mindray

# WATO EX-65 Pro

Anesthesia system

Digitally signed by Prodan Sveatoslav
Date: 2023.06.20 12:23:22 EEST
Reason: MoldSign Signature
Location: Moldova

www.mindray.com

P/N:ENG-WATO EX-65 Pro-210285X8P-20210407



mindray

healthcare within reach

Since 2006 Mindray has successfully installed over 50,000 anesthesia machines for customers all over the globe. We are glad and proud that every few seconds a clinician somewhere on this planet happily switches on a Mindray anesthesia machine.

For the last decade, Mindray has continued to work closely with clinicians across the globe, to recognize and understand the clinical challenges encountered every day and overcome them with new innovative and intuitive solutions. With this in mind, Mindray is now proud to bring you the flagship of the WATO series, the WATO EX-65 Pro.

## More Precise

With new integrated innovative functions, the WATO EX-65 Pro enables you to precisely control the system for different types of patient easily.

## More Visible

With a 15-inch high-resolution display and intuitive touch user interface, the WATO EX-65 Pro makes the anesthesia process more visible.

## More Cost Effective

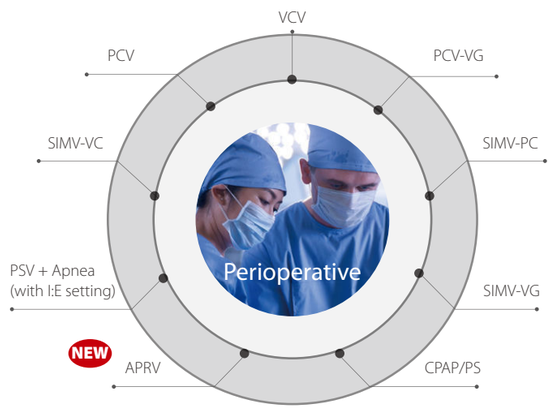
As a multifunctional anesthesia system, the WATO EX-65 Pro is designed with cost in mind.


# More Precise

## Enjoy Optimal Performance at Every Stage of Anesthesia

A full range of ICU grade ventilation modes meet your requirements through all the stages of anesthesia, enabling precise ventilation care for the critically ill patient.

- VCV
- PCV
- PCV-VG
- SIMV-VC
- SIMV-PC
- SIMV-VG
- PSV + Apnea
- CPAP/PS
- APRV

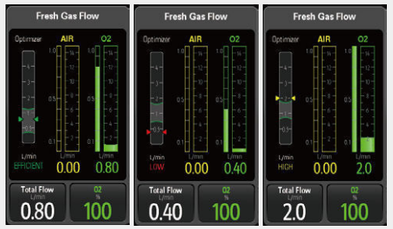



## Integrated HFNC for Better Perioperative Management

High flow nasal cannula (HFNC) plays an important role in maintaining safe oxygen saturation in patients as it extends the safe apnoeic oxygenation time during induction. HFNC can help clinicians intubate more easily, especially for patients with poor oxygen saturation such as bariatric, pediatric, or critically ill patients, or those with a difficult airway.

## Precise Digital Gas Mixer with Safe Low Flow by Optimizer

The digital gas mixer makes fresh gas flow settings easier and more precise.
The fresh gas flow Optimizer indicates the recommended fresh gas flow setting against your current setting value and the minimum $O_2$ needed by the patient. It ensures a safe low flow and minimizes the waste of anesthetic agents and medical gases.




## Precise Monitoring

Mindray Plug-and-Play Multi-Gas modules provide comprehensive breath-by-breath analysis of $O_2$, $CO_2$, $N_2O$, and auto-detection of five anesthetic agents, as well as BIS.

# More Visible

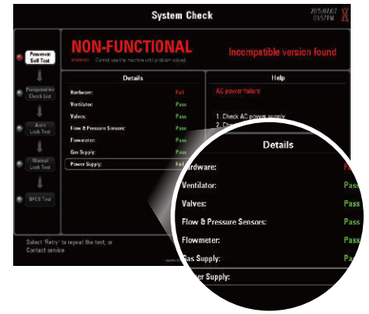
## 15-inch Touchscreen with Intuitive UI

With a high-resolution, 15-inch capacitive touch-screen users are able to view and configure parameters as required. The intuitive layout and simple flat-menu structure ensure all parameters are clearly displayed and only two steps are required to set the ventilation mode.


## Visual System Check

The System Check can be visualized with graphs and charts to simplify complicated operation steps.

- Automatic self-test
- Manual leak test with step by step graphic instructions
- Recommended solution for failed steps using written instructions and graphics




## Smart Alarm

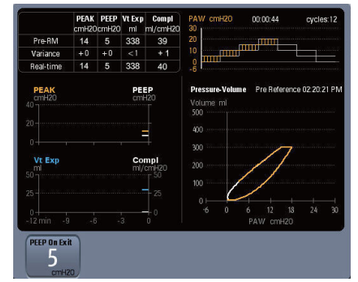
The Smart Alarm provides the real-time graphic information, enabling quicker correction of potentially fatal errors.

- More alarm information: access to alarm log
- Alarm limit setting directly from the alarm message
- Picture indication of potential issues


## Lung Recruitment

The new Lung Recruitment function induces improvements in gas exchange and respiratory mechanics, and can reduce the incidence of postoperative pulmonary complications.

- Two optional maneuvers: stepwise PEEP or sustained inflation
- Multiple criteria to evaluate recruitment effectiveness



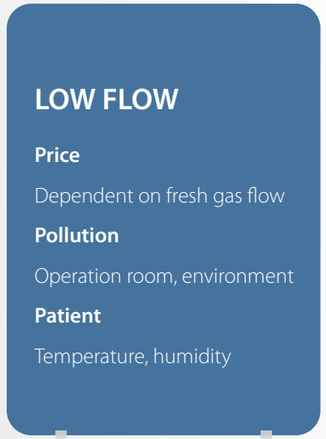
# More Cost Effective

## Saves Anesthetic Agents

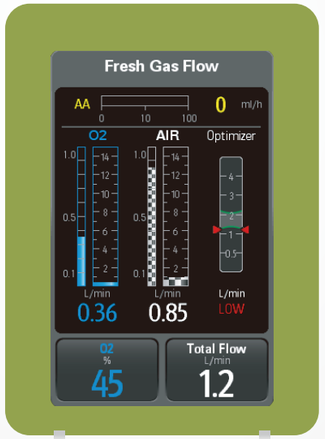
The low flow Optimizer provides real time guidance for cost-effective optimization of the fresh gas flow, and thus the anesthetic agent. During general inhalation anesthesia, the Optimizer continuously informs users whether the fresh gas flow is too high, appropriate, or too low.
Using the Optimizer results in a large reduction in anesthetic consumption, saving money and reducing environmental pollution.

AA Measurement: The new anesthetic agent calculation software enables you to monitor real-time anesthetic agent consumption and keep costs in mind.

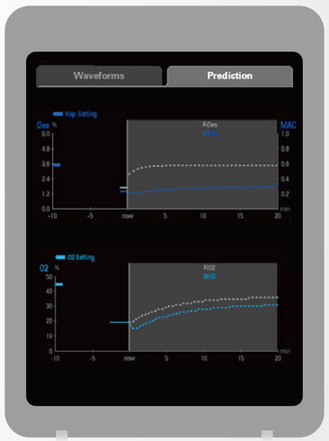
With AA prediction, it is possible to display both previous and current values of FiAA, EtAA as well as MAC, and even forecast their future trends.




Why low flow?




Optimizer
AA Measurement




AA prediction

## Modular Design

The Plug-and-Play monitoring modules are compatible with the Mindray modular patient monitor. The modular design not only saves money, but also makes maintenance of your devices easier.

## Flow Sensors Which Users Could Calibrate

Flow sensors are always a challenge for users of anesthesia machines. They need changing every couple of months, and sometimes will become inaccurate and affect the precision of Tidal Volume. And normally they have to be calibrated by a service technician.

The WATO EX-65 Pro is different. As well as the two flow sensors in the expiration and inspiration ports for dynamic tidal volume compensation, the WATO EX-65 Pro comes with a built-in 3rd flow sensor as a benchmark. The benchmark flow sensor is used to calibrate the flow sensors in the expiration and inspiration ports to ensure the flow sensors maintain accuracy while extending their life span. Users can even calibrate the sensors themselves.

- 3rd benchmark flow sensor
- User calibration
- Extended life span

# WATO EX-65 Pro

## Anesthesia System

**Physical Specifications**

**Dimensions and Weight**

| | |
|---|---|
| Height | 1370 mm |
| Width | 780 mm (not including breathing system)<br>945 mm (including breathing system) |
| Depth | 690 mm |
| Weight | <145 kg (without vaporizers and cylinders) |

**Top Shelf**

| | |
|---|---|
| Weight limit | 30 kg |
| Width | 305 mm |
| Length | 545 mm |

**Work Surface**

| | |
|---|---|
| Height | 850 mm |
| Area | 1635 $cm^2$ |

**Drawer (3Xdrawers, Internal Dimension)**

| | |
|---|---|
| Height | 130 mm |
| Width | 415 mm |
| Depth | 320 mm |

**Bag Arm**

| | |
|---|---|
| Height | 1150 mm |
| Length | 312 mm |
| Connection | ISO 22mm OD, 15mm ID |

**Casters**

| | |
|---|---|
| Diameter | 125 mm |
| Brakes | Center brake system with Lock / Unlock icons |

**Ventilator Specifications**

**Modes of Ventilation**

Manual/Spontaneous Ventilation/Bypass
Volume Control Ventilation (VCV) with PLV function
Pressure Control Ventilation (PCV) with/without volume guarantee (VG)
Synchronized Intermittent Mandatory Ventilation
(SIMV-Volume Controlled and SIMV-Pressure Controlled)
Pressure Support Ventilation (PS) with apnea backup
Synchronized Intermittent Mandatory Ventilation Volume Guarantee
(SIMV-VG)
Continuous Positive Airway Pressure/Pressure Support Ventilation
(CPAP/PS)
Airway Pressure Release Ventilation (APRV)

**Compensation**

Circuit gas leakage compensation and automatic compliance
compensation

**Ventilation Parameters Range**

| | |
|---|---|
| Patient Size | Adult, Pediatric, Neonate |
| Tidal volume | 10~1500 mL (Volume Mode)<br>5~1500 mL (Pressure Mode) |
| Pinsp | 5~80 $cmH_2O$ |
| Plimit | 10~100 $cmH_2O$ |
| ΔPsupp | 3~60 $cmH_2O$<br>0, 3~60 $cmH_2O$ (CPAP/PS) |
| Rate | 2~100 bpm |
| I:E | 4:1 - 1:8 |
| Inspiratory pause (Tip:Ti) | OFF, 5% - 60% |
| Inspiratory time (Tinsp) | 0.2 - 10.0 s |
| Trigger window | 5% - 90% |
| Flow trigger | 0.2 ~ 15 L/min |
| Pressure trigger | -20~ -1 $cmH_2O$ |
| Expiration termination level | 5% - 80% |
| Minimum Rate | 2 - 60 bpm |
| Tslope | 0.0 - 2.0 s |
| Apnea I: E | 4:1~1:8 |
| ΔPapnea | 3 - 60 $cmH_2O$ |
| Phigh | 3 - 80 $cmH_2O$ |
| Plow | OFF, 3 to 30 cmH2O |
| Thigh | 0.2 to 10.0s |
| Tlow | 0.2 to 10.0s |

**Positive End Expiratory Pressure (PEEP)**

| | |
|---|---|
| Type | Integrated, electronic controlled |
| Range | OFF, 3~30 $cmH_2O$ |

**Ventilator Performance**

| | |
|---|---|
| Driving pressure | 280 kPa to 600 kPa |
| Peak gas flow | 180 L/min + Fresh Gas Flow |

**Monitoring Parameters**

| | |
|---|---|
| Minute volume | 0 ~ 100 L/min |
| Tidal volume | 0~3000 ml |
| Inspired oxygen ($FiO_2$) | 18% ~ 100% |
| Airway pressure | -20 ~ 120 $cmH_2O$ |
| I:E | 50:1 ~ 1:50 |
| Rate | 0 ~120 bpm |
| PEEP | 0 ~ 70 $cmH_2O$ |
| Resistance (R) | 0 ~ 600 $cmH_2O$/(L/s) |
| Compliance (C) | 0 ~ 300 ml/$cmH_2O$ |
| Elasticity (E) | 0.003 to 10 hPa/mL(cmH2O/mL) |

**Control Accuracy**

| | |
|---|---|
| Volume delivery | 5 mL to 60 mL: ±10 mL<br>60 mL to 210 mL: ±15 mL<br>210 mL to 1500 mL: ± 7% of the set value |
| Pressure | Pinsp, Plimit, ΔPsupp, ΔPapnea, Phigh, Plow<br>± 2.5 $cmH_2O$ or ± 7% of the set value, whichever is greater |
| PEEP | OFF: ± 3.0 $cmH_2O$<br>3 to 30 $cmH_2O$: ± 2.0 $cmH_2O$, or ± 8% of the set value, whichever is greater |
| Rate | ± 1bpm or ± 10% of the set value, whichever is greater |
| I:E | 2:1 to 1:4: ± 10% of the set value<br>Other range: ± 25% of the set value |
| Tip:Ti | ± 8% |
| Tinsp | ± 0.2s |
| Thigh | ± 0.2s or ± 10% of the set value, whichever is greater |
| Tlow | ± 0.2s or ± 10% of the set value, whichever is greater |
| Trigger Window | ± 10% |
| Flow Trigger | ± 1L/min |
| Pressure Trigger | ± 2$cmH_2O$ |
| Exp% | ± 10% |

### Monitoring Accuracy

| | |
|---|---|
| Volume monitoring | 0 to 60 mL: ± 10 mL<br>60 to 210 mL: ± 15 mL<br>210 to 3000 mL: ± 7% of the real reading |
| Pressure monitoring | ± 2.0 $cmH_2O$ or ± 4% of the real reading, whichever is greater |
| Rate | ± 1bpm or ± 5% of the real reading, whichever is greater |
| I:E | 2:1 to 1:4: ± 10% of the reading<br>Other range: no defined. |
| MV | ± 0.1L/min or ± 8% of the real reading, whichever is greater |
| O2 concentration | ± (2.5% of volume percentage + 2.5% of gas concentration) |

