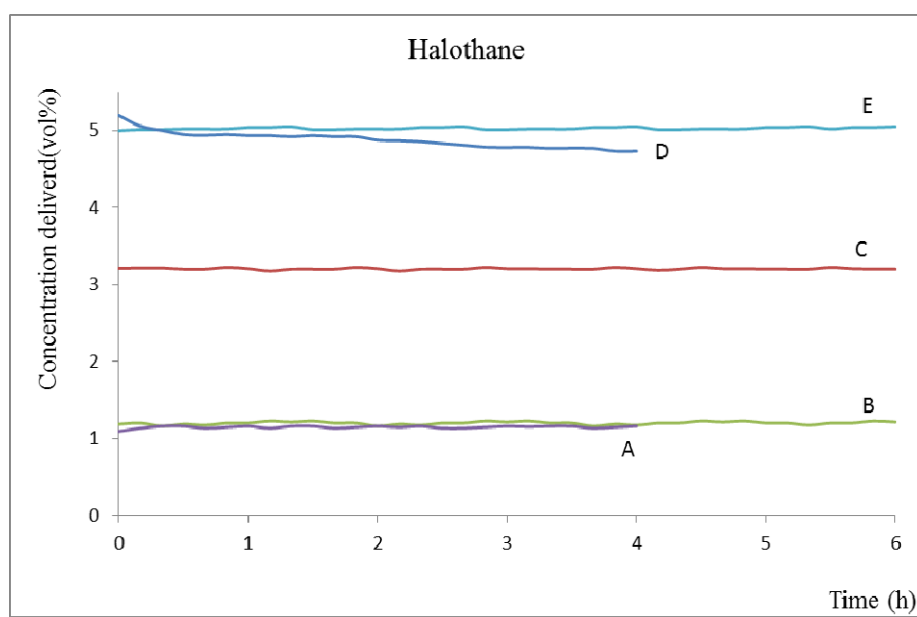
The accuracy given in *A Product Specifications* applies as long as the temperature of the vaporizer does not fall outside the operating range.

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







A Product Specifications

A.1 Standards Compliance

The Anesthetic Vaporizer is in compliance with the following industry standards.

EN ISO 14971 /ISO 14971	Medical devices-Application of risk management to medical devices
EN 1041	Information supplied by the manufacturer with medical devices
EN ISO15223-1/ISO15223-1	Medical devices-Symbols to be used with medical device labels, labeling and information to be supplied
EN ISO 5360 /ISO 5360	Anaesthetic vaporizers - Agent-specific filling systems
EN 62366/IEC62366	Medical devices - Application of usability engineering to medical devices
/	COUNCIL DIRECTIVE 93/42/EEC of 14 June 1993 concerning medical devices
EN 60601-1/IEC 60601-1	Medical electrical equipment -- Part 1: General requirements for basic safety and essential performance
EN 60601-1-6:	Medical electrical equipment -- Part 1-6: General requirements for basic safety and essential performance - Collateral standard: Usability
EN 980	Symbols for use in the labelling of medical devices
ISO 80601-2-13	Medical electrical equipment --Part 2-13:Particular requirements for basic safety and essential performance of an anaesthetic workstation

A.2 Physical Specifications

Weight	6 ± 0.5kg (empty)
Dimensions	Height: 235 mm±10mm Width: 235 mm±10mm Depth: 200 ±10 mm
Filling volume	360 ml (dry wick) 300 ml (moist wick) 260 ml (between the minimum and maximum marks)

A.3 Operating Range

Temperature	
During operation	10 to 40°C
During storage (empty)	-20 to 60°C
During transport (empty)	-20 to 60°C
Humidity	
During operation	15 to 95%, non-condensing
During storage	10 to 95%, non-condensing
Atmospheric pressure	
During operation and shut-down (filled, control dial at “0” position)	70 to 106 kPa
During storage (empty)	50 to 120 kPa
Concentration range	
Isoflurane	0 to 6%
Sevoflurane	0 to 8%
Enflurane	0 to 5%
Halothane	0 to 5%

A.4 Performance Specifications

Range of concentration accuracy (maximum value always applies)		
Operating environment	15 to 35°C or 0.2 to 10 L/min	10 to 15°C or 35 to 40°C or 10 to 15 L/min
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
Maximum angle of tilt		
Alone, freestanding	10°	
During operation (fixed position)	30°	
Pressure difference		
Difference between pressure range and ambient pressure on the vaporizer outlet		-10 to 10 kPa

A.5 Product Configurations

Filling system			
	Key Filler	Quik-Fil	Pour Fill
Isoflurane vaporizer	Yes	No	Yes
Sevoflurane vaporizer	Yes	Yes	Yes
Enflurane vaporizer	Yes	No	Yes
Halothane vaporizer	Yes	No	Yes

A.6 Flow Range

Flow Range
0.2 to 15 L/min 0.2 to 10 L/min for concentrations > 5 Vol.%

FOR YOUR NOTES

B Accessories List

The anesthetic vaporizer should work with the following accessories.

Description	PN
Filling adapter	
Key Filler filling adapter for enflurane vaporizer	040-000064-00
Key Filler filling adapter for isoflurane vaporizer	040-000065-00
Key Filler filling adapter for sevoflurane vaporizer	040-000066-00
Key Filler filling adapter for halothane vaporizer	040-000063-00
Draining adapter	
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 ₂ O	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 %
°C	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, unit of flow
Min	Minute, unit of time
H	Hour, unit of time
M	Meter, unit of length
mm	Millimeter, unit of length
EN	European Norm
ISO	International Organization for Standardization
Iso	Isoflurane
Sev	Sevflurane
Enf	Enflurane
Hal	Halothane
Pour Fill	While filling, fill anesthetic agent into the filler directly. While draining, open the draining valve by specific key to drain the anesthetic agent into the anesthetic agent bottle.
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.



Anesthesia accessory

CATALOGUE

2022.06

www.mindray.com

P/N:ENG-Anesthesia accessory catalogue-210210X64P-20220606
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Finding the Right Part

This catalog has been designed to make finding the right part easy. Chapters are organized by specific accessory categories. Simply locate the type of part you are looking for under the appropriate category.

Note:

This catalog is not an Operating Instructions Manual. This catalog will assist you in identifying the correct parts and accessories to connect to your Mindray Anesthesia machine, please refer to the Operating Instructions Manual. Warnings, Precautions and Notes can also be found in the Operating Instructions.