### Trend Graph

Continuous trend information with time discrete events for the latest 48 hours

### Trend Table

Continuous trend information together with time discrete events for the latest 48 hours

### Alarm Log Book

500 events storage, first in first out

### Alarm setting

| | |
|---|---|
| Tidal volume | Low: 0 ~ 1595 ml<br>High: 5 ~ 1600 ml |
| Minute volume | Low: 0 ~ 99 L/min<br>High: 0.2 ~ 100 L/min |
| Inspired oxygen | Low: 18% ~ 98%<br>High: OFF, 20% ~ 100% |
| Apnea alarm | VTe < 10ml measured in 20s<br>Paw < (PEEP + 3) $cmH_2O$ in 20s |
| Airway pressure low | 0 ~98 $cmH_2O$ |
| Airway pressure high | 2 ~100 $cmH_2O$ |

Sustained airway pressure alarm: 15s

Subatmospheric pressure alarm: Paw < -10 $cmH_2O$

Alarm silence countdown timer: 120 to 0 seconds

### Lung Recruitment Tool

| | |
|---|---|
| Maneuver | Multi-Step and One-Step Recruitment |
| One-Step Recruitment | Pressure Hold: 20 to 60 $cmH_2O$<br>Hold Time: 10 to 40s<br>PEEP on Exit: Off, 3 to 30 $cmH_2O$ |
| Multi-Step Recruitment | Increasing PEEP progressively<br>(with a maximum of 7 stages) |

## Ventilator Components

### 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 |

### Ventilator Screen

| | |
|---|---|
| Display type | Color capacitive touch screen |
| Display size | 15 inch |
| Pixel format | 1024 x 768 |
| Brightness | Adjustable |
| Screen display | configurable |
| 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, $EtCO_2$, $N_2O$, Aesthesia gas concentration, BIS) |
| Display waveforms | P-T, F-T, V-T, $CO_2$, BIS, $O_2$, Anesthetic gas, $N_2O$ |
| Spirometry loops | P-V, F-V and F-P |
| Timer | On screen timer |

### Communication Ports

One RS-232C connector and one DB9 connector

Ethernet (RJ-45)

USB

VGA

## Vaporizers

| | |
|---|---|
| Vaporizer | Mindray V60 Anesthetic Vaporizer or Penlon Sigma Delta Anesthetic Vaporizer |
| Support agents | Halothane, Enflurane, Isoflurane, Sevoflurane |
| Position | MAX.2 |
| Mounting mode | Selectatec®, with interlocking function<br>Plug-in®, with interlocking function |

## Modules

### Anesthesia Gas (AG) Module

| | |
|---|---|
| Monitor gases | $CO_2$, $N_2O$, Halothane, Enflurane, Isoflurane, Sevoflurane, Desflurane, MAC, Paramagnetic $O_2$ (optional) |
| Warm-up time | 45 s (ISO accuracy mode)<br>10min (full accuracy mode) |
| Pump rate | Adu/Ped: 150, 180, 200 ml/min<br>Neo: 100, 110, 120 ml/min |
| Range | $CO_2$: 0% ~ 10%<br>Des: 0% ~ 18 %<br>Sev: 0% ~ 8%<br>Enf, Iso, Hal: 0% ~ 5%<br>$O_2$/$N_2O$: 0% ~ 100% |

### Carbon Dioxide ($CO_2$) Modules

| | |
|---|---|
| Method | Infrared absorption |
| Module type | Mindray side-stream<br>Capnostat mainstream<br>Oridion micro-stream<br>(optional) |
| Work mode | Standby or measurement |
| Displayed numerics | $EtCO_2$, $FiCO_2$ |
| Waveform | Capnography |

### Side-Stream Carbon Dioxide ($CO_2$) Module

| | |
|---|---|
| Measurement range | 0 ~ 152 mmHg |
| Accuracy | ±2 mmHg (0 ~ 40 mmHg)<br>± 5% of the real reading (41 ~ 76 mmHg)<br>± 10% of the real reading (77 ~152 mmHg)) |
| Resolution | 1 mmHg |
| Pump rate | Neonatal: 100 mL/min or 120 mL/min<br>Adult/children: 120 mL/min or 150 mL/min |
| Warming-up time | < 1 min, enter the ISO accuracy mode<br>After 1 min, enters the full accuracy mode |
| Response time | <5 s@100 mL/min<br><5 s@120 mL/min<br>Measured by using neonatal watertrap and 2.5 m neonatal sampling line<br><6.5 s@120 mL/min<br><6 s@150 mL/min<br>Measured by using adult watertrap and 2.5 m adult sampling line |

### Mainstream $CO_2$ Module

| | |
|---|---|
| Measurement range | 0 ~ 150 mmHg |
| Accuracy | ± 2 mmHg (0 ~ 40 mmHg)<br>± 5% of the reading (41 ~ 70 mmHg)<br>± 8% of the reading (71 ~ 100 mmHg)<br>± 10% of the reading (101 ~ 150 mmHg) |
| Resolution | 1 mmHg |
| Response time | <2 s |
| Alarm limit | $EtCO_2$ High: OFF, 2 ~ 150 mmHg |

| | |
|---|---|
| | $EtCO_2$ Low: OFF, 0 ~ 148 mmHg |
| | $FiCO_2$ High: OFF, 1 ~ 150 mmHg |

**Micro-stream $CO_2$ Module**

| | |
|---|---|
| Measurement range | 0 ~ 99 mmHg |
| Accuracy | 0 ~ 38 mmHg: ± 2 mmHg |
| | 39 ~ 99 mmHg: ± (5 % of the reading + 0.08 % of (the reading minus 38 mmHg)) |
| Sampling rate | 50 ml/min |
| Sampling accuracy | -7.5 ml/min ~ + 15 ml/min |
| Initialization time | 30s |
| Response time | ≤2.9s |
| Rising time | ≤190 ms |
| Alarm range | $EtCO_2$ High: OFF, 2 ~ 99 mmHg |
| | $EtCO_2$ Low: OFF, 0 ~ 97 mmHg |
| | $FiCO_2$ High: OFF, 1 ~ 99 mmHg |

**BIS Module**

| | |
|---|---|
| Measured parameters | EEG |
| BIS/BIS L, BIS R | 0 ~ 100 |
| Sweep speed | 6.25 mm/s,12.5 mm/s, 25 mm/s or 50 mm/s |
| Alarm limit | BIS high: 2 ~ 100 |
| | BIS low: 0 ~ 98 |
| 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 |

**Agent consumption calculation**

| | |
|---|---|
| Calculation range | 0 to 3000 ml |
| Accuracy | ± 2 mL, or ± 15% of the real reading, whichever is larger |

**Agent consumption speed**

| | |
|---|---|
| Anesthetic agents | Desflurane, Enflurane, Isoflurane, Sevoflurane and Halothane |
| Consumption speed | Desflurane: 0 ~ 900 ml/h |
| | Sevoflurane: 0 ~ 450 ml/h |
| | Enflurane, Isoflurane and Halothane: 0 ~ 250 ml/h |
| Accuracy | ± 2ml/h or ±15% of the real reading, whichever is greater |

**Anesthetic Prediction**

| | |
|---|---|
| Patient Type | Height: 150 to 200 cm |
| | Weight: 40 to 140 kg |
| | Age: 18 to 90 years old |
| Anesthetic Agents | Desflurane, Enflurane, Isoflurane, Sevoflurane and Halothane |
| Prediction trend and waveform | |
| | The system displays 8 waveforms: 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≠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 |

**Electrical Specifications**

**Current Leakage**

| | |
|---|---|
| 100 ~ 240V | < 500 μA |

**Power and Battery Backup**

| | |
|---|---|
| Power input | 220-240 V, 50/60 Hz, 6A |
| | 100-120 V, 50/60 Hz, 7A |
| | 100-240 V, 50/60 Hz, 7A |
| Auxiliary electrical outlets | |
| | Up to 4 outlets (3A for each, total 5A) |
| Battery backup | 150 minutes in case of two batteries (powered by new fully-charged batteries with 25°C ambient temperature) |
| Battery type | Build-in Li-ion battery, 9000 mAh (two batteries) |
| Safety feature | In case of electricity and battery failure, manual ventilation, gas delivery and agent delivery are possible |

**Pneumatic Specifications**

**ACGO (Auxiliary Common Gas Outlet, Integrated)**

| | |
|---|---|
| Connector | ISO 22 mm OD and 15 mm ID |

**Pipeline Supply**

| | |
|---|---|
| Gas type | $O_2$, $N_2O$ and Air |
| Pipeline input range | 280 to 600 kPa |
| Pipeline connections | DISS or NIST |

**Pipeline Supply Pressure Gauges**

| | |
|---|---|
| Display type | Electronic or Mechanical |
| Ranges | 0 to 1000kPa |
| 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 |
| $N_2O$ Input Range | 4.2 to 6 MPa |
| Air Input Range | 6.9 to 20 MPa |
| Cylinder Connections | Pin-Index Safety System (PISS) |
| Yoke Configuration | $O_2$, $N_2O$, Air |

**Cylinder Supply Pressure Gauges**

| | |
|---|---|
| Display type | Electronic or Mechanical |
| Air Range | 0 to 25 MPa |
| $O_2$ Range | 0 to 25 MPa |
| $N_2O$ Range | 0 to 10 MPa |
| Accuracy | ± (4% of the full scale reading+8% of the actual reading) |

**$O_2$ Controls**

| | |
|---|---|
| Method | $N_2O$ shut off with loss of $O_2$ pressure |
| Supply failure alarm | ≤ 220.6 kPa ± 34.2kPa |
| $O_2$ Flush | 25 ~ 75 L/min |

**Auxiliary $O_2$ Flowmeter**

| | |
|---|---|
| Range | 0 ~ 15 L/min |
| Indicator | Flow tube |

**High Flow Nasal Cannula Oxygen (HFNC)**

| | |
|---|---|
| Range | 0 ~ 60 L/min |
| Indicator | Flow tube |

**Electronic Flow control system (Electronic Mixer)**

**Direct Flow Control Mode**

| | |
|---|---|
| $O_2$ flow range | 0 to 15 L/min |
| Air flow range | 0 to 15 L/min |
| $N_2O$ 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/$N_2O$) flow accuracy | |
| | ± 50 ml/min or ±5% of setting value, whichever is greater |

**Total Flow Control Mode**

| | |
|---|---|
| Total flow range | 0.2 to 18 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) or 26% to 100% (The balance gas is $N_2O$) |
| Accuracy | ± 5% V/V for flows < 1 L/min or 5% setting for flows ≥ 1 L/min |

### Optimizer
Only available when AG or $CO_2$ 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)

### Total flow meter

| | |
|---|---|
| Control Range (O2) | 1 +/- 0.25 to 10 L/min |
| Indicator | Flow tube |
| Indicator accuracy | ± 10% of the indicated value for flows (between 10% and 100% of full scale with oxygen) |

## Environmental Specifications

### Operating

| | |
|---|---|
| Temperature | 10 ~ 40°C |
| Relative humidity | 15% ~ 95% (noncondensing) |
| Barometric (Kpa) | 70 ~ 106 kPa |

### Storage

| | |
|---|---|
| Temperature | -20 ~ 60°C for main unit,<br>-20 ~ 50°C for $O_2$ sensor |
| Relative humidity | 10% ~ 95% (noncondensing) |
| Barometric | 50 ~ 106 kPa |

### Electromagnetic Compatibility

| | |
|---|---|
| Immunity | Complies with all requirements of IEC 60601-1-2 |
| Emissions | Complies with all requirements of IEC 60601-1-2 |

## Breathing System Specification

### Breathing system volume (Pre-pak)

| | |
|---|---|
| Automatic ventilation | 2850 ml |
| Manual ventilation | 1800 ml |

### Breathing system volume (Non Pre-pak)

| | |
|---|---|
| Automatic ventilation | 2600 ml |
| Manual ventilation | 1800 ml |

### System Components
Carbon dioxide absorbent canister
Absorbent capacity: 1500 mL
Integrated expiratory limb water trap
Capacity: 6 mL

### Breathing Circuit Parameters

| | |
|---|---|
| System leakage | ≤ 60 mL/min at 3 kPa |
| Compliance | ≤4 mL/100Pa (Manual mode)<br>Automatically compensates for compression losses within the breathing circuit in mechanical mode |
| Expiration resistance | < 6.0 cm $H_2O$ @60 L/min |
| Inspiration resistance | < 6.0 cm $H_2O$ @60 L/min |

### System Pressure Gauge

| | |
|---|---|
| Range | -20 ~ 100 $cmH_2O$ |
| Accuracy | ± (2% of the full scale reading + 4% of the actual reading) |

### Ports and 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 |

### Integrated Adjustable Pressure Limiting (APL) Valve

| | |
|---|---|
| Range | SP, 5 ~ 70 $cmH_2O$ |
| Tactile knob indication at above 30 $cmH_2O$ | |
| Accuracy | ± 3 $cmH_2O$ or ± 15% of the setting value, which is greater, but is not more than + 10 $cmH_2O$ |

### Anesthetic Gas Scavenging System (AGSS)

| | |
|---|---|
| Size (H x W x D) | 430 x 132 x 114 mm |
| Type of disposal system | Active: High-flow or Low-flow<br>Passive |
| Applicable standard | ISO 80601-2-13 |
| Pump rate | 75 ~ 105 L/min (High-flow)<br>25 ~ 50 L/min (Low-flow) |

Pressure relief device: Pressure compensation opening to the air
State indication of the disposal system: The float falls below the "MIN" mark on the sight glass when the disposal system does not work or the pump rate is lower than 25 L/min (Low-flow) or 75 L/min (high-flow).
Connector of the disposal system: ISO 9170-2

### Materials
All materials in contact with exhaled patient gases are autoclavable, except flow sensors (being not capable of being autoclaved), $O_2$ sensor, and mechanical pressure gauge.
All materials in contact with patient gas are latex free.

## Suction Device

### Venturi Suction Regulator

| | |
|---|---|
| Gas source | Air, from system gas source |
| Minimum flow | 20 L/min |
| Maximum vacuum | ≥72 kPa at supply gas pressure of 280 kPa;<br>≥73 kPa at supply gas pressure of 600 kPa |

### Continuous Suction Regulator

| | |
|---|---|
| Supply | Negative Pressure Suction |
| Maximum vacuum | 517.5 mmHg to 540 mmHg (69 kPa to 72 kPa) with external vacuum applied of 540 mmHg and 40 L/min free flow |
| Maximum flow | 39 L/min to 40 L/min with external vacuum applied of 540mmHg and 40 L/min free flow |
| Minimum flow | 20 L/min |

---

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

**www.mindray.com**

P/N: ENG-WATO EX-65 Pro datasheet-210285X4P-20210330



mindray
healthcare within reach

# WATO EX-65 Pro

# Anesthesia System

# Operator’s Manual

CE 0123

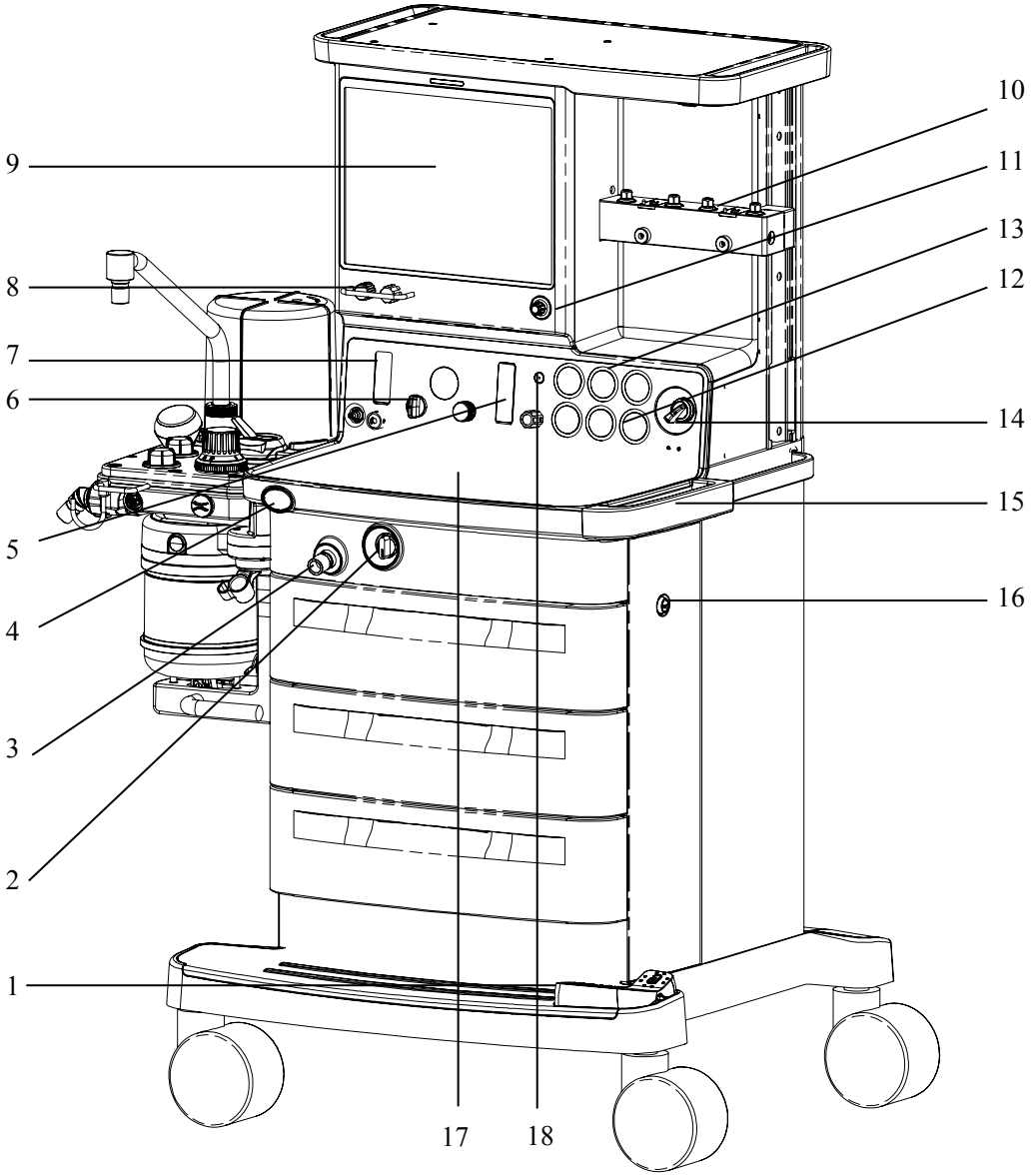
# 2.2 Equipment Appearance

The anesthesia system can be configured with two types of breathing systems. Anesthesia system with breathing system compatible with Pre-Pak and anesthesia system with breathing system not compatible with Pre-Pak are defined here.

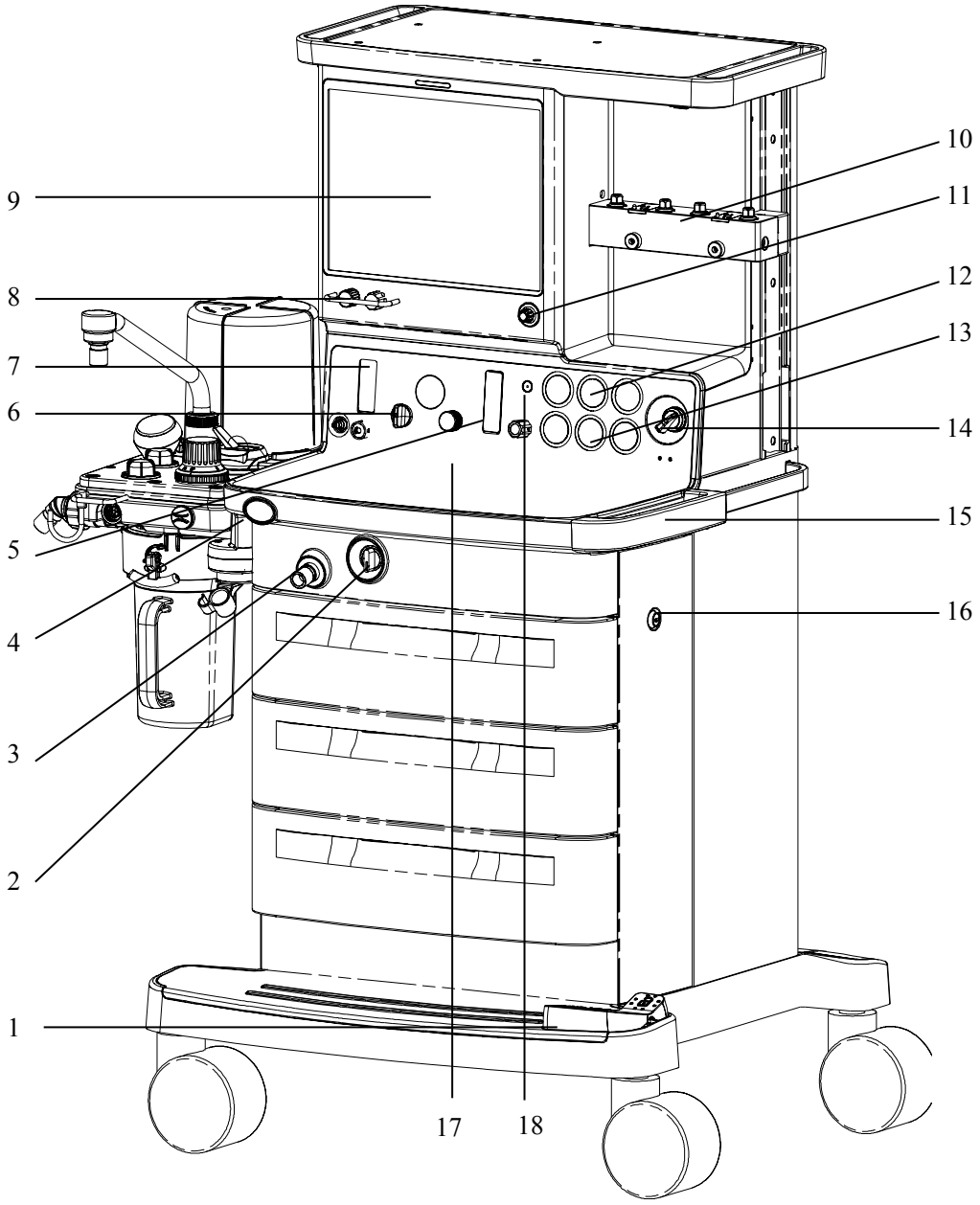
## 2.2.1 Front View

### ——Display and control panel

Anesthesia system with breathing system compatible with Pre-Pak:



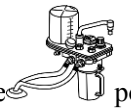
Anesthesia system with breathing system not compatible with Pre-Pak:



1. Brake
2. ACGO (Auxiliary Common Gas Outlet) switch

   ◆ Set the switch to the 

position to stop mechanical ventilation. Then, fresh gas is sent to the externally connected manual breathing system through the ACGO. The system monitors airway pressure and $O_2$ concentration instead of volume.

   ◆ Set the switch to the  position to apply mechanical or manual ventilation to the patient through the breathing system.
3. ACGO separate outlet
4. $O_2$ flush button

   Push $O_2+$ to supply high flows of $O_2$ to the breathing system.
5. Total flowmeter

   The middle of the float in the flow tube indicates the current flow of the mixed gas.
6. Negative pressure suction control panel
7. Auxiliary flowmeter/High-flow nasal cannula oxygen (HFNC)

   The middle of the float in the flow tube indicates the current flow of auxiliary $O_2$ supply or high flow $O_2$ supply.

   The flow control of the flowmeter controls the flow as follows:

   ◆ Turn the control counterclockwise to increase the gas flow.

   ◆ Turn the control clockwise to decrease the gas flow.
8. Flow control (s)

   When the system switch is set to the ON position:

   ◆ Turn the control counterclockwise to increase the gas flow.

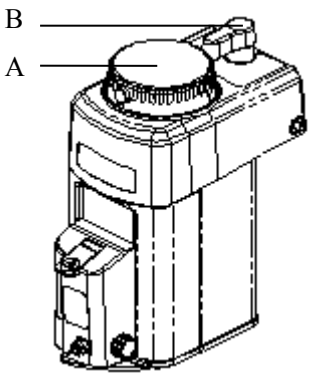
   ◆ Turn the control clockwise to decrease the gas flow.
9. Display
10. Vaporizer V60

    A. Concentration control

    Push the button and turn the concentration control to set the concentration of anesthetic agent.

    B. Locking lever

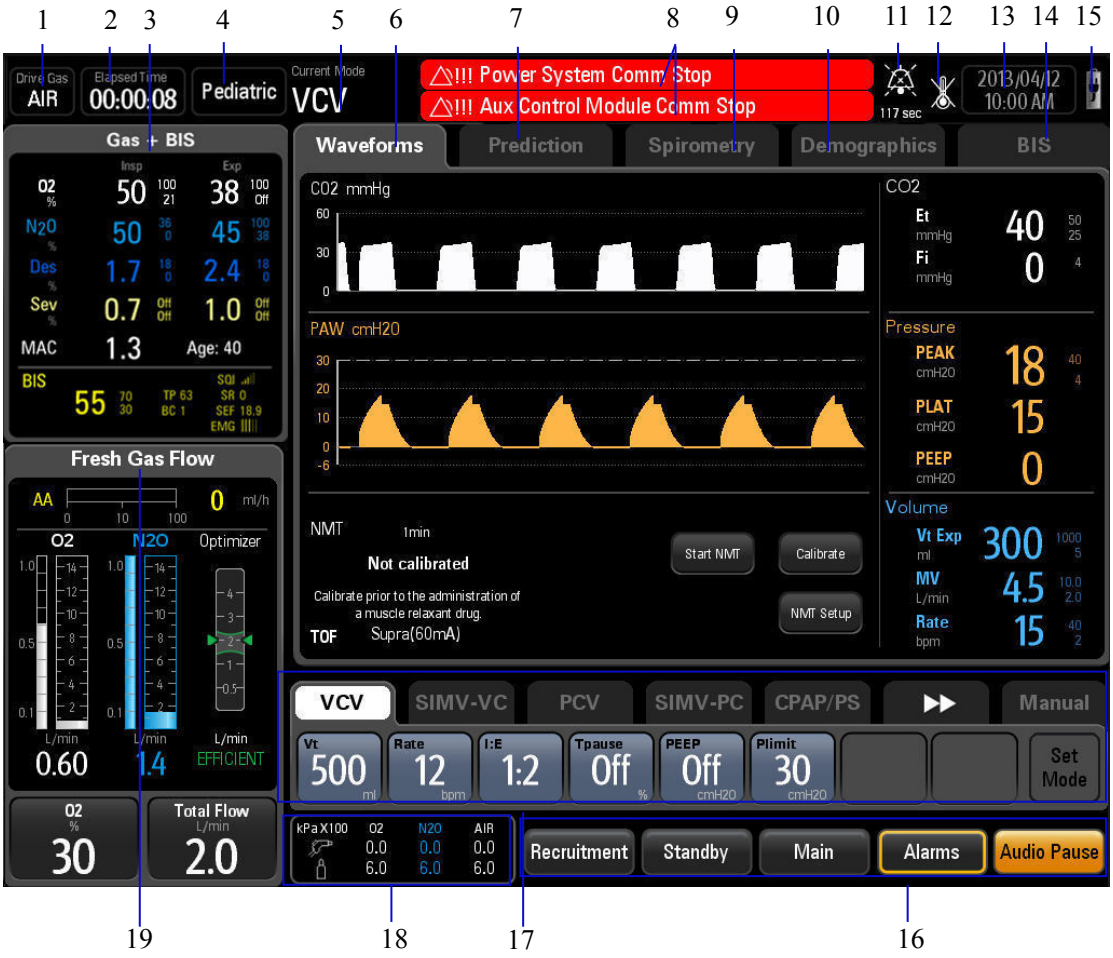
    Turn the locking lever clockwise to lock the vaporizer in position.




11. Control knob

# 3 System Controls and Basic Settings

## 3.1 Display Control




1. Drive Gas

   Displayed if configured with Drive Gas Auto Switch function. It displays current drive gas type. When the primary drive gas pressure is low and the temporary drive gas pressure is normal, select [**Yes**] from the pop-up dialog box to switch to the temporary drive gas. When the primary drive gas pressure resumes, select [**Yes**] from the pop-up dialog box to switch to the primary drive gas. When the area displays the temporary drive gas or the primary drive gas pressure is low, you can select the area to open the [**Drive Gas**] menu and set the drive gas in the menu.