Anesthesia Mask



Disposable Anesthesia Mask

- Single patient use to avoid cross-infection
- Ergonomic design for convenient one-hand operation
- Adjustable air cushion design for optimal comfort and tightness
- Transparent design for optimal visibility
- Materials in accordance with ISO-10993:10993 biological compatibility requirements
- Complete range of models with color-coded hook for easier identification

Picture	Part No.	Description	Apply to
	040-001817-00	Aircushion mask, disposable, size #0	All
	040-001818-00	Aircushion mask, disposable, size #1	All
	040-001819-00	Aircushion mask, disposable, size #2	All
	040-001820-00	Aircushion mask, disposable, size #3	All

Picture	Part No.	Description	Apply to
	040-001821-00	Aircushion mask, disposable, size #4	All

	040-001822-00	Aircushion mask, disposable, size #5	All
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Reusable Anesthesia Mask

- Ergonomic design for convenient one-hand operation
- Transparent design for optimal visibility
- Materials in accordance with ISO-10993:10993 biological compatibility requirements
- Full range of models for different clinical applications



Picture	Part No.	Description	Apply to
	040-001835-00	Silicon face mask, reusable, size #0	All

	040-001836-00	Silicon face mask, reusable, size #1	All
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	040-001837-00	Silicon face mask, reusable, size #2	All
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	040-001841-00	Silicon face mask, reusable, size #3	All
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Picture	Part No.	Description	Apply to
	040-001842-00	Silicon face mask, reusable, size #4	All

	040-001843-00	Silicon face mask, reusable, size #5	All
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Breathing Bag

Disposable breathing bag

- Single patient use to avoid cross-infection
- Standard 22F connector compatible with all conventional devices
- Latex free materials to prevent latex allergy
- Full range of models for different clinical applications



Part No.	Description	Apply to
040-001827-00	Latex-free breathing bag, disposable, 0.5L	All
040-001828-00	Latex-free breathing bag, disposable, 1L	All
040-001829-00	Latex-free breathing bag, disposable, 2L	All
040-001830-00	Latex-free breathing bag, disposable, 3L	All

Reusable breathing bag

- Use of innocuous medical grade materials
- Standard 22F connector compatible with all conventional devices
- Full range of models for different clinical applications



Part No.	Description	Apply to
040-001856-00	Silicon breathing bag, reusable, 0.5L	All
040-001857-00	Silicon breathing bag, reusable, 1L	All
040-001858-00	Silicon breathing bag, reusable, 2L	All
040-001859-00	Silicon breathing bag, reusable, 3L	All

Anesthesia Breathing Circuit



Disposable breathing circuit

- Single patient use to avoid cross-infection
- Use of innocuous medical grade materials
- Good compliance and low flow resistance
- Transparent design for optimal visibility
- Light weight to easy operation
- Standardized and air-tight connectors for innovative assembly
- Elbow connector with air sampling and monitoring

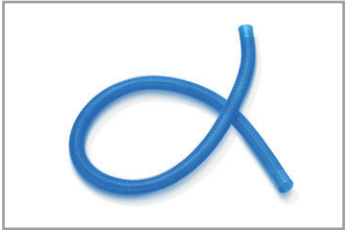
Picture	Part No.	Description	Apply to
	040-001876-00	Disposable breathing circuit package, Adult, Including: - Adult circuit with Y-piece, 1.5 m, diameter 22mm, 22F, 1 pcs - Elbow connector with Luer lock port, 1 pcs - Straight connector, 22M-22M, 1 pcs - Bacteria filter, 1 pcs - Extension tube, 0.5 m, 22F, 1 pcs - Latex-free breathing bag, 3L, 1 pcs	All
	040-001878-00	Disposable breathing circuit package, Child, Including: - Child circuit with Y-piece, 1.5m, diameter 15 mm, 22F, 1 pcs - Elbow connector with Luer lock port, 1 pcs - Straight connector, 22M-22M, 1 pcsz - Bacteria filter, 1 pcs - Extension tube, 0.5m, diameter 15 mm, 22F, 1 pcs - Latex-free breathing bag, 1L, 1 pcs	All
	040-001831-00	Bacteria Filter, disposable, 1 pcs Bacterial removal: >99.9995% Viral removal: >99.995% Pressure Drop: <0.15kPa @ 30 L/min Dead space: 25.5 ml Connectors: 22F/15M-22M/15F	All

Part No.	Description	Apply to
115-030717-00	Disposable breathing circuit accessory kit with mask, Adult, including: - 040-001876-00 Disposable breathing circuit package, Adult (circuit with Y-piece 1.5m, Extension tube 0.5m, Elbow connector, Straight connector, Bacteria filter, Breathing bag 3L), 1 pcs - 040-001822-00 Aircushion mask, disposable, size #5, 1 pcs	All
115-030718-00	Disposable breathing circuit accessory kit with mask, Child, including: - 040-001878-00 Disposable breathing circuit package, Child, (circuit with Y-piece 1.5m, Extension tube 0.5m, Elbow connector, Straight connector, Bacteria filter, Breathing bag 1L), 1 pcs - 040-001819-00 Aircushion mask, disposable, size #2, 1 pcs	All

Open Circuit

Picture	Part No.	Description	Apply to
	040-001704-00	Mapleson C circuit, Adult open circuit, including: - Breathing tube, 1.8m, 1 pcs - Connector, 22/15M, 1 pcs - Latex-free breathing bag, 2L, 1 pcs - APL valve, 1 pcs	All
	040-001703-00	T-piece system circuit, Child open circuit, including: - Breathing tube, 1.8m, 1 pcs - Connector, 22/15M, 1 pcs - Latex-free breathing bag, 0.5L, 1 pcs - APL valve, 1 pcs	All

HFNC Circuit

Picture	Part No.	Description	Apply to
	040-006057-00	Single tube for HFNC, disposable, ID 22 mm, length 1.8 m	A9/ A8/ WATO EX-65 Pro
	040-006058-00	Tubing kit for HFNC, disposable, with heated wire, ID 22 mm, length 1m, 1.5m	A9/ A8/ WATO EX-65 Pro
	040-002376-00 040-002377-00 040-002378-00	Nasal cannula for HFNC (OPT842-small size) Nasal cannula for HFNC (OPT844-medium size) Nasal cannula for HFNC (OPT846-large size)	A9/ A8/ WATO EX-65 Pro

Reusable breathing circuit

- Use of innocuous medical grade materials
- Good compliance and low flow resistance
- Transparent design for optimal visibility
- Standardized and air-tight connectors for innovative assembly
- Y-piece with port for temperature and pressure monitoring