2. Elapsed Timer

   Displays elapsed time. Select to start, stop, or reset the timer.

3. Gas and/or BIS Area

   Displayed when AG module and/or BIS module is connected. It displays real-time inspiratory and expiratory levels of gas concentration.

# 4.4 Input Fresh Gas

## 4.4.1 Set $O_2$, $N_2O$ and Air Inputs

Safety systems within the anesthesia system work to prevent hypoxic mixtures from being delivered to the patient. Nitrous oxide will not be delivered unless oxygen flow is present.

All units are designed to maintain a safe O2:N2O ratio by allowing nitrous oxide to be set to a flow rate that is proportional to a previously adjusted flow of oxygen. The N2O flow is limited by the flow of O2 so that a safe ratio of no less than 25% oxygen can be maintained.

1. Connect the gas supplies correctly and ensure adequate gas pressure.
2. Set the O2 and balance gas through EFCS or set the $O_2$ flow through BFCS.

### NOTE

- **This anesthesia system can be used alone as a ventilator. You can adjust $O_2$ concentration in the breathing system through the $O_2$ flow control.**
- **The $O_2$ concentration in the fresh gas may be quite different from that in the breathing system.**
- **The total flowmeter is calibrated based on 100% $O_2$. The accuracy of the flowmeter may degrade with other gas or mixed gas.**
- **When viewing the readings on the total flowmeter, keep your visual angle at the same level as the level of the float. The reading of a same scale may vary when viewed at a different angle.**
- **If the readings shown on the electronic flowmeters differ from that on the total flowmeter, the former shall prevail and the latter is an approximate value.**

## 4.4.2 Set Anesthetic Agent

### NOTE

- **You do not need to perform this operation if inspiratory anesthetic agent is not used.**
- **This anesthesia system can be mounted with vaporizers corresponding with Halothane, Enflurane, Isoflurane, Sevoflurane and Desflurane. Only one of the two mounted vaporizers can be opened at a time because the vaporizers are featured with interlock.**

# 5.5 Gas Monitoring

## 5.5.1 Display Gas Parameter

The gas monitored parameter group consists of the following parameters (available with the AG module):

- Fraction of inspired carbon dioxide and End-tidal carbon dioxide ($FiCO_2$ and $EtCO_2$)
- Fraction of inspired oxygen and End-tidal oxygen ($FiO_2$ and $EtO_2$)
- Fraction of inspired nitrous oxide and End-tidal nitrous oxide ($FiN_2O$ and $EtN_2O$)
- Fraction of inspired anesthetic agent and End-tidal anesthetic agent (FiAA and EtAA, AA stands for anesthetic agent)
- Minimum alveolar concentration (MAC)
- Age

The gas monitored parameter group consists of the following parameters (available with the $CO_2$ module):

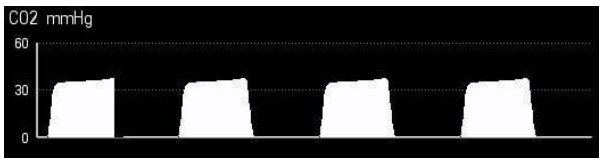
- Fraction of inspired carbon dioxide and End-tidal carbon dioxide ($FiCO_2$ and $EtCO_2$)
- Breath rate (Rate) (display only when the system is in the ACGO or Monitor mode)

If the parameter data is out of range, it is displayed as ---.

### NOTE

- **The high alarm limit is displayed to the top right of the reading. The low alarm limit is displayed to the bottom right of the reading.**

## 5.5.2 Display Gas Waveform




The Y-axis of the $CO_2$ vs. Time waveform is labeled $CO_2$. The unit of measure is mmHg, kPa, or %. You can adjust the scales of the Y-axis.

# 6.4 Leak and Compliance Tests

## 6.4.1 Automatic Circuit Leak and Compliance Test

### NOTE

- **The system records the result of the last Automatic Circuit Leak & Compliance Test in the [General] tab, including if the test had passed, failed, or was skipped. To access this information, from the main screen, select the [**Main**] softkey → [General] tab.**
- **If fresh gas is detected by the system before proceeding with the Automatic Circuit Leak & Compliance Test, a [Fresh gas flow detected! Adjust all flowmeters to zero].**

1. Start to test.

■ From power up:

If the System is being powered on, the system automatically initiates a system self-test. The system self-test includes the **Automatic Circuit Leak & Compliance Test**.

■ From the main screen:

Select the [**Main]** softkey → [**General**] tab → [**Test Leak/Compliance**] button.

2. Follow the instructions on the screen:
   (1) Seal the Y-piece.
   (2) Ensure that the sample line port of the breathing circuit is occluded.
   (3) Ensure the vaporizers are locked and closed.
   (4) (If mechanical ACGO is configured) Turn off the ACGO switch.
   (5) Set the Auto/Manual switch to the  position

Select [**Continue]** button to proceed with the Automatic Circuit Leak Test.

### NOTE

- **The [Continue] button can be selected only when the Auto/Manual switch is set to the  position and when no fresh gas is detected.**

3. Proceed to operate based on the self-test results.

## 6.4.2 Manual Circuit Leak Test

### NOTE

- **If fresh gas is detected by the system before proceeding with the Manual Circuit Leak Test, a [Fresh gas flow detected! Adjust all flowmeters to zero] message is displayed on the screen.**

1. Start to test.

■ From power up:

If the System is being powered on, the system automatically initiates a system self-test. The system self-test includes the **Manual Circuit Leak Test**.

■ From the main screen:

Select the [**Main]** softkey → [**General**] tab → [**Test Leak/Compliance**] button.

2. Follow the instructions on the screen:
   (1) Adjust the **APL** to the 50 $cmH_2O$ position.
   (2) Install the manual bag.
   (3) Set the Auto/Manual switch to the  position.

Select [**Continue**] button to proceed with the **Manual Circuit Leak Test**.
Or,
Select [**Skip**] button to go directly to operational mode.

### NOTE

- **The [Continue] button can be selected only when the Auto/Manual switch is set to the  position and when no fresh gas is detected.**

3. Proceed to operate based on the self-test results.

# 12 Alarms

## 12.1 Introduction

Alarms, triggered by a vital sign that appears abnormal or by technical problems of the anesthesia system, are indicated to the user by visual and audible alarm indications.

### NOTE

- **The System performs a self-test of its alarm system when powered on. The self-test includes the alarm LED and speaker. During the self-test, the alarm LED will illuminate in sequence the colors red, yellow, and cyan for approximately 1 second each color. The system speaker will produce one tone after the alarm light is in self-test.**
- **If the equipment power failure lasts for not more than 60 s, the alarm settings prior to the power failure are restored when the equipment is powered on again.**
- **The auditory alarm signal A-weighted sound pressure level is within 45 to 85 dB.**
- **When multiple alarms of different levels occur simultaneously, the anesthesia system will select the alarm of the highest level and give visual and audible alarm indications accordingly.**
- **When multiple alarms of same levels occur simultaneously, the alarm messages are displayed in order of time of occurrence.**

### 12.1.1 Types of Alarms and Messages

By nature, the anesthesia system's alarms fall into three categories: physiological alarms, technical alarms and prompt messages.

1. Physiological alarms

   Physiological alarms, also called patient status alarms, are triggered by a monitored parameter value that violates set alarm limits or an abnormal patient condition. Physiological alarm messages are displayed in the physiological alarm area.

2. Technical alarms

   Technical alarms, also called system status alarms, are triggered by a device malfunction or a patient data distortion due to proper operation or mechanical problems. Technical alarm messages are displayed in the technical alarm area.

3. Prompt messages

   As a matter of fact, prompt messages are not alarm messages. Apart from the physiological and technical alarm messages, the anesthesia system will show some messages telling the system status. Messages of this kind are included into the prompt message category and usually displayed in the prompt message area.

## 12.1.2 Alarm Indicators

The system provides the following alarm indicators:

- **An alarm LED located on top of the LCD monitor.** The LED can illuminate red, yellow, cyan, or OFF depending on the alarm condition. The following table describes the alarm behavior of different alarm types and different alarm priority labels. If multiple alarms occur simultaneously, the audio and LED behavior will follow the highest priority active alarm.
- **Colored alarm messages displayed on the Main Screen.** High priority messages are red. Medium priority messages are yellow. Low priority messages are cyan. Prompt messages are white. Messages are displayed according to priority and time.
- **Alarm audio through the system alarm speaker.** The following table lists the audio behavior for each type of alarm.

| Alarm Type | Alarm Priority | Audio Behavior | Message Behavior | Alarm LED Color |
|---|---|---|---|---|
| Physiological Alarm | High | Play high priority alarm sound file, the interval between each play is 5 ± 1 s. | White text red background, high priority icon . | Red |
| | Medium | Play medium priority alarm sound file, the interval between each play is 5 ± 1 s. | Black text yellow background, medium priority icon . | Yellow |
| | Low | Play low priority alarm sound file, the interval between each play is 17 ± 1 s. | White text cyan background, low priority icon . | Cyan |
| Technical Alarm | High | Play high priority alarm sound file, the interval between each play is 5 ± 1 s. | White text red background, high priority icon . | Red |
| | Medium | Play medium priority alarm sound file, the interval between each play is 5 ± 1 s. | Black text yellow background, medium priority icon . | Yellow |
| | Low | Play low priority alarm sound file, the interval between each play is 17 ± 1 s. | White text cyan background, low priority icon . | Cyan |
| Prompt Message | None | None | Black text white background | Off |

## 12.2 Display Alarms

On the LCD monitor screen, alarm messages are automatically displayed at the top area of the Main Screen when alarm conditions occur. Additionally, a list of all active alarms and an alarm log can be found in the [**Alarms**] window.

Each message is displayed with an associated priority symbol as follows:

- High priority: △!!!
- Medium priority: △!!
- Low priority: △!

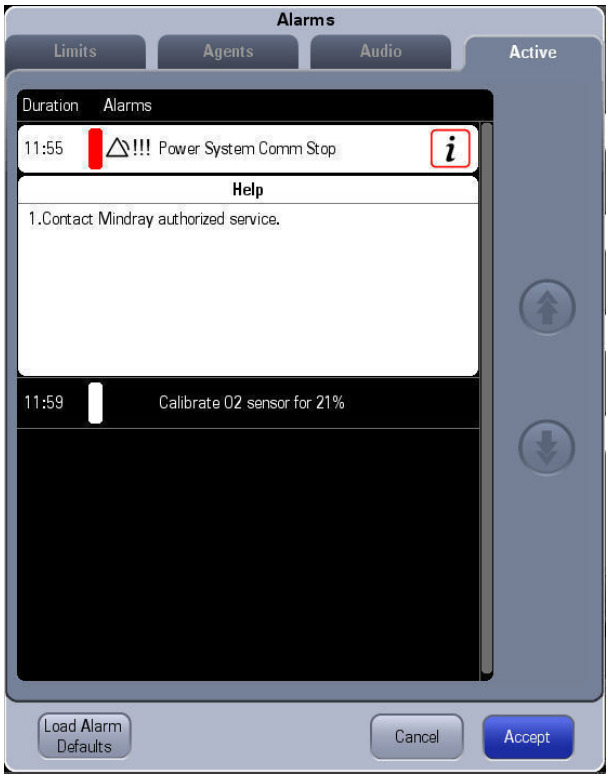
To display a list of all active alarms:

1. On the Main Screen, select the [**Alarms**] softkey or touch the Alarm Message area at the top of the screen.

   The [**Alarms]** window is displayed.

2. Select the [**Active]** tab.

   A list of all active alarm messages is displayed. Alarms are displayed in order of priority and time.

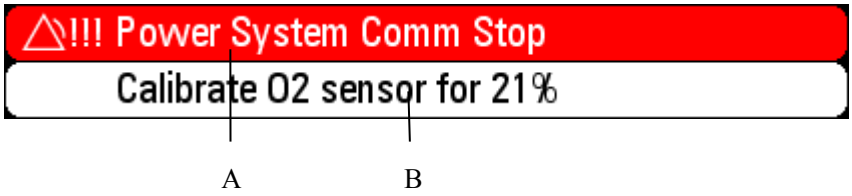


**NOTE**

- **Only high priority alarms offer help information.**
- **Active alarms are ordered by alarm priority and time. The most recent and highest alarm is shown first.**

## 12.3 Displayed Order of Alarm Messages

Alarm messages are displayed in order of priority and time of occurrence. The alarm messages list divided into two areas.




A: Area A (Highest priority and most recent alarm)
B: Area B (Less priority or less recent alarms)

- To be in Area A, an alarm must be both the highest priority and the most recent (Area A does not cycle). The remaining active alarms and prompt messages cycle in Area B.
- New Alarms with less priority than alarms in Area A are displayed immediately in Area B, and the cycle proceeds from that position in the list.
- Alarms cycling in Area B are grouped and displayed in the following order: high priority, medium priority, low priority, and prompt messages. In each group, the most recent alarm is displayed first.
- If the alarm in Area A is removed, then the most recent and highest priority alarm from Area B is moved to Area A.

## 12.4 Set Alarm Volume

Users can set the audio level of alarms and system alerts by selecting the [**Alarms**] softkey on the Main Screen to display the [**Alarms**] window.
The [**Alarms**] volume settings adjust the audio level of all high, medium, and low Priority sounding alarms. The [**System Alerts**] volume settings adjust the audio level of all sounding pop-up prompts and non-confirmed ventilation mode alerts.
To set the Alarm Volume:

1. On the Main Screen, select the [**Alarms**] softkey.

   The [**Alarms]** window is displayed.

2. Select the [**Audio]** tab.

   Volume controls for [**Alarms]** and [**System Alerts]** are displayed.

3. Adjust the volume by selecting the  (increase) or  (decrease) buttons.

   - The Alarms volume has 10 levels of adjustment. Default level is 5.
   - The System Alerts volume has 10 levels of adjustment. Default level is 2.

4. Select [**Accept]** button to activate your changes and exit the [**Alarms**] window. (Selecting [**Cancel]** button will discard your changes and exit the [**Alarms**] window.)

### ⚠WARNING

- **Do not rely exclusively on the audible alarm system when using the anesthesia system. Adjustment of alarm volume to a low level may result in a hazard to the patient. Always keep the patient under close surveillance.**

## 12.5 Set Alarm Limits

### ⚠WARNING

- **Set ALARM LIMITS to extreme values can render the ALARM SYSTEM useless.**

### NOTE

- **An alarm is triggered when the parameter value is higher than the [**High Limit**] or lower than the [**Low Limit**]. The background of this parameter flashes. Click the flashing parameter to open the [Alarms] menu, to set the alarm limit quickly.**
- **When using the anesthesia system, always keep an eye to whether the alarm limits of a specific parameter are set to the appropriate values.**
- **When the machine is powered on after system power is off, the configuration to be loaded should be determined according to the power off duration. If the power off duration is equal to or longer than 120 seconds then the user default configurations should be loaded into Current configurations. If the power off duration is equal to or shorter than 60 seconds then the latest configurations should be loaded into the Current configurations. When the anesthesia system is powered on 60 seconds to 120 seconds after the previous power-off, either the latest current configuration or the user default configuration may be loaded. This is unspecified due to precision error of power-off duration saved in the system.**

## 12.5.1 Set Ventilator Alarm Limits

Users can set the alarm limits of Paw, MV, Vt Exp, Rate, $FiO_2$, $EtO_2$, $FiN_2O$, $EtN_2O$, $FiCO_2$ and $EtCO_2$ to create alarm conditions consistent with patient needs. The alarm is then triggered when the parameter value is greater than the High Limit or lesser than the Low Limit.

1. On the Main Screen, select the [**Alarms**] softkey.

   The [**Alarms]** window is displayed.
2. Select the [**Limits]** tab or [**Agents]** tab.
3. Select a parameter softkey. The softkey is highlighted when selected.
4. Use the on-screen keypad to enter the desired parameter value, or press down the  or  button to increase or decrease the parameter value, or turn the control knob to set the value. For each parameter, the range of values is displayed above the keypad.
5. Optionally, to restore the default values, select the [**Load Alarm Defaults]** button. This restores the high and low values for the parameters to the user default values.
6. Repeat Steps 3 and 4 for each parameter value.
7. Select [**Accept]** button to save the change (or select [**Cancel]** button to not save).

## 12.5.2 Set $CO_2$ Alarm Limits

1. On the Main Screen, select the [**Alarms**] softkey → [**Limits]** tab.
2. Set [**High Limit**] and [**Low Limit**] respectively for each parameter.
3. Select [**Accept]** button to save the change (or select [**Cancel]** button to not save).

## 12.5.3 Set AG Alarm Limits

1. On the Main Screen, select the [**Alarms**] softkey → [**Agent]** tab.
2. Set [**High**] and [**Low**] respectively for each parameter.
3. Select [**Accept]** button to save the change (or select [**Cancel]** button to not save).

## 12.5.4 Set BIS Alarm Limits

1. On the Main Screen, select the [**Alarms**] softkey → [**BIS]** tab.
2. Set [**High**] and [**Low**] respectively for each parameter.
3. Select [**Accept]** button to save the change (or select [**Cancel]** button to not save).

## 12.5.5 Auto Alarm Limits

The Auto Alarm Limits function uses an algorithm based on measured values. The relationship is shown in the table below.

The [**Auto Alarm Limits**] button is disabled when the system is in Standby mode, Manual mode or Monitor mode. The [**Auto Alarm Limits**] button is also disabled when the current mode is PS, SIMV-VC, or SIMV-PC.

| **Alarm Limit** | **Adjust Formula** |
|---|---|
| Paw High | PEAK+5 or PLAT+10, whichever is greater<br>minimum 35 $cmH_2O$ |
| Paw Low | (PLAT-PEEP) × 0.6 + PEEP - 1<br>minimum 3 $cmH_2O$<br>maximum Paw High - 1 |
| MV High | MV × 1.4<br>minimum 2.0 L/min |
| MV Low | MV × 0.6<br>minimum 0.3 L/min<br>maximum MV High - 0.1 |
| Vt Exp High | Vt Exp× 1.4<br>maximum 1600 mL |
| Vt Exp Low | Vt Exp× 0.6<br>minimum 0 mL |
| Rate High | Rate × 1.4<br>maximum 100 bpm |
| Rate Low | Rate × 0.6<br>minimum 2 bpm |

The parameters in the formula are all measured parameters. The new alarm limits for Paw are calculated on the basis of average values for PEAK, PLAT, and PEEP. The value used for average uses the value of the last four ventilation cycles or the value in one minute, whichever is smaller. Spontaneous breaths by the patient are not taken into account.

If there is not a valid measured MV, the corresponding MV alarm limits will not be adjusted.

If the average value for PEAK, PLAT, and PEEP cannot be calculated, the corresponding alarm limits will not be adjusted.

If the calculated alarm limit is more than the high threshold of setting range or less than the low threshold, the corresponding threshold is used as the auto alarm limit.

# 12.6 Alarm Audio Pause

## 12.6.1 Set Alarm Audio Pause

When an alarm condition occurs and the alarm audio is heard, the user can select the [**Audio Pause**] softkey to pause the alarm audio. In audio paused status, all the alarm indicators work normally except audible alarm tones.

Select [**Audio Pause**] softkey to pause all currently sounding alarm tones. The icon on the left of the alarm message changes to  . It indicates the alarm audio has been paused. The alarm audio pause icon 

and 120 s countdown time appear at the top of the screen.

### NOTE

- **The alarm audio will be heard, if an alarm condition occurs when the system is in an audio-off state. Select [Audio Pause] softkey, the new alarm tone will be paused for 120 s.**
- **When the 120 s countdown time is up, the 120 s alarm audio paused status will be finished and audible alarm tones restored.**

### 12.6.2 Cancel Alarm Audio Pause

In the alarm audio paused status, pressing [**Audio Pause**] softkey or triggering a new alarm will finish the current paused status and restore audible alarm tones. Besides, the alarm audio pause icon 

and 120 s countdown time will disappear from the upper right corner of the screen.

## 12.7 When an Alarm Occurs

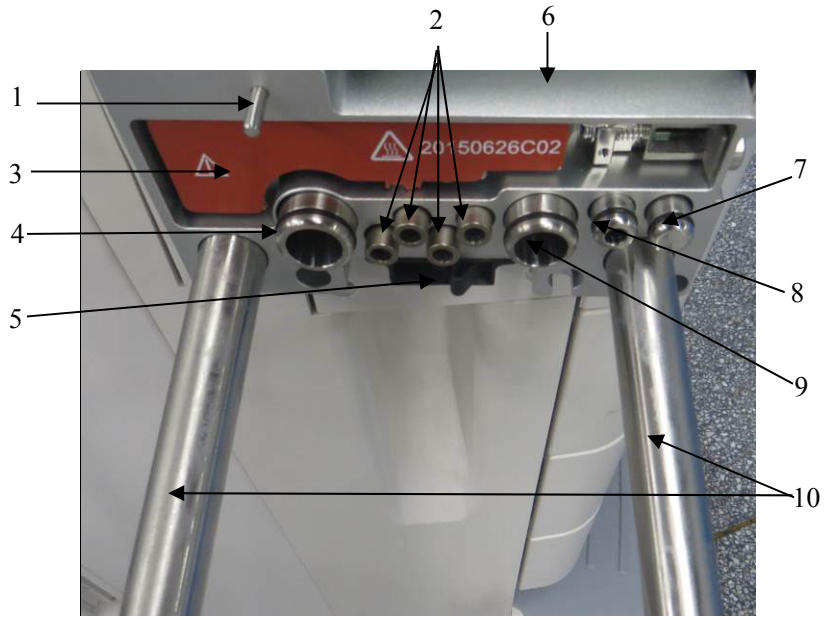
When an alarm occurs, do as follows:

1. Check the patient's condition.
2. Determine the alarming parameter or alarm category.
3. Identify the alarm source.
4. Take proper actions to eliminate the alarm condition.
5. Ensure the alarm condition is corrected.

For details about how to troubleshoot alarms, refer to ***D Alarm and Prompt Messages.***

| | | | |
|---|---|---|---|
| 1 | Bellows housing | 12 | Leak test plug |
| 2 | Bag arm | 13 | Expiration connector |
| 3 | Auto/Manual switch | 14 | Inspiration connector |
| 4 | APL valve | 15 | Water collection cup |
| 5 | Inspiratory check valve | 16 | Drive gas connector |
| 6 | Expiratory check valve | 17 | Guide pin hole |
| 7 | $O_2$ sensor | 18 | Locking catch retainer |
| 8 | Hook | 19 | Pressure sampling connector |
| 9 | $CO_2$ absorbent canister | 20 | APL valve gas outlet |
| 10 | Handle for $CO_2$ absorbent canister | 21 | Fresh gas inlet |
| 11 | Airway pressure gauge | 22 | ACGO connector |

### 13.1.1.2 Circuit Adapter Diagram



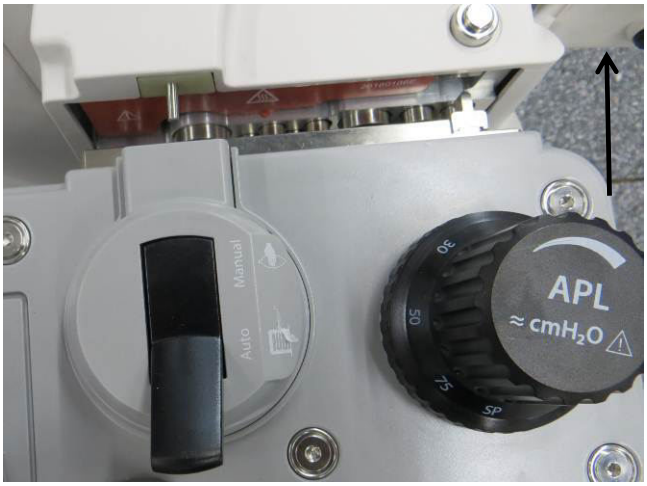

| | | | |
|---|---|---|---|
| 1 | Auto/Manual ventilation linked switch | 6 | Circuit adapter base |
| 2 | Pressure sampling connector | 7 | ACGO connector |
| 3 | Heating module | 8 | Fresh gas inlet |
| 4 | Drive gas connector | 9 | APL valve gas outlet |
| 5 | Circuit switch | 10 | Circuit support guide |

## NOTE

- **The heating module does not work when the anesthesia system is battery powered.**
- **Do not overbear the bag arm, such as depressing it forcibly or hanging heavy objects onto it.**
- **When the difference between the reading on the airway pressure gauge and the Paw value displayed on the screen is great, please contact us.**

### 13.1.1.3 Install the Breathing system

1. Align the guide pin holes on the circuit block with the matching guide pins on the circuit adapter.




2. Push the breathing system into the circuit adapter with force to allow the breathing system to be connected to the adapter seamlessly.


3. Lock the breathing system. Refer to ***13.1.1.8 Install the CO2 Absorbent Canister*** for operation steps. The process of installing the $CO_2$ absorbent canister is the process of locking the breathing system.

## ⚠WARNING

- **After the breathing system is installed onto the circuit adapter, ensure that the breathing system is firmly locked. If not, the breathing system will be disconnected from the circuit adapter during use, which can cause serious fresh gas leak and inaccurate tidal volume measurement.**

| | |
|---|---|
| AGSS receiving hosing, (35G-WAGD-DS/FG2-3), from AGSS assembly to vacuum system | 082-001372-00 |
| AGSS British-standard connection material kit | 115-020745-00 |
| AGSS kit, low flow, high vacuum | 115-030332-00 |
| AGSS kit, high flow, low vacuum | 115-030333-00 |
| AGSS Assembly, high-flow, low vacuum | 115-017375-00 |
| AGSS Assembly, low-flow, high vacuum | 115-017376-00 |
| **Patient Monitor Bracket Assembly** | |
| Top shelf mounting kit for Beneview T5 | 115-004004-00 |
| Top shelf mounting kit for Beneview T8 | 115-004003-00 |
| GCX bracket kit for monitor PM7000, 8000 | 115-015769-00 |
| GCX bracket kit for Beneview T5, PM 9000 | 115-015770-00 |
| GCX bracket kit for Beneview T8 | 115-015783-00 |
| GCX bracket kit for Beneview T5, with module rack mounting pole | 115-015771-00 |
| GCX bracket kit for Beneview T8, with module rack mounting pole | 115-015784-00 |
| GCX bracket kit for iMEC, iPM | 115-015786-00 |
| GCX Bracket for N12/15/17/ePM15, fixed height | 115-066028-00 |
| GCX Bracket for N12/15/17, variable | 115-066029-00 |
| GCX Bracket for ePM10/12/uMEC, fixed height | 115-070011-00 |
| GCX Bracket for ePM10/12/uMEC, variable height | 115-070768-00 |
| Top shelf mounting kit for N15/17 | 115-070794-00 |
| Top shelf mounting kit for N12 | 115-074073-00 |
| GCX external auxiliary work surface | 115-073384-00 |
| Flexible bag arm assembly | 115-048035-00 |
| **Gas Source Hose** | |
| O2 supply hose, British standard, NIST, 5m, 34I-OXY-BS/NS-5 | 082-001209-00 |
| Air supply hose, British standard, NIST, 5m, 34I-AIR-BS/NS-5 | 082-001210-00 |
| N2O supply hose, British standard, NIST, 5m, 34I-N2O-BS/NS-5 | 082-001211-00 |
| O2 supply hose, Germany standard, NIST, 5m, 34I-OXY-GS/NS-5 | 082-001212-00 |
| Air supply hose, Germany standard, NIST, 5m, 34I-AIR-GS/NS-5 | 082-001213-00 |
| N2O supply hose, Germany standard, NIST, 5m, 34I-N2O-GS/NS-5 | 082-001214-00 |
| O2 supply hose, Australian standard, NIST, 5m, 34I-OXY-SIS/NS-5 | 082-001215-00 |
| Air supply hose, Australian standard, NIST, 5m, 34I-AIR-SIS/NS-5 | 082-001216-00 |
| N2O supply hose, Australian standard, NIST, 5m, 34I-N2O-SIS/NS-5 | 082-001217-00 |
| O2 supply hose, French standard, NIST, 5m, 34I-OXY-FS/NS-5 | 082-001218-00 |
| Air supply hose, French standard, NIST, 5m, 34I-AIR-FS/NS-5 | 082-001219-00 |
| N2O supply hose, French standard, NIST, 5m, 34I-N2O-FS/NS-5 | 082-001220-00 |
| O2 supply hose, US standard, DISS, 5m, 34U-OXY-DS/DS-5 | 082-003443-00 |
| N2O supply hose, US standard, DISS, 5m, 34U-N2O-DS/DS-5 | 082-003444-00 |
| Air supply hose, US standard, DISS, 5m, 34U-AIR-DS/DS-5 | 082-003445-00 |
| O2 supply hose, British Standard, DISS, 5m, 34U-OXY-BS/DS-5 | 082-001227-00 |
| Air supply hose, British Standard, DISS, 5m, 34U-AIR-BS/DS-5 | 082-001228-00 |

| Alarm settings | | | |
|---|---|---|---|
| **Parameter** | | **Setting range** | **Remark** |
| FiO2 | High Limit | OFF, 20 to 100 % | The specified high limit shall be 2% greater than the low limit. |
| | Low Limit | 18 to 98 % | |
| Vt | High Limit | 5 to 1600 mL | The specified high limit shall be 5 mL greater than the low limit. |
| | Low Limit | 0 to 1595mL | |
| MV | High Limit | 0.2 to 100L/min | When the alarm setting range is 0 to 15L/min, the specified high limit shall be 0.2 L/min greater than the low limit. When the alarm setting range is 15 to 100L/min, the specified high limit shall be 1 L/min greater than the low limit. |
| | Low Limit | 0 to 99L/min | |
| Rate | High Limit | 4 to 100 bpm | The specified high limit shall be 2 bpm greater than the low limit. |
| | Low Limit | 2 to 98 bpm | |
| Paw | High Limit | 2 to 100 $cmH_2O$ | The specified high limit shall be 2 $cmH_2O$ greater than the low limit. |
| | Low Limit | 0 to 98$cmH_2O$ | |