Picture	Part No.	Description	Apply to
	115-031780-00	Reusable breathing circuit accessory kit, Adult, including: - 040-001850-00 Breathing tube, silicon, adult, 1.5m, 2 pcs - 040-001859-00 Silicon breathing bag, 3L, 1 pcs - 040-001843-00 Silicon face mask, size #5, adult large, 1 pcs - 040-001866-00 connector, Y-piece, with sample port, 1pcs - 040-001868-00 connector, L type (Elbow), 22M/15F, 22F, 1pcs	All
	115-031781-00	Reusable breathing circuit accessory kit, Child, including: - 040-001851-00 Breathing tube, silicon, child/infant, 1.5m, 2 pcs - 040-001857-00 Silicon breathing bag, reusable, 1L, 1 pcs - 040-001837-00 Silicon face mask, size #2, child, 1 pcs - 040-001866-00 connector, Y-piece, with sample port, 1pcs - 040-001868-00 connector, L type (Elbow), 22M/15F,22F, 1pcs	All
	040-001850-00	Breathing tube, silicon, reusable, Adult, 1.5m	All

Picture	Part No.	Description	Apply to
	040-001851-00	Breathing tube, silicon, reusable, Child/infant, 1.5m	All
	040-001854-00	Breathing tube, silicon, reusable, Adult, 0.45m	All
	040-001866-00	connector, Y-piece, reusable, with sample port	All
	040-001868-00	connector, L type (Elbow), reusable, 22M/15F,22F	All

Vaporizer



- Large capacity
- Highly compatible supporting different anesthetic agents
- Automatic flow, temperature, pressure compensation
- Maintenance-free design

Mindray V60 Vaporizer

Picture	Part No.	Description	Apply to
	115-005348-00	Mindray V60 vaporizer, Isoflurane, Pour fill	All except A9
	115-005345-00	Mindray V60 vaporizer, Isoflurane, Key filler, with Key filler adapter	All except A9
	115-005349-00	Mindray V60 vaporizer, Sevoflurane, Pour fill	All except A9
	115-005346-00	Mindray V60 vaporizer, Sevoflurane, Key filler, with Key filler adapter	All except A9

Picture	Part No.	Description	Apply to
	115-005350-00	Mindray V60 vaporizer, Sevoflurane, Quik-Fil	All except A9
	115-014139-00	Mindray V60 vaporizer, Halothane, Pour fill	All except A9
	115-014138-00	Mindray V60 vaporizer, Halothane, Key filler, with Key filler adapter	All except A9
	115-017631-00	Vaporizer parking position (the third vaporizer position)	A8/A7/A5/ WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35

Mindray V90 Vaporizer

Picture	Part No.	Description	Apply to
	115-063020-00	Mindray V90 vaporizer, Isoflurane, Safety Filling, with adapter	A9
	115-063018-00	Mindray V90 vaporizer, Sevoflurane, Safety Filling, with adapter	A9
	115-063017-00	Mindray V90 vaporizer, Sevoflurane, Quik-Fil	A9
	115-063022-00	Mindray V90 vaporizer, Desflurane, Safe-T-Fil	A9

Adapter for Vaporizer

Picture	Part No.	Description	Apply to
	040-000065-00	Key filler Adapter for filling the vaporizer, Isoflurane	V60
	040-000066-00	Key filler Adapter for filling the vaporizer, Sevoflurane	V60
	115-026747-00	Quik-Fil Adapter for filling the vaporizer, Sevoflurane	V60, V90
	040-000067-00	Quik-Fil Drain Funnel adapter for draining the vaporizer, Sevoflurane	V60

Picture	Part No.	Description	Apply to
	040-000063-00	Key filler adapter for filling the vaporizer, Halothane	V60
	115-064147-00	Safety filling adapter for filling the Mindray V90 vaporizer, Isoflurane	V90
	115-064146-00	Safety filling adapter for filling the Mindray V90 vaporizer, Sevoflurane	V90
	115-082300-00	Filling converter for Sevoflurane	V60, V90

Flow sensor

Picture	Part No.	Description	Apply to
	0601-30-69700	Inspiration flow sensor, 1 pcs	WATO EX-65 Pro/ EX-55 Pro/ EX-65/EX-55/ EX-35/EX-30/ EX-20
	0601-30-78894	Expiration flow sensor, 1 pcs	
	115-001366-00	Flow sensor kit, including: - Inspiration flow sensor, 1 pcs 0601-30-69700 - Expiration flow sensor, 1 pcs 0601-30-78894	
	115-008262-00	Inspiration Flow sensor, 1 pcs	A7/A5
	115-008263-00	Expiration Flow sensor, 1 pcs	
	115-008264-00	Flow sensor kit, including: - Inspiration Flow sensor, 1 pcs 115-008262-00 - Expiration Flow sensor, 1 pcs 115-008263-00	
	115-041519-00	Flow sensor kit, autoclavable, including: - Inspiration flow sensor, 1 pcs 115-041507-00 - Expiration flow sensor, 1 pcs 115-041508-00	All

O₂ monitoring accessory

Picture	Part No.	Description	Apply to
	115-009958-00	Oxygen monitoring kit, including: Oxygen sensor Medcel MOX-2 and Oxygen sensor mounting kit	A7/A5/ WATO EX-65 Pro/ EX-55 Pro/EX-65/ EX-55/EX-35 with Pre-Pak circuit
	115-034487-00	Oxygen monitoring kit, including: Oxygen sensor OOM102-1 and Oxygen sensor cable	WATO EX-35 without Pre-Pak circuit WATO EX-30/EX-20
	115-065993-00	Oxygen monitoring kit, including: Base for Oxygen sensor and Oxygen sensor MOX-2	A9/A8
	115-016612-00	Oxygen sensor position choke plug kit, including: - 043-003033-00 Oxygen sensor position cap, 1 pcs - 115-016612-00 Oxygen snesor position choke plug, 1 pcs	A7/A5

O₂ monitoring accessory

Picture	Part No.	Description	Apply to
	0611-10-45654	Oxygen sensor, Medigel MOX-2, 1 pcs	A9/A8/A7/A5/ WATO EX-65 Pro/ EX-55 Pro WATO EX-65/EX-55 WATO EX-35 with pre-pak circuit
	040-000898-00	Oxygen sensor, OOM102-1, 1pcs	WATO EX-35 without pre-pak circuit WATO EX-30/EX-20
	043-000616-00	Oxygen sensor cable	A7/A5/ WATO EX-65 Pro/ EX-55 Pro/ EX-65/EX-55/ EX-35
	115-064181-00	Base for Oxygen sensor	A9/A8

CO₂ module and accessory



Sidestream CO₂ module and accessory

- Sampling lines are disposable
- Water trap can be reused (Should be replaced every month)
- Latex free
- Good biocompatibility