# B.10 Anesthetic Vaporizer

| Anesthetic vaporizer (for details, refer to the vaporizer Instructions for Use) | |
|---|---|
| Type | Penlon Sigma Delta anesthetic vaporizers. Four types of vaporizers with anesthetic agents halothane, enflurane, isoflurane, sevoflurane are available.<br>Mindray-made V60 vaporizer. Four types of anesthetic agents are optional, which are Enflurane, isofluane, halothane, and sevoflurane.<br>Drager D-Vapor Desflurane vaporizer |
| Selectatec® vaporizer manifold | |
| Vaporizer position | Single or double vaporizer positions (optional) |
| Mounting mode | Selectatec®, with interlocking function (Selectatec® is registered trademark of Datex-Ohmeda Inc.) |
| Plug-in® vaporizer manifold | |
| Vaporizer position | double vaporizer positions |
| Mounting mode | Plug-in ®, with interlocking function |

# D Alarm and Prompt Messages

This chapter lists physiological and technical alarm messages, and prompt message.

For each alarm message, corresponding actions are given instructing you to troubleshoot problems. If the problem persists, contact your service personnel.

## D.1 Physiological Alarm Messages

### NOTE

- **The Disable in Manual and Cardiac Bypass mode column indicates how this alarm is controlled by the alarm on/off button and the cardiac bypass mode button in manual mode.**
- **The Disable in Standby mode column indicates which physiological alarms will be disabled automatically in Standby mode.**

### D.1.1 VCM Physiological Alarm List

| Message | Alarm Priority | Cause | Disabled when Alarm is off | Disabled in Standby mode |
|---|---|---|---|---|
| Apnea | Medium | Two triggering conditions are met simultaneously:<br>1. Paw < (PEEP+3) $cmH_2O$ for more than 20 s.<br>2. Vt < 10 mL for more than 20 s. | Yes | N/A |
| Volume Apnea >2 min | High | No breath has been detected within the last 120 s. | Yes | N/A |
| Paw Too High | High | Paw ≥ high alarm limit setting. | No | N/A |
| Paw Too Low | High | Paw ≤ low alarm limit setting for 20 s. | Yes | N/A |
| Pressure Limiting | Low | Paw ≥ Plimit. | N/A | N/A |
| $FiO_2$ Too High | Medium | $FiO_2$ > high alarm limit setting. | No | N/A |
| $FiO_2$ Too Low | High | $FiO_2$< low alarm limit setting. | No | N/A |
| Vt Too High | Medium | Vt > high alarm limit setting. | Yes | N/A |

| | | | | |
|---|---|---|---|---|
| Vt Too Low | Medium | Vt < low alarm limit setting. | Yes | N/A |
| MV Too High | Medium | MV > high alarm limit setting. | Yes | N/A |
| MV Too Low | Medium | MV < low alarm limit setting. | Yes | N/A |
| Rate Too High | Low | Rate > high alarm limit setting. | Yes | N/A |
| Rate Too Low | Low | Rate < low alarm limit setting. | Yes | N/A |
| Continuous Airway Pressure | High | Paw in the breathing circuit > sustained airway pressure alarm limit for 15 s. | No | N/A |
| Negative Pressure | High | Paw < -10 $cmH_2O$ for 1 second. | No | N/A |

## D.1.2 AG Physiological Alarm List

| Message | Alarm Priority | Cause | Disabled when Alarm is off | Disabled in Standby mode |
|---|---|---|---|---|
| $EtCO_2$ Too High | Medium | $EtCO_2$ > high alarm limit setting. | No | Yes |
| $EtCO_2$ Too Low | Medium | $EtCO_2$ < low alarm limit setting. | No | Yes |
| $FiCO_2$ Too High | Medium | $FiCO_2$ > high alarm limit setting. | No | Yes |
| $EtN_2O$ Too High | Medium | $EtN_2O$ > high alarm limit setting. | No | Yes |
| $EtN_2O$ Too Low | Medium | $EtN_2O$ < low alarm limit setting. | No | Yes |
| $FiN_2O$ Too Low | Medium | $FiN_2O$ > high alarm limit setting. | No | Yes |
| EtHal Too High | Medium | EtHAL > high alarm limit setting. | No | Yes |
| EtHal Too Low | Medium | EtHAL < low alarm limit setting. | No | Yes |
| FiHal Too High | Medium | FiHAL > high alarm limit setting. | No | Yes |
| FiHal Too Low | Medium | FiHAL < low alarm limit setting. | No | Yes |
| EtEnf Too High | Medium | EtENF > high alarm limit setting. | No | Yes |
| EtEnf Too Low | Medium | EtENF < low alarm limit setting. | No | Yes |
| FiEnf Too High | Medium | FiENF > high alarm limit setting. | No | Yes |
| FiEnf Too Low | Medium | FiENF < low alarm limit setting. | No | Yes |
| EtIso Too High | Medium | EtISO > high alarm limit setting. | No | Yes |
| EtIso Too Low | Medium | EtISO < low alarm limit setting. | No | Yes |
| FiIso Too High | Medium | FiIso > high alarm limit setting. | No | Yes |
| FiIso Too Low | Medium | FiIso < low alarm limit setting. | No | Yes |
| EtSev Too High | Medium | EtSev > high alarm limit setting. | No | Yes |
| EtSev Too Low | Medium | EtSev < low alarm limit setting. | No | Yes |
| FiSev Too High | Medium | FiSev > high alarm limit setting. | No | Yes |

| | | | | |
|---|---|---|---|---|
| FiSev Too Low | Medium | FiSev < low alarm limit setting. | No | Yes |
| EtDes Too High | Medium | EtDes > high alarm limit setting. | No | Yes |
| EtDes Too Low | Medium | EtDes < low alarm limit setting. | No | Yes |
| FiDes Too High | Medium | FiDes > high alarm limit setting. | No | Yes |
| FiDes Too Low | Medium | FiDes < low alarm limit setting. | No | Yes |
| $EtO_2$ Too High | Medium | $EtO_2$ > high alarm limit setting. | No | Yes |
| $EtO_2$ Too Low | Medium | $EtO_2$ < low alarm limit setting. | No | Yes |
| $FiO_2$ Too High | Medium | $FiO_2$ > high alarm limit setting. | No | Yes |
| $FiO_2$ Too Low | Medium | $FiO_2$ < low alarm limit setting. | No | Yes |
| Apnea $CO_2$ | High | No breath is detected and Apnea time ≥ Apnea alarm time. | No | Yes |
| MAC Too High | Medium | MAC> high alarm limit setting. | No | Yes |
| MAC Too Low | Medium | MAC < low alarm limit setting. | No | Yes |

## D.1.3 BIS Physiological Alarm List

| Message | Alarm Priority | Cause | Disable when Alarm is off | Disabled in Standby mode |
|---|---|---|---|---|
| BIS Too High | Medium | BIS > high alarm limit setting. | No | Yes |
| BIS Too Low | Medium | BIS < low alarm limit setting. | No | Yes |
| BIS L Too High | Medium | BIS L > high alarm limit setting. | No | Yes |
| BIS L Too Low | Medium | BIS L < low alarm limit setting. | No | Yes |
| BIS R Too High | Medium | BIS R > high alarm limit setting. | No | Yes |
| BIS R Too Low | Medium | BIS R < low alarm limit setting. | No | Yes |

## D.1.4 $CO_2$ Physiological Alarm List

| Message | Alarm Priority | Cause | Disable when Alarm is off | Disabled in Standby mode |
|---|---|---|---|---|
| $EtCO_2$ Too High | Medium | $EtCO_2$ > high alarm limit setting. | No | Yes |
| $EtCO_2$ Too Low | Medium | $EtCO_2$ < low alarm limit setting. | No | Yes |
| $FiCO_2$ Too High | Medium | $FiCO_2$ > high alarm limit setting. | No | Yes |
| Apnea $CO_2$ | High | No breath is detected and Apnea time ≥ Apnea alarm time. | No | Yes |

| | |
|---|---|
| Tlow | Adu: 5.0 s<br>Ped: 2.7s<br>Inf: 2.0s |

### F.5.10 Manual

| PARAMETER | FACTORY DEFAULT |
|---|---|
| Alarms | On |
| Bypass | Off |
| Monitor | Off |
| $CO_2$ Alarms | On |

### F.5.11 Standby

| OBJECT | PARAMETER | FACTORY DEFAULT |
|---|---|---|
| Standby Dialog | Restore default settings | Off |

## F.6 Ventilation Parameter Relationships

| VENTILATION MODE | PARAMETER | PARAMETER RELATIONSHIP EQUATION(S) |
|---|---|---|
| VCV | Rate | $Rate \le 300 \times \frac{I:E}{1+I:E}$<br>$Rate \le 150 \times \frac{1}{1+I:E}$<br>2 ≤ Rate ≤ 100 |
| | Vt | $Vt \le 1833 \times \frac{60 \times \left(\frac{I:E}{1+I:E}\right) * (1-TP)}{Rate}$<br>$Vt \ge 10 \times \frac{60 \times \left(\frac{I:E}{1+I:E}\right)(1-TP)}{Rate}$<br>10 ≤ Vt ≤ 1500 |
| | Plimit | Plimit ≥ PEEP+5<br>10≤ Plimit ≤ 100 |
| SIMV-VC | Rate | $Rate \le \frac{60}{Tinsp+0.4}$<br>2 ≤ Rate ≤ 100 |
| | Vt | $10 \times Tinsp(1-TP) \le Vt \le 1833 \times Tinsp(1-TP)$<br>10 ≤ Vt ≤ 1500 |

| | | |
|---|---|---|
| | ΔPsupp (in VCV or PCV-VG mode) | ΔPsupp ≤ Plimit-PEEP<br>3 ≤ ΔPsupp ≤ 60 |
| | Plimit | Plimit ≥ PEEP+5<br>Plimit ≥ ΔPsupp+PEEP<br>10 ≤ Plimit ≤ 100 |
| PCV | Rate | $Rate \le 300 \times \frac{I:E}{1+I:E}$<br>$Rate \le 150 \times \frac{1}{1+I:E}$<br>2 ≤ Rate ≤ 100 |
| | Pinsp | Pinsp ≥ PEEP+5<br>5 ≤ Pinsp ≤ 80 |
| SIMV-PC | Rate | $Rate \le \frac{60}{Tinsp + 0.4}$<br>2 ≤ Rate ≤ 100 |
| | ΔPsupp | 3 ≤ ΔPsupp ≤ 60 |
| | Pinsp | Pinsp ≥ PEEP+5<br>5 ≤ Pinsp ≤ 80 |
| SIMV-VG | Rate | $Rate \le \frac{60}{Tinsp + 0.4}$<br>2 ≤ Rate ≤ 100 |
| | ΔPsupp (in VCV or PCV-VG mode) | ΔPsupp ≤ Plimit-PEEP<br>3 ≤ ΔPsupp ≤ 60 |
| | Plimit | Plimit ≥ PEEP+5<br>Plimit ≥ ΔPsupp+PEEP<br>10 ≤ Plimit ≤ 100 |
| CPAP/PS | Min Rate | $0.2 <= \frac{60}{MinRate} \times \frac{\text{Apnea I : E}}{1 + \text{Apnea I : E}} <= \frac{60}{\text{Min Rate}} - 0.5$ |
| | Apnea I:E | $\frac{60}{MinRate} \times \frac{\text{Apnea I : E}}{1 + \text{Apnea I : E}} <= 10$ |
| | Apnea Ti | $\frac{60}{MinRate} - Apnea\ Ti \ge 0.5$ |
| PCV-VG | Rate | $Rate \le 300 \times \frac{I:E}{1+I:E}$<br>$Rate \le 150 \times \frac{1}{1+I:E}$<br>2 ≤ Rate ≤ 100 |
| | Plimit | Plimit≥PEEP+5<br>10≤Plimit≤100 |
| APRV | Phigh | Phigh ≥ Plow + 3 $cmH_2O$ |
| | Plow | |

# V60 Anesthetic Vaporizer

# Operator’s Manual

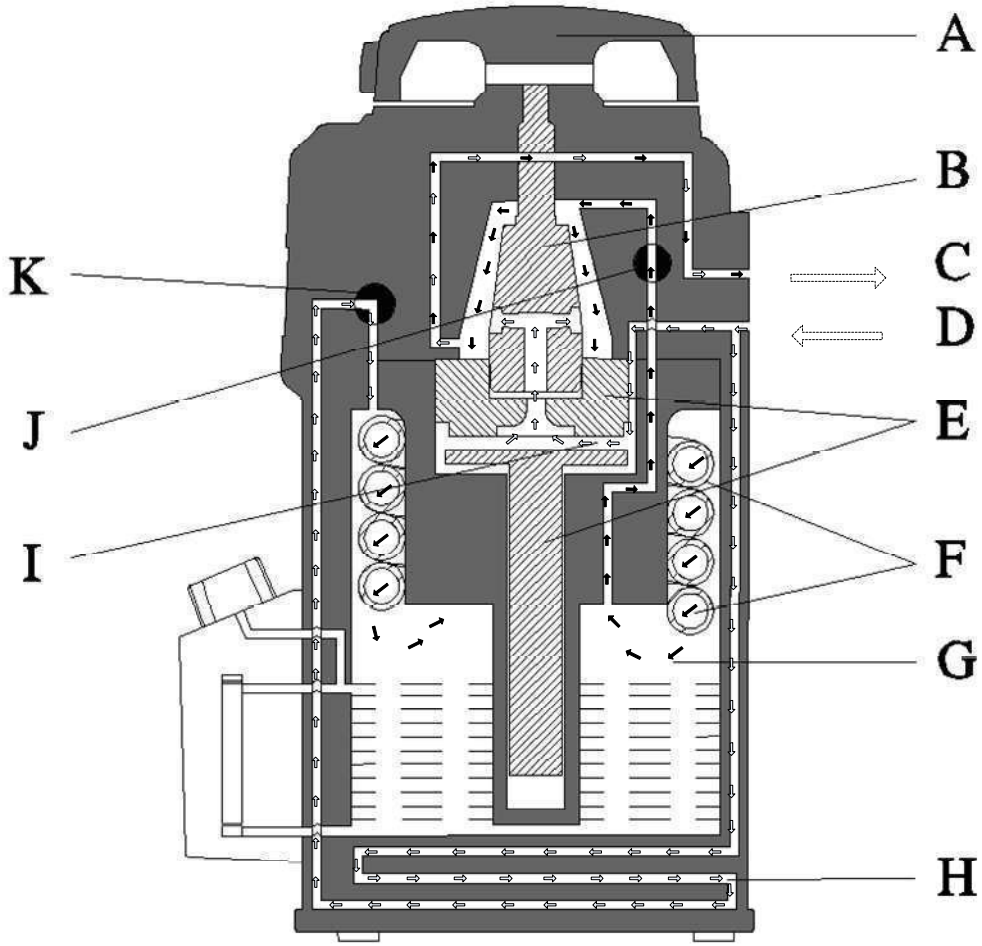
For this Operator's Manual, the issue date is September, 2016.

# 11 Theory of Operation

## 11.1 Operating Principle

The following image illustrates the operating principle of the vaporizer.

Control dial position above 0--Vaporizer switched on:




Fresh gas

Fresh gas mixed with anesthetic gas

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

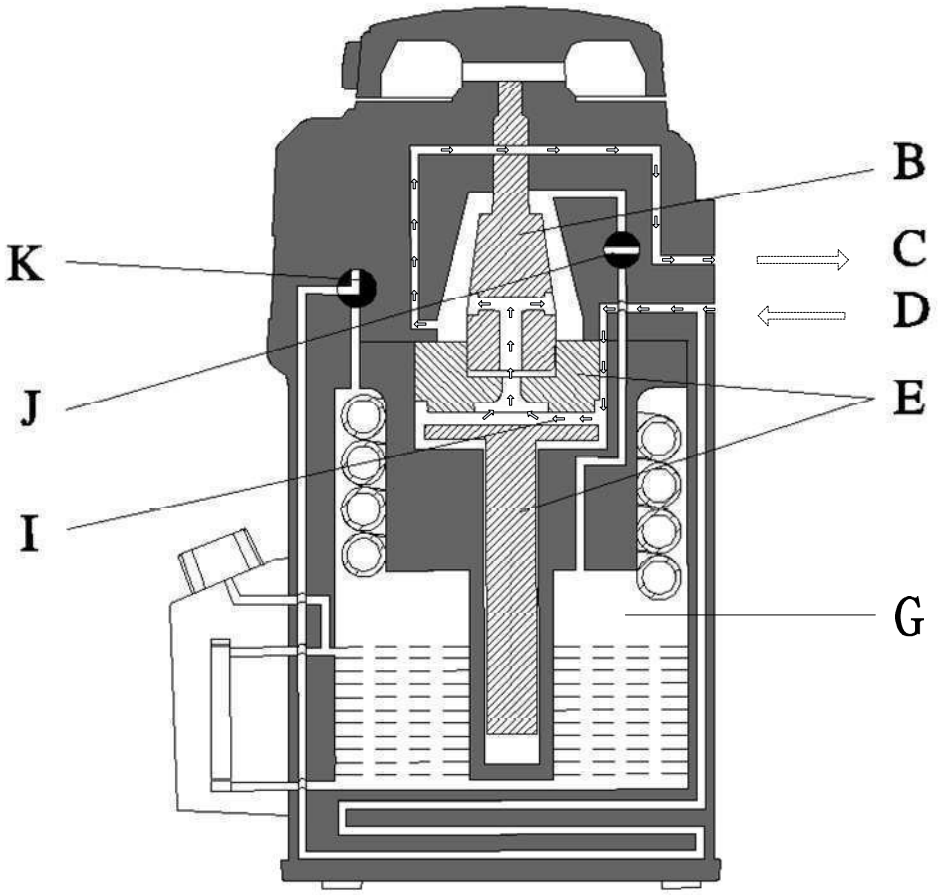
Fresh gas enters by the inlet D. Some of the fresh gas is routed through the vaporizing chamber G, and charged with anesthetic agent in soaked wick F. The rest of the fresh gas is routed past the airway I and through the temperature compensator E.

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

The output concentration control of anesthetic agent vapor is important.

1. The concentration is influenced by the temperature compensator E, which makes use of the thermal expansion characteristics of different materials to expand or contract, based on heating or cooling, the airway I. This process compensates for the influence of temperature on the satuation 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.

mindray

healthcare within reach

# Anesthesia accessory

CATALOGUE 2022.06

www.mindray.com

P/N:ENG-Anesthesia accessory catalogue-210210X64P-20220606



mindray

healthcare within reach

## 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.

# *CONTENTS*

## 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 |

## 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 |
|  | 040-001837-00 | Silicon face mask, reusable, size #2 | All |
|  | 040-001841-00 | Silicon face mask, reusable, size #3 | All |

| 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 |

## 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:**<br>- Adult circuit with Y-piece, 1.5 m, diameter 22mm, 22F, 1pcs<br>- Elbow connector with Luer lock port, 1pcs<br>- Straight connector, 22M-22M, 1pcs<br>- Bacteria filter, 1pcs<br>- Extension tube, 0.5 m, 22F, 1pcs<br>- Latex-free breathing bag, 3L, 1pcs | All |
|  | 040-001878-00 | **Disposable breathing circuit package, Child, Including:**<br>- Child circuit with Y-piece, 1.5m, diameter 15 mm, 22F, 1pcs<br>- Elbow connector with Luer lock port, 1pcs<br>- Straight connector, 22M-22M, 1pcsz<br>- Bacteria filter, 1pcs<br>- Extension tube, 0.5m, diameter 15 mm, 22F, 1pcs<br>- Latex-free breathing bag, 1L, 1pcs | All |
|  | 040-001831-00 | Bacteria Filter, disposable, 1 pcs<br>Bacterial removal: >99.9995%<br>Viral removal: >99.995%<br>Pressure Drop: <0.15kPa @ 30 L/min<br>Dead space: 25.5 ml<br>Connectors: 22F/15M-22M/15F | All |

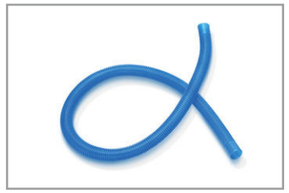
| Part No. | Description | Apply to |
|---|---|---|
| 115-030717-00 | **Disposable breathing circuit accessory kit with mask, Adult, including:**<br>- 040-001876-00 Disposable breathing circuit package, Adult (circuit with Y-piece 1.5m, Extension tube 0.5m, Elbow connector, Straight connector, Bacteria filter, Breathing bag 3L), 1 pcs<br>- 040-001822-00 Aircushion mask, disposable, size #5, 1 pcs | All |
| 115-030718-00 | **Disposable breathing circuit accessory kit with mask, Child, including:**<br>- 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<br>- 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:**<br>- Breathing tube, 1.8m, 1 pcs<br>- Connector, 22/15M, 1 pcs<br>- Latex-free breathing bag, 2L, 1 pcs<br>- APL valve, 1 pcs | All |
|  | 040-001703-00 | **T-piece system circuit, Child open circuit, including:**<br>- Breathing tube, 1.8m, 1 pcs<br>- Connector, 22/15M, 1 pcs<br>- Latex-free breathing bag, 0.5L, 1 pcs<br>- 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<br>040-002377-00<br>040-002378-00 | Nasal cannula for HFNC (OPT842-small size)<br>Nasal cannula for HFNC (OPT844-medium size)<br>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:**<br>- 040-001850-00 Breathing tube, silicon, adult, 1.5m, 2 pcs<br>- 040-001859-00 Silicon breathing bag, 3L, 1 pcs<br>- 040-001843-00 Silicon face mask, size #5, adult large, 1 pcs<br>- 040-001866-00 connector, Y-piece, with sample port, 1pcs<br>- 040-001868-00 connector, L type (Elbow), 22M/15F, 22F, 1pcs | All |
|  | 115-031781-00 | **Reusable breathing circuit accessory kit, Child, including:**<br>- 040-001851-00 Breathing tube, silicon, child/infant, 1.5m, 2 pcs<br>- 040-001857-00 Silicon breathing bag, reusable, 1L, 1 pcs<br>- 040-001837-00 Silicon face mask, size #2, child, 1 pcs<br>- 040-001866-00 connector, Y-piece, with sample port, 1pcs<br>- 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 |

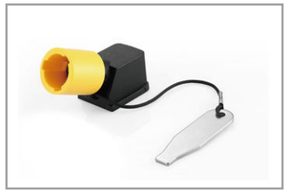
| Picture | Part No. | Description | Apply to |
|---|---|---|---|
|  | 115-005350-00 | Mindray V60 vaporizer, Sevoflurane, Quik-Fil | All except A9 |
|  | 115-014139-00 | Mindray V60 vaporizer, Halothane, Pour fill | All except A9 |
|  | 115-014138-00 | Mindray V60 vaporizer, Halothane, Key filler, with 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<br>0601-30-78894<br>115-001366-00 | Inspiration flow sensor, 1 pcs<br>Expiration flow sensor, 1 pcs<br>**Flow sensor kit, including:**<br>- Inspiration flow sensor, 1 pcs 0601-30-69700<br>- Expiration flow sensor, 1 pcs 0601-30-78894 | WATO<br>EX-65 Pro/<br>EX-55 Pro/<br>EX-65/EX-55/<br>EX-35/EX-30/<br>EX-20 |
|  | 115-008262-00<br>115-008263-00<br>115-008264-00 | Inspiration Flow sensor, 1 pcs<br>Expiration Flow sensor, 1 pcs<br>**Flow sensor kit, including:**<br>- Inspiration Flow sensor, 1 pcs 115-008262-00<br>- Expiration Flow sensor, 1 pcs 115-008263-00 | A7/A5 |
|  | 115-041519-00 | **Flow sensor kit, autoclavable, including:**<br>- Inspiration flow sensor, 1 pcs 115-041507-00<br>- Expiration flow sensor, 1 pcs 115-041508-00 | All |

## $O_2$ monitoring accessory

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

## $O_2$ monitoring accessory

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

## $CO_2$ module and accessory

### Sidestream $CO_2$ 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<br>EX-65 Pro/<br>EX-55 Pro/<br>EX-65/ EX-55/<br>EX-35 |
|  | 115-024752-00 | **Sidestream $CO_2$ accessory kit, Adult/Pediatric, including:**<br>- Dryline airway adapter, straight, Adu/Ped, 2 pcs<br>- DRYLINE II Water Trap, Adu/Ped, 2 pcs<br>- Sampling line, Adu/Ped, 2.5 m, 2pcs<br>- Quick connector for gas return, 1 pcs | A7/A5/<br>WATO<br>EX-65 Pro/<br>EX-55 Pro/<br>EX-65/ EX-55/<br>EX-35 |

| Picture | Part No. | Description | Apply to |
|---|---|---|---|
|  | 115-024753-00 | **Sidestream $CO_2$ accessory kit, Neonate,including:**<br>- Airway adapter, Neonate, 2 pcs<br>- DRYLINE II Water Trap, Neonate, 2 pcs<br>- Sampling Line, Neonate, 2.5 m, 2 pcs<br>- Quick connector for gas return, 1 pcs | A7/A5/<br>WATO<br>EX-65 Pro/<br>EX-55 Pro/<br>EX-65/ EX-55/<br>EX-35 |
| | 115-024797-00 | **Sidestream $CO_2$ module kit, with accessory, Adult/Ped, including:**<br>- $CO_2$ module, 1-slot, 1 pcs<br>- $CO_2$ accessory kit, Adult/Pediatric | A7/A5 |
| | 115-024798-00 | **Sidestream $CO_2$ module kit, with accessory, Neonate, including:**<br>- $CO_2$ module, 1-slot, 1 pcs<br>- $CO_2$ accessory kit, Neonate | A7/A5 |
| | 120-015033-00 | **Sidestream $CO_2$ module kit, with accessory, Adult/pediatric, including:**<br>- Sidestream $CO_2$ module<br>- Sidestream $CO_2$ accessory kit, Adult/Pediatric | WATO<br>EX-65 Pro/<br>EX-55 Pro/<br>EX-65/ EX-55/<br>EX-35 |
| | 120-015034-00 | **Sidestream $CO_2$ module kit, with accessory, Neonate, including:**<br>- Sidestream $CO_2$ module<br>- Sidestream $CO_2$ accessory kit, Neonate | WATO<br>EX-65 Pro/<br>EX-55 Pro/<br>EX-65/ EX-55/<br>EX-35 |



| Picture | Part No. | Description | Apply to |
|---|---|---|---|
|  | 115-030421-00 | **External sidestream $CO_2$ module, with accessory, Adult/pediatric, including:**<br>- External sidestream $CO_2$ module<br>- External sidestream $CO_2$ accessory kit, Adult/Pediatric | WATO EX-30 |
| | 115-030422-00 | **External sidestream CO2 module, with accessory, Neonate, including:**<br>- External sidestream $CO_2$ module<br>- External sidestream $CO_2$ accessory kit, Neonate | WATO EX-30 |
|  | 115-002594-00 | **External sidestream $CO_2$ accessory kit, Adult/pediatric, including:**<br>- Dryline airway adapter, straight, Adu/Ped, 2 pcs<br>- Water trap, Adu/Ped, 2 pcs<br>- Sampling line, Adu/Ped, 2.5 m, 2pcs<br>- Quick connector for gas return, 1 pcs | WATO EX-30 |
|  | 115-002595-00 | **External sidestream $CO_2$ accessory kit, Neonate, including:**<br>- Airway adaptor, 2 pcs<br>- Water trap, neonate, 2 pcs<br>- Sampling Line, Neonate, 2.5 m, 2 pcs<br>- Quick connector for gas return, 1 pcs | WATO EX-30 |