Picture	Part No.	Description	Apply to
	115-030418-00	Sidestream CO ₂ module, without accessory	A7, A5
	120-013811-00	Sidestream CO ₂ module, without accessory	WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35
	115-024752-00	Sidestream CO₂ accessory kit, Adult/Pediatric, including: - Dryline airway adapter, straight, Adu/Ped, 2 pcs - DRYLINE II Water Trap, Adu/Ped, 2 pcs - Sampling line, Adu/Ped, 2.5 m, 2pcs - Quick connector for gas return, 1 pcs	A7/A5/ WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35

Picture	Part No.	Description	Apply to
	115-024753-00	Sidestream CO₂ accessory kit, Neonate,including: - Airway adapter, Neonate, 2 pcs - DRYLINE II Water Trap, Neonate, 2 pcs - Sampling Line, Neonate, 2.5 m, 2 pcs - Quick connector for gas return, 1 pcs	A7/A5/ WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35
	115-024797-00	Sidestream CO₂ module kit, with accessory, Adult/Ped, including: - CO₂ module, 1-slot, 1 pcs - CO₂ accessory kit, Adult/Pediatric	A7/A5
	115-024798-00	Sidestream CO₂ module kit, with accessory, Neonate, including: - CO₂ module, 1-slot, 1 pcs - CO₂ accessory kit, Neonate	A7/A5
	120-015033-00	Sidestream CO₂ module kit, with accessory, Adult/pediatric, including: - Sidestream CO₂ module - Sidestream CO₂ accessory kit, Adult/Pediatric	WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35
	120-015034-00	Sidestream CO₂ module kit, with accessory, Neonate, including: - Sidestream CO₂ module - Sidestream CO₂ accessory kit, Neonate	WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35

Picture	Part No.	Description	Apply to
	115-030421-00	External sidestream CO₂ module, with accessory, Adult/pediatric, including: - External sidestream CO₂ module - External sidestream CO₂ accessory kit, Adult/Pediatric	WATO EX-30
	115-030422-00	External sidestream CO₂ module, with accessory, Neonate, including: - External sidestream CO₂ module - External sidestream CO₂ accessory kit, Neonate	WATO EX-30
	115-002594-00	External sidestream CO₂ accessory kit, Adult/pediatric, including: - Dryline airway adapter, straight, Adu/Ped, 2 pcs - Water trap, Adu/Ped, 2 pcs - Sampling line, Adu/Ped, 2.5 m, 2pcs - Quick connector for gas return, 1 pcs	WATO EX-30
	115-002595-00	External sidestream CO₂ accessory kit, Neonate, including: - Airway adaptor, 2 pcs - Water trap, neonate, 2 pcs - Sampling Line, Neonate, 2.5 m, 2 pcs - Quick connector for gas return, 1 pcs	WATO EX-30

Mainstream CO₂ module and accessory

- Short response time
- Adapter are disposable
- Latex free
- Good biocompatibility

For A7, A5, WATO EX-65 Pro, EX-55 Pro, EX-65, EX-55, EX-35

Picture	Part No.	Description
	115-030414-00	Mainstream CO ₂ module, without accessory
	6800-30-50613	Mainstream CO₂ accessory kit, including: - Capnostat CO₂ sensor, with cable 2.4 m, 1 pcs - Airway adapter, Adu/Ped, disposable, 1 pcs - Airway adapter, Neonate, disposable, 1 pcs - Cable Holding Clips, 5 pcs
	115-030410-00	Mainstream CO₂ module kit, with accessory, including: - Mainstream CO₂ module, CAPNOSTAT - Mainstream CO₂ accessory kit

AG module and accessory

- Sampling lines are disposable
- Water trap can be reused (Should replaced every month)
- Latex free
- Good biocompatibility

For A9, A8, A7, A5, WATO EX-65 Pro, EX-55 Pro, EX-65, EX-55, EX-35

Picture	Part No.	Description
	115-030368-00	AG+O ₂ module, 2-slot, without accessory
	115-030369-00	AG module, 2-slot, without accessory
	115-030385-00	AG accessory kit, including: - Dryline airway adapter, straight, Adu/Ped, 2 pcs - Airway adapter, Neonate, 2 pcs - DRYLINE II Water Trap, Adu/Ped, 2 pcs - Sampling line, Adu/Ped, 2.5 m, 2 pcs - DRYLINE II Water Trap, Neonate, 2 pcs - Sampling Line, Neonate, 2.5 m, 2 pcs - Quick connector for gas return, 1 pcs
	115-030379-00	AG+O₂ module kit, with accessory, including: - AG+O₂ module , 2-slot - AG accessory kit
	115-030380-00	AG module kit, with accessory, including: - AG module , 2-slot - AG accessory kit

BIS module and accessory

- Flexible design adjusts to different head sizes
- Connector provides secure click-in connection with push button release
- BIS sensor single patient use, avoiding cross-infection
- Latex-free
- Good biocompatibility, avoiding allergic reactions to patient

For A9, A8, A7, A5, WATO EX-65 Pro, EX-65

Picture	Part No.	Description
	115-013194-00	BIS module, 1-slot, without accessory
	6800-30-50761	BIS Measuring Cable Assembly, 4.5 m, 1 pcs

Picture	Part No.	Description
	6800-30-50878	BIS accessory kit, Adult, including: - BIS Measuring Cable Assembly, 4.5 m, 1 pcs - BIS Sensor Quatro 186-0106, Adu, disposable, 5 pcs
	6800-30-50144	BIS accessory kit, Pediatric, including: - BIS Measuring Cable Assembly, 4.5 m, 1 pcs - BIS Sensor Quatro 186-0200, Pediatric, disposable, 5 pcs
	6800-30-50880	BIS module kit, with accessory, Adult, including: - BIS module, 1-slot - BIS accessory kit, Adult
	6800-30-50427	BIS module kit, with accessory, Pediatric, including: - BIS module, 1-slot - BIS accessory kit , Pediatric

BISx4 module and accessory

For A9, A8, A7, A5, WATO EX-65 Pro, EX-65

Picture	Part No.	Description
	115-005707-00	BISx4 Measuring Cable Assembly, 4.5 m, 1 pcs
	115-005614-00	BISx4 accessory kit, Adult, including: - BISx4 Measuring Cable Assembly, 4.5 m, 1 pcs - BISx4 Sensor Quatro 186-0212, Adult, disposable, 5 pcs
	115-030406-00	BISx4 module kit, with accessory, Adult, including: - BIS module, 1-slot - BISx4 accessory kit, Adult

AG+BIS module and accessory

For A9, A8, A7, A5, WATO EX-65 Pro, EX-65

Picture	Part No.	Description
	115-030370-00	AG+O ₂ +BIS module, 2-slot, without accessory
	115-030371-00	AG+BIS module , 2-slot, without accessory
	115-030381-00	AG+O₂+BIS module kit, with AG accessory, without BIS accessory, including: - AG+O₂+BIS module , 2-slot - AG accessory kit
	115-030382-00	AG+BIS module kit, with AG accessory, without BIS accessory, including: - AG+BIS module , 2-slot - AG accessory kit
	115-030383-00	AG+O₂+BIS module kit, with AG accessory, with BIS accessory, including: - AG+O₂+BIS module , 2-slot - AG accessory kit - BIS accessory kit, Adult
	115-030384-00	AG+BIS module kit, with AG accessory, with BIS accessory, including: - AG+BIS module , 2-slot - AG accessory kit - BIS accessory kit, Adult

NMT module and accessory

For A9, A8, A7, A5

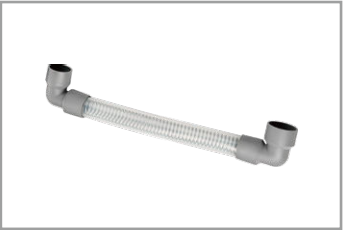
Picture	Part No.	Description
	115-020916-00	NMT module, without accessory
	115-018586-00	NMT accessory kit, including: - NMT main cable - NMT transducer cable - ECG electrode (3M, 2245), 50 pcs - Bandage for NMT transducer, disposable, 20pcs
	115-020917-00	NMT module kit, with accessory, including: - NMT module, 1-slot - NMT accessory kit

Anesthetic gas scavenging system (AGSS)



Active AGSS assembly and accessory

Picture	Part No.	Description	Apply to
	115-017376-00	AGSS Assembly, low-flow, high vacuum	A7/A5/ WATO EX-65 Pro/ EX-55 Pro EX-65/EX-55 EX-35/EX-30 EX-20
	115-017375-00	AGSS Assembly, high-flow, low vacuum	

Picture	Part No.	Description	Apply to
	115-006557-00	Waste gas transfer hose, from main unit to AGSS assembly (801-0631-00074-00)	A7/A5/ WATO EX-65 Pro/ EX-55 Pro EX-65/EX-55 EX-35/EX-30 EX-20
	115-009097-00	AGSS high flow receiving hose, from AGSS assembly to hospital's waste gas disposal system	All
	115-009073-00	AGSS low flow receiving hose, from AGSS assembly to hospital's waste gas disposal system	
	082-001372-00	AGSS receiving hosing, (35G-WAGD-DS/FG2-3), from AGSS assembly to vacuum system	

Active AGSS kit

Part No.	Description	Apply to
115-030332-00	AGSS kit, low flow, high vacuum, including: - AGSS Assembly, low-flow - Waste gas transfer hose, from main unit to AGSS assembly - AGSS low flow receiving hose, from AGSS assembly to hospital's waste gas disposal system - AGSS Three-way connector, from ACGO to AGSS	A7/A5/ WATO EX-65 Pro/ EX-55 Pro EX-65/EX-55 EX-35/
115-030333-00	AGSS kit, high flow, low vacuum, including: - AGSS Assembly, high-flow - Waste gas transfer hose, from main unit to AGSS assembly - AGSS high flow receiving hose, from AGSS assembly to hospital's waste gas disposal system - AGSS Three-way connector, from ACGO to AGSS	A7/A5/ WATO EX-65 Pro/ EX-55 Pro EX-65/EX-55 EX-35/
115-011860-00	AGSS kit, low flow, high vacuum, including: - AGSS Assembly, low-flow - Waste gas transfer hose, from main unit to AGSS assembly - AGSS low flow receiving hose, from AGSS assembly to hospital's waste gas disposal system - AGSS mounting kit	WATO EX-30/ EX-20
115-011859-00	AGSS kit, high flow, low vacuum, including: - AGSS Assembly, high-flow - Waste gas transfer hose, from main unit to AGSS assembly - AGSS high flow receiving hose, from AGSS assembly to hospital's waste gas disposal system - AGSS mounting kit	WATO EX-30/ EX-20

Passive AGSS accessory

Picture	Part No.	Description	Apply to
	115-002342-00	Passive AGSS accessory kit, including: - Tube, 32mm, 1 pcs - Adaptor, 1 pcs	All
	115-042912-00	AGSS Three-way connector, from ACGO to AGSS	All

Suction system



Venturi suction system (External)

Part No.	Description	Apply to
115-009509-00	Venturi suction kit, Air drive, NIST, including: - Suction main unit, venturi - Suction T connector, NIST - Suction liquid collection bottle bracket kit	WATO EX-30/ EX-20
115-011380-00	Venturi suction kit, Air drive, DISS, including: - Suction main unit, venturi - Suction T connector, DISS - Suction liquid collection bottle bracket kit	WATO EX-30/ EX-20

Part No.	Description	Apply to
115-041470-00	Venturi suction kit, Air drive, NIST, including: - Suction main unit, venturi - Suction T connector, NIST - Suction liquid collection bottle bracket kit, for rail	WATO EX-35
115-041471-00	Venturi suction kit, Air drive, DISS, including: - Suction main unit, venturi - Suction T connector, DISS - Suction liquid collection bottle bracket kit, for rail	WATO EX-35
115-015266-00	Venturi suction kit, Air drive, NIST, including: - Suction main unit, venturi - Suction T connector, NIST - Suction liquid collection bottle bracket kit, long, for rail	A5
115-015267-00	Venturi suction kit, Air drive, DISS, including: - Suction main unit, venturi - Suction T connector, DISS - Suction liquid collection bottle bracket kit, long, for rail	A5

Pipeline continuous vacuum suction system (External)



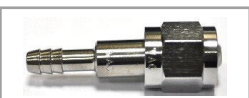
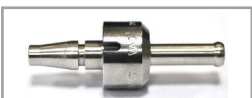
- Pipeline continuous vacuum suction kit, including:**
- Suction main unit, vacuum
 - Suction liquid collection bottle bracket kit
 - Vacuum hose assembly

Part No.	Description	Apply to
115-020734-00	Pipeline continuous vacuum suction kit, US, US/DISS	WATO EX-30/ EX-20
115-020735-00	Pipeline continuous vacuum suction kit, US, DISS/PB	WATO EX-30/ EX-20
115-020736-00	Pipeline continuous vacuum suction kit, US, DISS/Ohmeda	WATO EX-30/ EX-20
115-020737-00	Pipeline continuous vacuum suction kit, US, DISS/Chemetron	WATO EX-30/ EX-20
115-020738-00	Pipeline continuous vacuum suction kit, US, DISS/BS	WATO EX-30/ EX-20
115-020739-00	Pipeline continuous vacuum suction kit, Australian, NIST/SIS	WATO EX-30/ EX-20
115-020740-00	Pipeline continuous vacuum suction kit, French, NIST/FS	WATO EX-30/ EX-20
115-020741-00	Pipeline continuous vacuum suction kit, Germany, NIST/GS	WATO EX-30/ EX-20
115-020742-00	Pipeline continuous vacuum suction kit, Britain, NIST/BS	WATO EX-30/ EX-20