## Mainstream $CO_2$ 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 $CO_2$ accessory kit, including:**<br>- Capnostat $CO_2$ sensor, with cable 2.4 m, 1 pcs<br>- Airway adapter, Adu/Ped, disposable, 1 pcs<br>- Airway adapter, Neonate, disposable, 1 pcs<br>- Cable Holding Clips, 5 pcs |
| | 115-030410-00 | **Mainstream $CO_2$ module kit, with accessory, including:**<br>- Mainstream $CO_2$ module, CAPNOSTAT<br>- Mainstream $CO_2$ 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:**<br>- Dryline airway adapter, straight, Adu/Ped, 2 pcs<br>- Airway adapter, Neonate, 2 pcs<br>- DRYLINE II Water Trap, Adu/Ped, 2 pcs<br>- Sampling line, Adu/Ped, 2.5 m, 2 pcs<br>- DRYLINE II Water Trap, Neonate, 2 pcs<br>- Sampling Line, Neonate, 2.5 m, 2 pcs<br>- Quick connector for gas return, 1 pcs |
| | 115-030379-00 | **AG+$O_2$ module kit, with accessory, including:**<br>- AG+$O_2$ module , 2-slot<br>- AG accessory kit |
| | 115-030380-00 | **AG module kit, with accessory, including:**<br>- AG module , 2-slot<br>- 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:**<br>- BIS Measuring Cable Assembly, 4.5 m, 1 pcs<br>- BIS Sensor Quatro 186-0106, Adu, disposable, 5 pcs |
|  | 6800-30-50144 | **BIS accessory kit, Pediatric, including:**<br>- BIS Measuring Cable Assembly, 4.5 m, 1 pcs<br>- BIS Sensor Quatro 186-0200, Pediatric, disposable, 5 pcs |
| | 6800-30-50880 | **BIS module kit, with accessory, Adult, including:**<br>- BIS module, 1-slot<br>- BIS accessory kit, Adult |
| | 6800-30-50427 | **BIS module kit, with accessory, Pediatric, including:**<br>- BIS module, 1-slot<br>- 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:**<br>- BISx4 Measuring Cable Assembly, 4.5 m, 1 pcs<br>- BISx4 Sensor Quatro 186-0212, Adult, disposable, 5 pcs |
| | 115-030406-00 | **BISx4 module kit, with accessory, Adult, including:**<br>- BIS module, 1-slot<br>- BISx4 accessory kit, Adult |



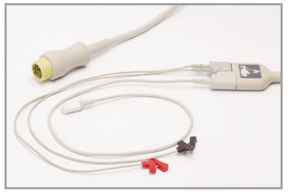
## AG+BIS module and accessory

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+$O_2$+BIS module kit, with AG accessory, without BIS accessory, including:**<br>- AG+$O_2$+BIS module , 2-slot<br>- AG accessory kit |
| | 115-030382-00 | **AG+BIS module kit, with AG accessory, without BIS accessory, including:**<br>- AG+BIS module , 2-slot<br>- AG accessory kit |
| | 115-030383-00 | **AG+$O_2$+BIS module kit, with AG accessory, with BIS accessory, including:**<br>- AG+$O_2$+BIS module , 2-slot<br>- AG accessory kit<br>- BIS accessory kit, Adult |
| | 115-030384-00 | **AG+BIS module kit, with AG accessory, with BIS accessory, including:**<br>- AG+BIS module , 2-slot<br>- AG accessory kit<br>- BIS accessory kit, Adult |

## NMT module and accessory

For A9, A8, A7, A5

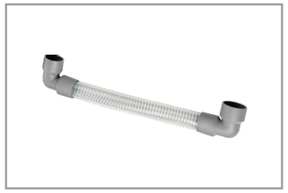
| Picture | Part No. | Description |
|---|---|---|
|  | 115-020916-00 | NMT module, without accessory |
|  | 115-018586-00 | **NMT accessory kit, including:**<br>- NMT main cable<br>- NMT transducer cable<br>- ECG electrode (3M, 2245), 50 pcs<br>- Bandage for NMT transducer, disposable, 20pcs |
| | 115-020917-00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



## Anesthetic gas scavenging system (AGSS)

## Active AGSS assembly and accessory

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

| 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/<br>WATO EX-65 Pro/<br>EX-55 Pro<br>EX-65/EX-55<br>EX-35/EX-30<br>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 vacum system | |

## Active AGSS kit

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

## Passive AGSS accessory

| Picture | Part No. | Description | Apply to |
|---|---|---|---|
|  | 115-002342-00 | **Passive AGSS accessory kit, including:**<br>- Tube, 32mm, 1 pcs<br>- 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:**<br>- Suction main unit, venturi<br>- Suction T connector, NIST<br>- Suction liquid collection bottle bracket kit | WATO EX-30/ EX-20 |
| 115-011380-00 | **Venturi suction kit, Air drive, DISS, including:**<br>- Suction main unit, venturi<br>- Suction T connector, DISS<br>- 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:**<br>- Suction main unit, venturi<br>- Suction T connector, NIST<br>- Suction liquid collection bottle bracket kit, for rail | WATO EX-35 |
| 115-041471-00 | **Venturi suction kit, Air drive, DISS, including:**<br>- Suction main unit, venturi<br>- Suction T connector, DISS<br>- Suction liquid collection bottle bracket kit, for rail | WATO EX-35 |
| 115-015266-00 | **Venturi suction kit, Air drive, NIST, including:**<br>- Suction main unit, venturi<br>- Suction T connector, NIST<br>- Suction liquid collection bottle bracket kit, long, for rail | A5 |
| 115-015267-00 | **Venturi suction kit, Air drive, DISS, including:**<br>- Suction main unit, venturi<br>- Suction T connector, DISS<br>- 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

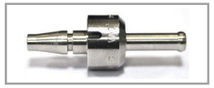
| Part No. | Description | Apply to |
|---|---|---|
| 115-020734-00 | Pipeline continuous vacuum suction kit, US, US/DISS | WATO EX-30/ EX-20 |
| 115-020735-00 | Pipeline continuous vacuum suction kit, US, DISS/PB | WATO EX-30/ EX-20 |
| 115-020736-00 | Pipeline continuous vacuum suction kit, US, DISS/Ohmeda | 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 |

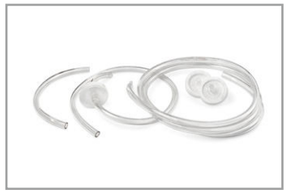


| Part No. | Description | Apply to |
|---|---|---|
| 115-041474-00 | Pipeline continuous vacuum suction kit, US, US/DISS | WATO EX-35 |
| 115-041475-00 | Pipeline continuous vacuum suction kit, US, DISS/PB | WATO EX-35 |
| 115-041476-00 | Pipeline continuous vacuum suction kit, US, DISS/Ohmeda | WATO 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

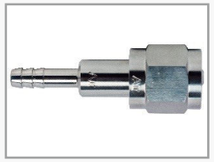
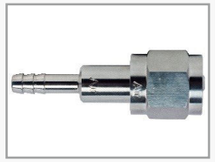
| Part No. | Specification | Standard | Hose color | Gas outlet (machine) | Gas inlet (wall) |
|---|---|---|---|---|---|
| 082-001333-00 | 35U-VAC-DS/DS-5 | USA | White | DISS  | DISS  |
| 082-001334-00 | 35U-VAC-PB/DS-5 | | | DISS  | Puritan-Bennett  |
| 082-001335-00 | 35U-VAC-OH/DS-5 | | | DISS  | 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 |

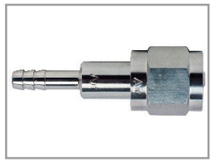
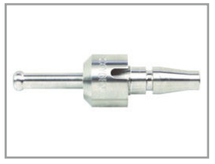
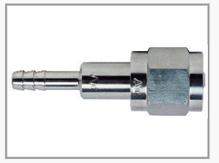
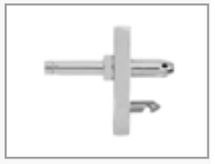
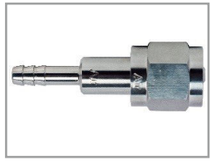
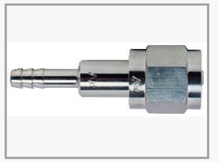
## Central gas supply hose

- Hose length 5 m
- Apply to all models

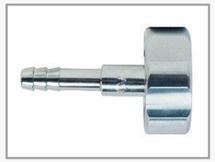
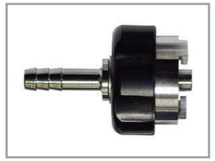
Standard: ISO

| 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 | $N_2O$ | 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 | $N_2O$ | 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 | $N_2O$ | 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 | $N_2O$ | 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 | $N_2O$ | 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 | $N_2O$ | 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 | $N_2O$ | 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 | $N_2O$ | 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 | $N_2O$ | Blue | | |

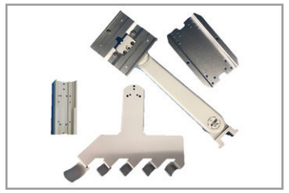
## Mounting solution

## Mounting solution for patient monitor N19/N22

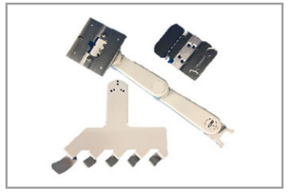
| Picture | Part No. | Description | Apply to |
|---|---|---|---|
|  | 115-066025-00 | GCX Bracket kit for N19/N22,fixed height | A7/A5 |
|  | 115-066027-00 | GCX Bracket kit for N19/N22,variable height | A7/A5 |
|  | 115-069443-00 | GCX bracket kit for N19/N22, fixed height | A9/A8 |



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

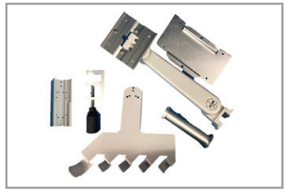
| Picture | Part No. | Description | Apply to |
|---|---|---|---|
|  | 115-066028-00 | GCX Bracket for N17/N15/N12/ePM15, fixed height | A7/A5<br>WATO<br>EX-65 Pro/<br>EX-55 Pro/<br>EX-65/ EX-55/<br>EX-35/EX-30/EX-20 |
|  | 115-066074-00 | GCX bracket kit for N17/N15/N12/ePM15, fixed height, M series,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

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

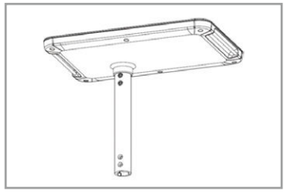
| Picture | Part No. | Description | Apply to |
|---|---|---|---|
|  | 115-070011-00 | GCX Bracket for ePM10/12, uMEC10/12/15, iPM, iMEC, fixed height | A7/A5<br>WATO<br>EX-65 Pro/<br>EX-55 Pro/<br>EX-65/ EX-55/<br>EX-35/EX-30/EX-20 |
|  | 115-070767-00 | GCX bracket kit for ePM10/ePM12/uMEC, fixed height, 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<br>WATO<br>EX-65 Pro/<br>EX-55 Pro/<br>EX-65/ EX-55/<br>EX-35 |



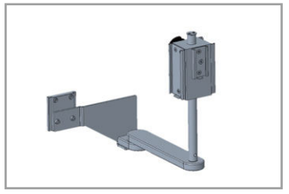
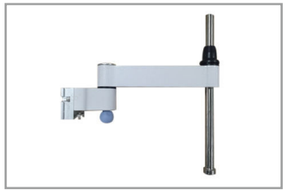
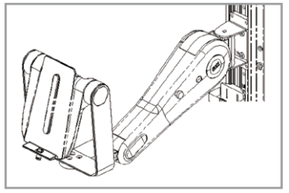
## Mounting solution for patient monitor T5/T8

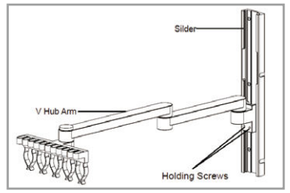
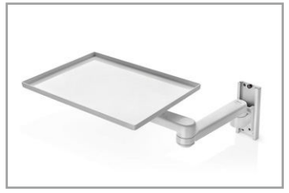
| Picture | Part No. | Description | Apply to |
|---|---|---|---|
|  | 115-015770-00<br><br>115-015783-00 | GCX bracket kit for Beneview T5, PM 9000, fixed height<br><br>GCX bracket kit for Beneview T8, fixed height | A7/A5<br>WATO<br>EX-65 Pro/<br>EX-55 Pro/<br>EX-65/ EX-55/<br>EX-35/EX-30/EX-20 |
|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

## Top shelf mounting kit

| Picture | Part No. | Description | Apply to |
|---|---|---|---|
|  | 115-004003-00<br>115-004004-00 | Top shelf mounting kit for Beneview T8, not support SMR<br>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<br>WATO<br>EX-65 Pro/<br>EX-55 Pro/<br>EX-65/ EX-55/<br>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<br>WATO<br>EX-65 Pro/<br>EX-55 Pro/<br>EX-65/ EX-55/<br>EX-35 |

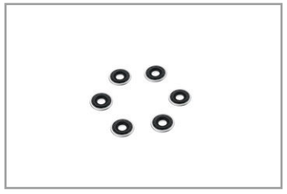
# Breathing system

| 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 |


mindray
mindray
mindray
mindray
00:05:00
00:05:00
72
99
120/80
120/80
30
1.4
1.7
50
10
120/80
37.2
37.4
60
VCV