Part No.	Description	Apply to
115-041474-00	Pipeline continuous vacuum suction kit, US, US/DISS	WATO EX-35
115-041475-00	Pipeline continuous vacuum suction kit, US, DISS/PB	WATO EX-35
115-041476-00	Pipeline continuous vacuum suction kit, US, DISS/Ohmeda	WATO EX-35
115-041477-00	Pipeline continuous vacuum suction kit, US, DISS/Chemetron	WATO EX-35
115-041478-00	Pipeline continuous vacuum suction kit, US, DISS/BS	WATO EX-35
115-041479-00	Pipeline continuous vacuum suction kit, Australian, NIST/SIS	WATO EX-35
115-041480-00	Pipeline continuous vacuum suction kit, French, NIST/FS	WATO EX-35
115-041481-00	Pipeline continuous vacuum suction kit, Germany, NIST/GS	WATO EX-35
115-041482-00	Pipeline continuous vacuum suction kit, Britain, NIST/BS	WATO EX-35

Pipeline Vacuum Hose assembly

- Gas supply: Vacuum, Hose length: 5 m; Apply to all models

Part No.	Specification	Standard	Hose color	Gas outlet (machine)	Gas inlet (wall)
082-001333-00	35U-VAC-DS/DS-5	USA	White	DISS 	DISS 
082-001334-00	35U-VAC-PB/DS-5			DISS 	Puritan-Bennett 
082-001335-00	35U-VAC-OH/DS-5			DISS 	Ohmeda 
082-001336-00	35U-VAC-CH/DS-5			DISS 	Chemetron 
082-001340-00	35U-VAC-BS/DS-5			DISS 	British standard 
082-001341-00	35I-VAC-BS/NS-5	ISO	Yellow	NIST 	British standard 
082-001339-00	35I-VAC-GS/NS-5			NIST 	Germany standard 
082-001337-00	35I-VAC-SIS/NS-5			NIST 	Australian SIS standard 
082-001338-00	35I-VAC-FS/NS-5			NIST 	French standard 

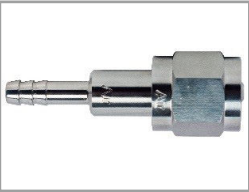
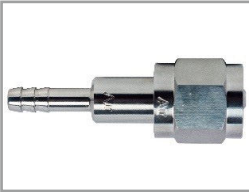
Picture	Part No.	Description	Apply to
	040-001532-00	Vacuum Liquid collection bottle/flask, with overflow protection	All
	040-001533-00	Vacuum Liquid collection bottle/flask, without overflow protection	All
	115-033264-00	Suction tube connect the anesthesia machine and liquid collection bottles, 3m, with filters	All

Central gas supply hose

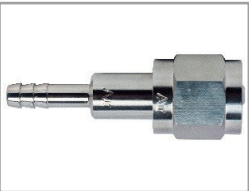
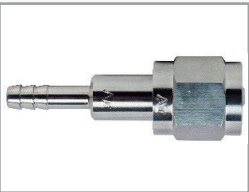
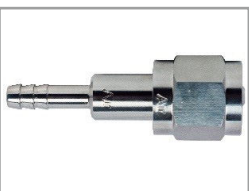


- Hose length 5 m
- Apply to all models

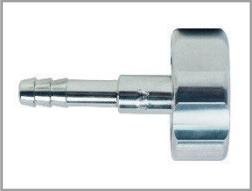
Standard: ISO

Part No.	Specification	Gas supply	Hose color	Gas outlet (machine)	Gas inlet (wall)
082-003443-00	34U-OXY-DS/DS-5	O ₂	Green	DISS	DISS
082-003445-00	34U-AIR-DS/DS-5	Air	Yellow		
082-003444-00	34U-N2O-DS/DS-5	N ₂ O	Blue		

Standard: USA

Part No.	Specification	Gas supply	Hose color	Gas outlet (machine)	Gas inlet (wall)
082-001227-00	34U-OXY-BS/DS-5	O ₂	Green	DISS	British standard
082-001228-00	34U-AIR-BS/DS-5	Air	Yellow		
082-001229-00	34U-N2O-BS/DS-5	N ₂ O	Blue		
082-001356-00	34U-OXY-CH/DS-5	O ₂	Green	DISS	Chemetron
082-001355-00	34U-AIR-CH/DS-5	Air	Yellow		
082-001354-00	34U-N2O-CH/DS-5	N ₂ O	Blue		
082-001376-00	34U-OXY-OH/DS-5	O ₂	Green	DISS	Ohmeda
082-001374-00	34U-AIR-OH/DS-5	Air	Yellow		
082-001373-00	34U-N2O-OH/DS-5	N ₂ O	Blue		
082-001375-00	34U-OXY-PB/DS-5	O ₂	Green	DISS	Puritan-Bennett
082-001378-00	34U-AIR-PB/DS-5	Air	Yellow		
082-001377-00	34U-N2O-PB/DS-5	N ₂ O	Blue		

Standard: ISO

Part No.	Specification	Gas supply	Hose color	Gas outlet (machine)	Gas inlet (wall)
082-001209-00	34I-OXY-BS/NS-5	O ₂	White	NIST	British standard
082-001210-00	34I-AIR-BS/NS-5	Air	Black & White		
082-001211-00	34I-N2O-BS/NS-5	N ₂ O	Blue		
082-001212-00	34I-OXY-GS/NS-5	O ₂	White	NIST	Germany standard
082-001213-00	34I-AIR-GS/NS-5	Air	Black & White		
082-001214-00	34I-N2O-GS/NS-5	N ₂ O	Blue		
082-001215-00	34I-OXY-SIS/NS-5	O ₂	White	NIST	Australian SIS standard
082-001216-00	34I-AIR-SIS/NS-5	Air	Black & White		
082-001217-00	34I-N2O-SIS/NS-5	N ₂ O	Blue		
082-001218-00	34I-OXY-FS/NS-5	O ₂	White	NIST	French standard
082-001219-00	34I-AIR-FS/NS-5	Air	Black & White		
082-001220-00	34I-N2O-FS/NS-5	N ₂ O	Blue		

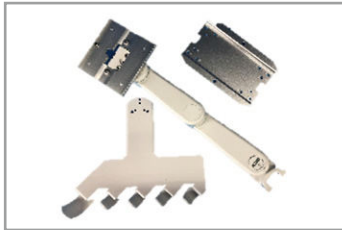
Mounting solution



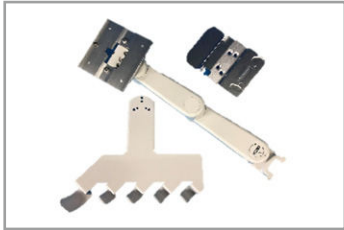
Mounting solution for patient monitor N19/N22

Picture	Part No.	Description	Apply to
	115-066025-00	GCX Bracket kit for N19/N22, fixed height	A7/A5
	115-066027-00	GCX Bracket kit for N19/N22, variable height	A7/A5
	115-069443-00	GCX bracket kit for N19/N22, fixed height	A9/A8

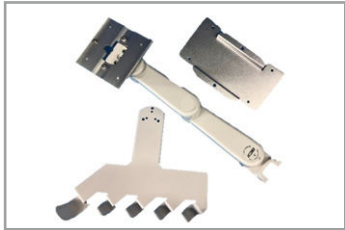
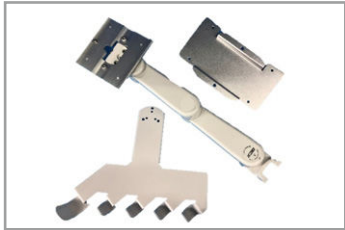
Mounting solution for patient monitor N17/N15/N12, ePM15

Picture	Part No.	Description	Apply to
	115-066028-00	GCX Bracket for N17/N15/N12/ePM15, fixed height	A7/A5 WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35/EX-30/EX-20
	115-066074-00	GCX bracket kit for N17/N15/N12/ePM15, fixed height, M series, 8"x8"	A9/A8
	115-066029-00	GCX Bracket for N17/N15/N12/ePM15, variable height	A9/A8/A7/A5 WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35

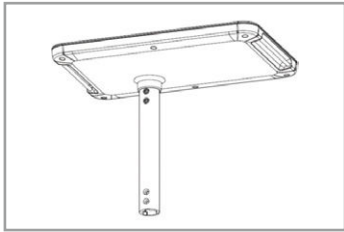
Mounting solution for patient monitor ePM10/12, uMEC10/12/15, iPM, iMEC

Picture	Part No.	Description	Apply to
	115-070011-00	GCX Bracket for ePM10/12, uMEC10/12/15, iPM, iMEC, fixed height	A7/A5 WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35/EX-30/EX-20
	115-070767-00	GCX bracket kit for ePM10/ePM12/uMEC, fixed height, M series, 8"x8"	A9/A8
	115-070768-00	GCX Bracket for ePM10/12, uMEC10/12/15, iPM, iMEC, variable height	A9/A8/A7/A5 WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35

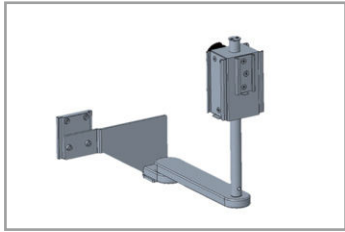
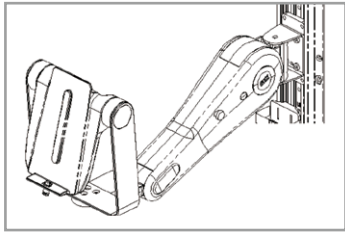
Mounting solution for patient monitor T5/T8

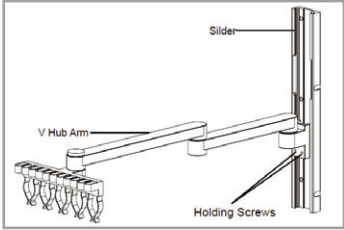
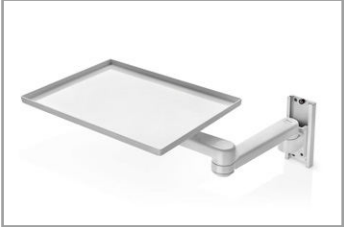
Picture	Part No.	Description	Apply to
	115-015770-00	GCX bracket kit for Beneview T5, PM 9000, fixed height	A7/A5 WATO
	115-015783-00	GCX bracket kit for Beneview T8, fixed height	EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35/EX-30/EX-20
	115-015771-00	GCX bracket kit for Beneview T5, fixed height, with module rack mounting pole	A7/A5 WATO
	115-015784-00	GCX bracket kit for Beneview T8, fixed height, with module rack mounting pole	EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35/EX-30/EX-20
	115-069066-00	GCX bracket kit for T5/ePM15, fixed height, M series, 8"x8"	A9/A8
	115-069067-00	GCX bracket kit for T8, fixed height, M series, 8"x8"	
	115-069068-00	GCX bracket kit for T5, fixed height, M series, 8"x8", with SMR module rack mounting pole	A9/A8
	115-069069-00	GCX bracket kit for T8, fixed height, M series, 8"x8", with SMR module rack mounting pole	

Top shelf mounting kit

Picture	Part No.	Description	Apply to
	115-004003-00 115-004004-00	Top shelf mounting kit for Beneview T8, not support SMR Top shelf mounting kit for Beneview T5, not support SMR	All
	115-070794-00	Top shelf mounting kit for N15/17, ePM15	All
	115-074073-00	Top shelf mounting kit for N12, ePM12/10	All
	115-069445-00	Top shelf mounting bracket	A9/A8

Other Accessories

Picture	Part No.	Description	Apply to
	115-054836-00	Bracket for liquid collection bottles and humidifier	A9/A8
	115-071657-00	Bracket for humidifier	WATO EX-65 Pro
	115-030486-00	GCX bracket kit for Pumps	A9/A8
	115-069585-00	GCX bracket kit for TE7	A9/A8

Picture	Part No.	Description	Apply to
	115-024614-00	GCX support arm(M series), V Hub Arm kit, for cable management	A9/A8/A7/A5
	115-024461-00	Support arm kit for holding breathing tubes, with tube clip	A9/A8/A7/A5
	115-014961-00	Trolley for Air compressor C3	All
	034-000460-00	GCX external auxiliary work surface, including 12" x 12" tray and articulating arm	A9/A8/A7/A5

Picture	Part No.	Description	Apply to
	043-010620-00	Hook mounting on the handles, for standard breathing tube	A9/A8
	115-011304-00	Tube clip, for coaxial breathing hoses, 1pcs	A9/A8/A7/A5 WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35
	115-017042-00	Quick connector for gas return, from gas module in the anesthesia machine to the AGSS or breathing circuit	A9/A8/A7/A5 WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35

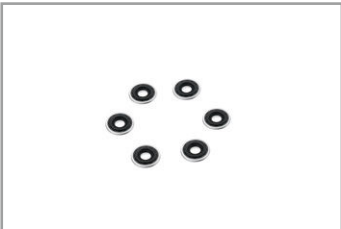
Breathing system

Picture	Part No.	Description	Apply to
	115-030838-00	Sodalime canister, for WATO EX-55/65/55 Pro/65 Pro, or WATO EX-20/30/35 breathing circuit with bypass	WATO series
	115-034194-00	Sodalime canister, for WATO EX-20/30/35 breathing circuit without bypass	WATO EX-20/ EX-30/ EX-35
	801-0631-00066-00	Sodalime canister, for Pre-pak breathing circuit	A7/A5/ WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35
	115-066324-00	Sodalime canister with handle, for Pre-pak breathing circuit (A9/A8)	A9/A8

Picture	Part No.	Description	Apply to
	040-000358-00	Bellows	A7/A5 WATO Series
	0601-20-78976	Foam pad for soda-lime canistor, for WATO EX-55/65/55 Pro/65 Pro, or WATO EX-20/30/35 breathing circuit with bypass , 20 pcs	WATO series
	115-046756-00	Quick Release APL Valve Assembly	A7
	115-048035-00	Flexible bag arm assembly	A9/A8/A7/A5 WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35

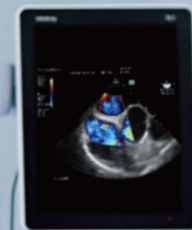
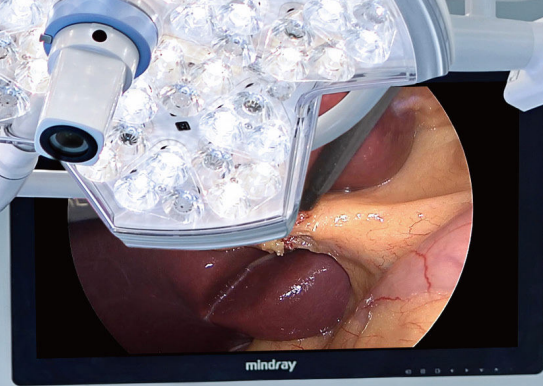
Picture	Part No.	Description	Apply to
	045-004527-00	Breathing system cleaning adaptor kit	A9/A8

Cylinder Accessory

Picture	Part No.	Description	Apply to
	0348-00-0185	Cylinder yoke seal, 6 pcs	All
	115-033063-00	Cylinder yoke spanner	All

Battery

Picture	Part No.	Description	Apply to
	115-018011-00	Li-ion Battery Package, 11.1 V, 4400mAh	WATO EX-30/ EX-20
	115-062081-00	Li-ion Bat Pack (10.95V) Li-ion Battery Package	A7/A5 WATO EX-65 Pro/ EX-55 Pro/ EX-65/ EX-55/ EX-35



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FILTERS

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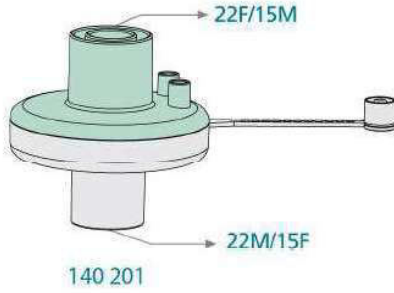
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FILTERS

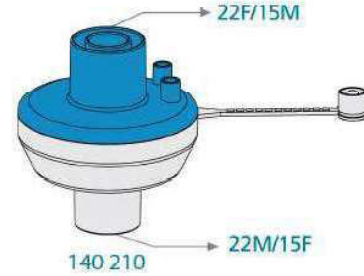
Filtreler

Plasti-med®
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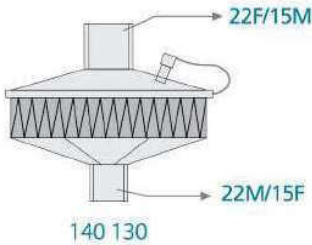
- BFE (Bakteriyel Filtre Etkinliği) %99.99998
- VFE (Viral Filtre Etkinliği) %99.9998
- Gaz Örnek Alma Portu
- Düşük Ölü Boşluk
- Düşük Akış Direnci
- Steril

- BFE (Bacterial Filtration Efficiency) %99.99998
- VFE (Viral Filtration Efficiency) %99.9998
- Gas Sampling Port
- Low Dead Space
- Low Flow Resistance
- Sterile



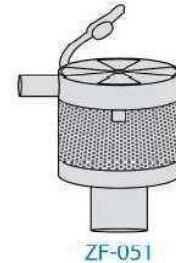
- BFE (Bakteriyel Filtre Etkinliği) %99.99998
- VFE (Viral Filtre Etkinliği) %99.9998
- 500 ml Tidal Hacim ile Nem Çıkış Değeri 33.2 mg/lt
- Gaz Örnek Alma Portu
- Düşük Ölü Boşluk
- Düşük Akış Direnci
- Steril

- BFE (Bacterial Filtration Efficiency) %99.99998
- VFE (Viral Filtration Efficiency) %99.9998
- Moisture Output at 500 ml Tidal Volume 33.2 mg/lt
- Gas Sampling Port
- Low Dead Space
- Low Flow Resistance
- Sterile



- BFE (Bakteriyel Filtre Etkinliği) %99.9999
- VFE (Viral Filtre Etkinliği) %99.9999
- Gaz Örnek Alma Portu
- Düşük Ölü Boşluk
- Düşük Akış Direnci
- Steril

- BFE (Bacterial Filtration Efficiency) %99.9999
- VFE (Viral Filtration Efficiency) %99.9999
- Gas Sampling Port
- Low Dead Space
- Low Flow Resistance
- Sterile



- 500 ml Tidal Hacim ile Nem Çıkış Değeri 24 hr: 28.8 mg/1 lt H₂O
- Aspirasyon Portu
- Oksijen Portu
- Düşük Ölü Boşluk
- Düşük Akış Direnci
- Steril

- Moisture Output at 500 ml Tidal Volume 24 hr: 28.8 mg/1 lt H₂O
- Suction Port
- Oxygen Port
- Low Dead Space
- Low Flow Resistance
- Sterile

KOD / CODE	TİP / TYPE	KOLİ ADEDİ QUANTITY PER BOX
140 201	BAKTERİ FİLTRESİ BACTERIAL FILTER	100
140 210	HMEF (BAKTERİ VE NEM) FİLTRE HMEF (BACTERIAL AND MOISTURE) FILTER	100
140 130	HEPA FİLTRE HEPA FILTER	100
ZF-051	TRAKEOSTOMİ HME FİLTRE TRACHEOSTOMY HME FILTER	400